DRAFT REPORT

Himachal Pradesh

February, 2020

Project Contributors:
GICIA India Pvt Ltd, NOIDA
Network for Certification and Conservation of Forest
ICIMOD, Nepal

Contents

1. Introduction

With its wide distribution, precarious conservation status, and immense aesthetic appeal, the snow leopard is considered the flagship species of the high altitudes and an indicator species for Asia's high mountain ecosystems. Snow leopard habitat is spread through the northern Himalayan mountains of Jammu and Kashmir, Himachal Pradesh, Uttarakhand and in western Himalayan region of Sikkim and Arunachal Pradesh in India (India NSLEP). In spite of all the ecological, social and cultural richness, Himalayas have not received the required attention to conserve and maintain its environment. The reasons may be lack of knowledge about the region and remoteness. Now, it's imperative that conservation measures should be in place to protect the ecological treasure and indigenous tribal communities. One such step taken by the Government to conserve and manage the high-altitudes is the Project Snow Leopard (PSL), developed specifically to strengthen conservation in these areas.

The Project Snow Leopard is an Indian initiative for strengthening wildlife conservation in the Himalayan high altitudes. It aims to promote a knowledge-based and adaptive conservation framework that fully involves the local communities, who share the snow leopard's range, in conservation efforts. (Project Snow Leopard)

The goal of Project Snow Leopard is *to safeguard and conserve India's unique natural heritage of high-altitude wildlife populations and their habitats by promoting conservation through participatory policies and actions.* (Project Snow Leopard)

Given that this high-altitude landscape is unique as the wildlife populations, though threatened, occur across the landscape and are not restricted to protected areas, an alternative, landscape-level conservation approach is needed. At the same time, this landscape continues to undergo traditional resource use in the form of livestock grazing and associated activities, and a participatory approach to conservation, that fully involves local communities, is urgently required.

SECURE Himalaya is the next step towards the conservation and management of the landscape. The project will be implemented integrating all relevant sectors that link different land uses with livelihood development sectors to ensure sustainable development of natural resources and the local communities. The project is intended to build on the existing socio-economic and natural resources developmental initiatives currently underway in the region and would aim for evolving innovative and participatory models for sustainable use of natural resources. It aims to achieve the objective of conservation by engaging local communities and collaborating with government and non-government agencies for conservation and promotion of sustainable resource use for improved livelihoods.
Furthermore, GIPL-UNDP Project aims at the development of an integrated strategy for conservation of snow leopard, other endangered species along with other biodiversity while

focusing on the improvement of socio-economic aspects of the areas through a landscape level participatory integrated approach in the ***Lahaul- Pangi Landscape and Kinnaur Landscape, Himachal Pradesh.***

Many important endemic floral and faunal species are found naturally occurring in this region, which besides supporting the livelihoods of the local communities, also have national and global demands in legal and illegal commerce.

In many high altitudinal areas, the threat to snow leopards, wild prey and their ecosystems face a variety of direct and indirect threats that vary in intensity and prominence. Habitat degradation and fragmentation is increasing due to unsustainable livestock grazing, high dependence of local communities on natural resources, pressures from economic and infrastructure development (unplanned development), selective removal of medicinal and aromatic plants, emerging threat of illegal wildlife trade and wildlife crime and climate change (Ning et al. 2013; Mishra et al. 2010). All these challenges demand evolution of a strategy that integrates actions of different sectors and stakeholders to converge the interventions that promote sustainable use, and conservation and improvement of the natural ecosystems, enhance the livelihood options available to the local communities, improve their health, education and skills, create renewable energy sources at local level, increase their stakeholder ship in local biodiversity, e.g., through active involvement in ecotourism activities, value addition and marketing of NWFP and medicinal herbs, etc.

The project will be implemented integrating all relevant sectors that link different land uses with livelihood development sectors to ensure sustainable development of natural resources and the local communities. The project is intended to build on the existing socio-economic and natural resources developmental initiatives currently underway in the region and would aim for evolving innovative and participatory models for sustainable use of natural resources. It aims to achieve the objective of conservation by engaging local communities and collaborating with government and non-government agencies for conservation and promotion of sustainable resource use for improved livelihoods.
The present management document is an effort to apply the principles of Project Snow Leopard and SECURE Himalaya. This management plan has been developed to conserve the Lahaul-Pangi landscape with the rich ecological, cultural and social diversity.

2. Methodology and analysis

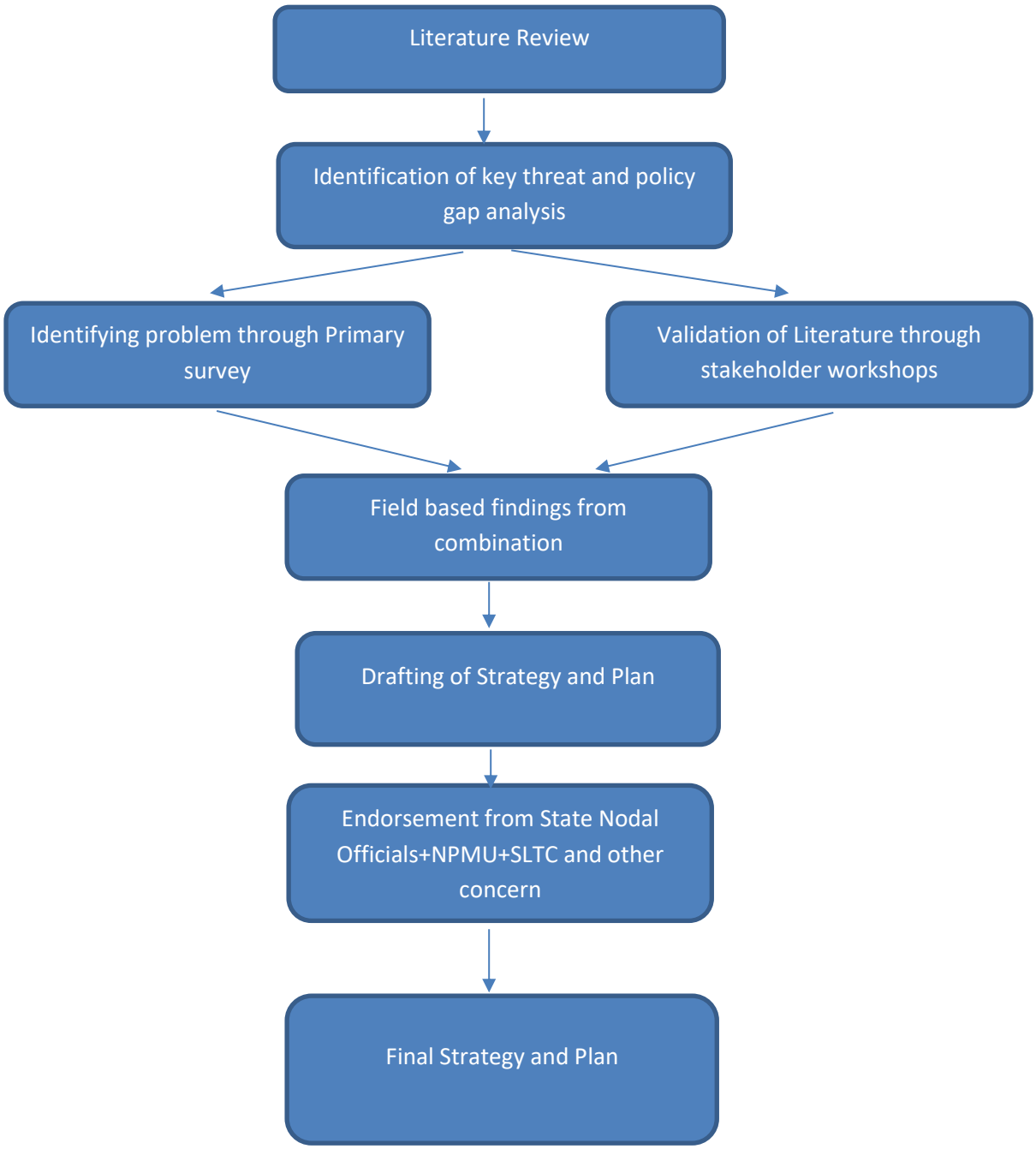
a. Broad Methodology

The methodology adopted undertaking the relevant objective in the assignment broadly involved following steps:

- Desktop Research and Literature review
- Stakeholder Engagement and Focus Group Discussion and Consultations and landscape level workshops
- Site Selection, Field visits and Data Collection
- Data Analysis
- Report Development and Final Report Submission

The methodology and approach encompass a combination of above activities that would comprise desk study, collections of existing information from relevant and related line departments, identifying visit sites and prioritizing stakeholders, especially women from local communities, conducting small and focus discussion through “culturally appropriate” mechanisms, local and state level workshops, selected need-based informed interviews and surveys. Innovative tools developed by ICIMOD for the purpose e.g. selected shorter landscape journeys with selected stakeholders were also used to enhance the quality and coverage of the interaction.

Strategy was to involve the government departments, NGOs, industries, Universities, Research Organization, experts and every other stakeholder related to the SECURE Himalaya to bring at a common ground and then create a platform for convergence. The Stakeholders list have been attached in the Annexure-3



The deliverables were divided in the form of Work Packages for better tracking of the progress of the project:

Component	Approach and Methodology	Work Done
WP-1 Assessment of Historic Trends, strengths and weaknesses and community perception	• Primary data collection Questionnaire based survey (Annexure-1) and focused group discussion (Annexure-5 and 6) • Secondary data collection Desk research (census, gazetteers, Government documents, annual reports, etc.)	400 no. of questionnaires were collected from 9 villages in Lahaul-Pangi Review of Research Papers have been shared in the Annexure-2
WP-2 Gap analysis of current management plans, schemes and strategies of landscape, its shortcomings and level of integration between all	• Desk Research • Tool: SWOT Analysis • Inputs from various core experts- Dr. Ruchi Badola (local communities, livelihoods, gender), Dr. Abhimanyu Mann (wildlife crime, involvement of LCs) and Dr. S K Dhyani (agroforestry, sustainable land use, livelihoods)	Policy Gap analysis sheet have been attached in the Annexure-4
A. Primary Information Collection B. Two Stakeholder Workshop Reports along with vision and objectives of Landscapes	A. Questionnaire based field survey B. Stakeholder mapping Tools: Power-Interest Matrix	The Proceedings of the Workshops have been attached as Annexure-5 and 6

Baseline Data and Monitoring Indicators	This was done by defining baseline, midterm and end term targets keeping in mind the timeline of SECURE	
Final Report	Based on all the inputs received from the above	

Primary Data Collection

Methodology:

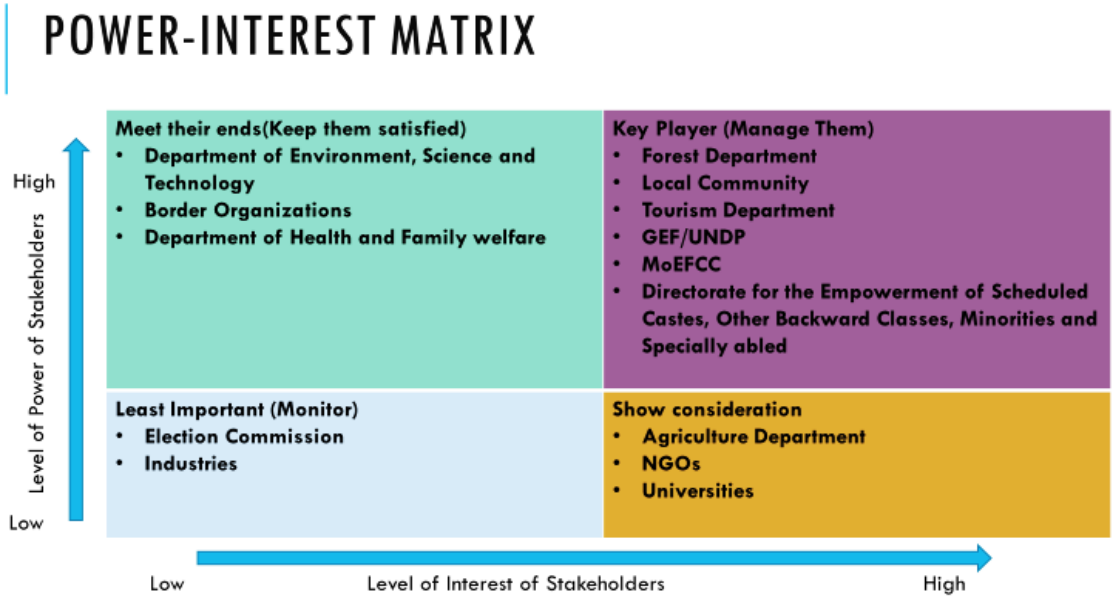
1. **Villages-** Villages list approved by the State Level Technical Committee, the list foe which was shared by UNDP. There were 35 villages from Lahaul-Pangi
2. **Households-** Household data collected from Census 2011 and respective GPUs.
3. **Sampling-** Stratified random sampling for households (maximum 30% of the total households)

Note: Random sampling has been adopted in order to cover all social strata of particular village

4. **Focused Group Discussion-** Adequate representation from all social classes and gender ensured. There is agenda of the FGD where discussion takes place according to details of the agenda. The pointers of the FGDs are discussed thoroughly with one person duly noting the minutes.

5. **Small meetings-** With various stakeholders. There is no agenda, only open-ended discussion takes place. Personal interviews were conducted through paper and pencil interview type (PAPI), Face to face interview (CAPI) or telephonic interview (as required) with government officials, domain experts, local leaders, etc. The various categories of stakeholder included Government departments, Institutions, Non-Government Organizations (NGOs), Agencies, Individual experts. Identification of key stakeholder was

done through Power Interest Matrix.



Stakeholders with high power but low interest shall be kept satisfied, while those with low interest and low power can be just monitored for their activities. Stakeholders with high interest in project and high power shall be closely managed and involved to the best possible extent. Lastly, stakeholder with low power and high interest in project will be regularly engaged, informed and appropriate action initiated to empower them. Some of the methods that will be used to consult stakeholders after prioritization include:

- Information Centre and Information Boards
- Communication by phone, email, text and instant messaging
- Distribution of pamphlets and response to questionnaire (Format of Questionnaires appended as Annexure-1
- One-on-one interviews
- Formal meetings
- Public meetings
- Workshops
- Focus group meetings
- Surveys

For deciding the frequency and the appropriate engagement technique to consult a stakeholder group, we will consider three criteria as listed below:

- The extent of impact of the project on the stakeholder group.
- The extent of influence of the stakeholder group on the project design/focus.
- The culturally acceptable engagement and information dissemination methods.

Stakeholder Consultation Workshops

Two stakeholder workshops were organized in the landscape. First workshop was conducted in Shimla to ensure the participation of every State Line Department. The second workshop was conducted in the landscape village, Killar, Pangi. The Mandate of the workshops were to evaluate the Draft Management Strategy prepared after the primary data collection and secondary Data review. It was kept in mind to keep the adequate gender representation at each with presence of all key stakeholders. The Proceedings of these workshops have been attached in the Annexure- 5 and 6.

3. Extent of landscape

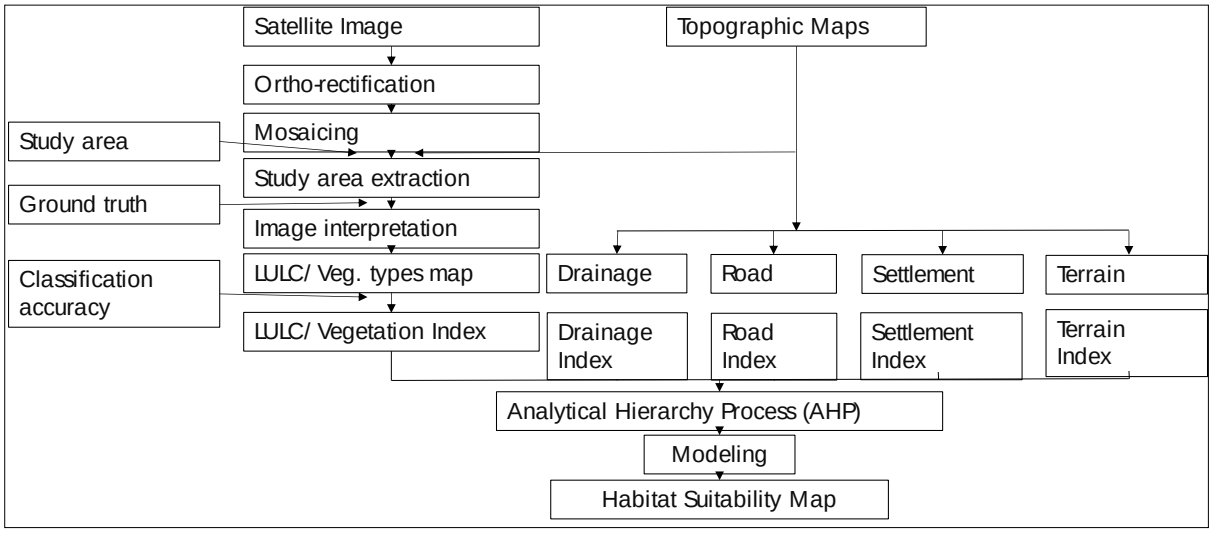
Habitat suitability modelling for Snow leopard in Himachal Pradesh

Methods

In this study we used combination of GIS and multi-criteria decision making (MCDM) model was used to obtain the habitat suitability of snow leopard. The methodology flowchart is shown in Figure 1.

Model variables

We selected the predictor variables considering their applicability to the scale of our study area, relevant predictive capacity, and their association with the ecological requirements of the selected species. We classified the selected variables into following four thematic classes viz., a) habitat composition, b) anthropogenic disturbance, c) topography and d) distance to water courses. We used vegetation and land use map prepared by the Biodiversity characterization project for Sikkim state using IRS satellite data of year 2013-14. We calculated Euclidian distance for proximity to settlements and roads/ trails, which represents the impact of anthropogenic drivers. Additionally, under topography we selected altitude, slope, and aspect that can potentially affect the movement of the species**.**



Habitat Quality Rating

Digital database of vegetation type/ land use, drainage network, settlement, road network, elevation, slope and aspect was prepared in GIS environment. Four categories of each thematic layers i.e. vegetation types/land uses, terrain complexity (elevation, slope and aspect), drainage, road network and settlements were rated into habitat values by assigning habitat quality rating (HQR) based on their suitability on a scale of 1–4 in descending order of suitability (for instance value 1 was assigned to highly suitable habitat while 4 to unsuitable

habitat). We created buffer maps using Euclidean Distance tool in ArcMAP for drainage, roads/ trails and settlements. Once all thematic layers were classified into four suitability classes, a linear additive model was run to model habitat suitability of Snow Leopard, in Sikkim state. Weights assigned to different layers were derived using Analytical Hierarchy Process (AHP). AHP is a pair-wise comparison procedure of the criteria that is based on a square matrix in which the number of rows and columns is defined by the number of criteria to weigh. In this study, the criteria weights were obtained using the AHP and employed in the GIS based MCDM model.

Linear additive model: $0.491 \times VTI_{sl} + 0.287 \times TI_{sl} + 0.128 \times DI_{sl} + 0.062 \times RI_{sl} + 0.033 \times SI_{sl}$ (CR: 0.081)

where,

HSI = Habitat Suitability Index,

VTI = Vegetation Type Index,

TI = Terrain Index

DI = Drainage Index,

RI = Road Index,

SI = Settlement Index

CR = Consistency Ratio

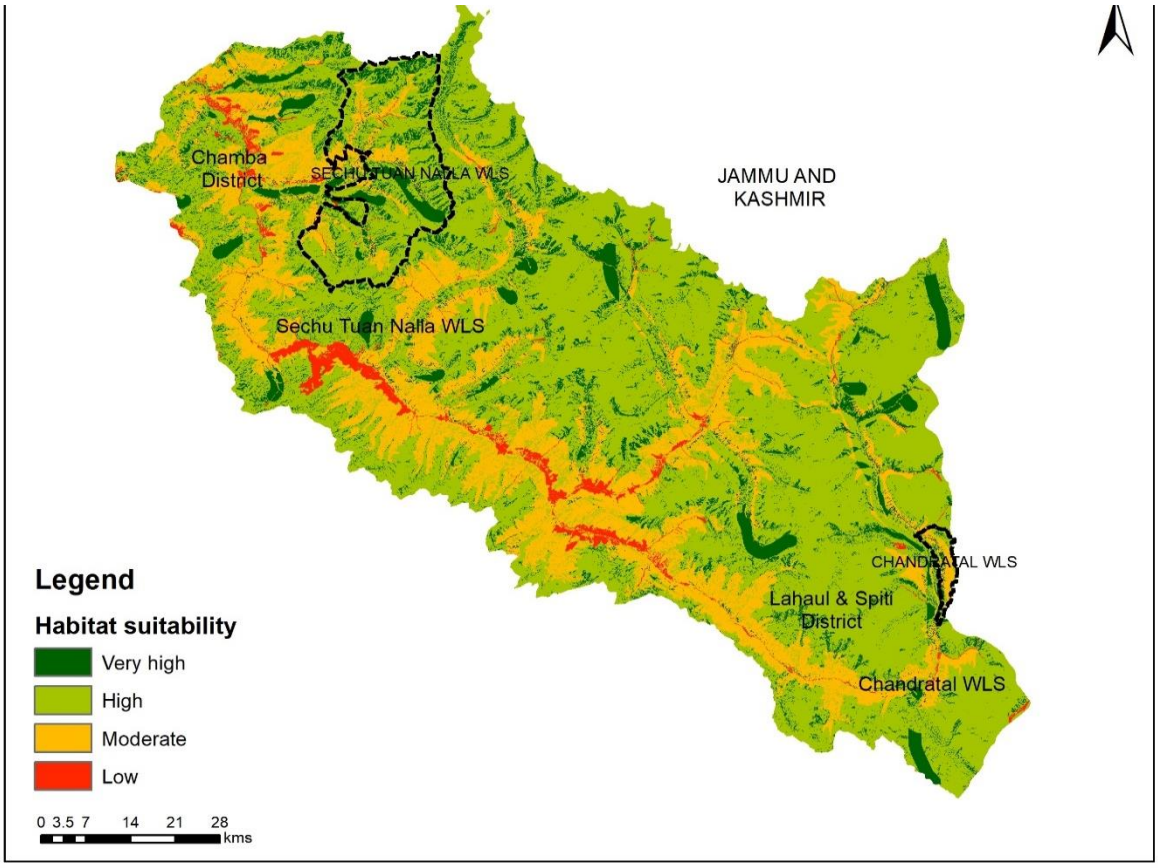
Accuracy of linear additive models for habitat suitability index of each species were evaluated by observing consistency ration (CR) value following Saaty's principle, where CR ratings lesser than 0.10 could be further used in the study, while ratings >0.10 should be re-evaluated. In this study, the consistency ratio was 0.081, which means the results were acceptable.

Table 1: Suitability class and Habitat Quality Rating (HQR)

Suitability Class	HQR
Highly suitable	1
Suitable	2
Moderately suitable	3
Least suitable	4

Table 2: Vegetation Type/Land Use type wise Habitat Quality Rating (HQR)

Sr. No.	Class	HQR
1	Alpine Moist Meadows	1
2	Alpine Dry Scrub	2
3	Alpine Moist Scrub	2
4	Montane Broadleaved (Deciduous) Forests	3
5	Subalpine Forests	3
6	Montane Needle leaved Forests	3
7	Tropical broadleaved forest	4
8	Sub-Tropical broadleaved forest	4
9	Sub-Tropical needle leaved forest	4
10	Montane Broadleaved Evergreen Forests	4
11	Secondary scrub	4
12	Montane grassland	2
13	Subalpine scrub	2
14	Alpine steppe	1
15	Snow and glaciers	1
16	Agriculture	4
17	Habitation	4
18	Waterbody	4
19	Rock/barren land	1



4. Landscape profile, threats (trends & drivers of change) and gaps in conservation of snow leopard habitats

Background information and attributes of the landscape

Himachal Pradesh located between 30°22' and *30°12'* north latitude and between *75°47'* and *79°4'* east longitude is a hilly state where the Himalaya is demarcated into various ranges like Outer Himalaya with Shivalik range, the Lesser Himalaya with Dhauladhar range, the Great Himalaya with Pir Panjal range and the Trans Himalaya with Zanskar range. It is characterized by an uneven elevation, which ranges from 350 meters to 7000 meters above sea level. Himachal Pradesh sharing its borders with Jammu and Kashmir in the north, Punjab in the west and south-west, Uttar Pradesh and Haryana in the south, Uttarakhand on south-east and Tibet on the east, spread across an area of 55,673 sq km occupying nearly 10.54% of the Himalayan land mass. The state has great climatic variations, ranging from hot and sub-humid tropical to cold glacial and alpine. The state has 63.9% percent of its area under forest cover. The forests are mainly of three types viz., Tropical Forests - confined to foothills with scrub of *Acacia* and *Zizyphus* and dry deciduous forests of Sal; Sub tropical forests from elevation of 500-1800m (subtropical evergreen forests below 1200m dominated with species of *Albizzia, Terminalia* etc. and subtropical forests of Pine upto 1800 m.) and Temperate forests - from 1800m to 3000 m with trees of oaks, deodar, blue pine, horse chestnut, holm oak and edible pine. Himachal Pradesh is known for the natural beauty of its forests, rivers, valleys, hills and has a rich flora and a wide variety of wildlife.

The high-altitude Himalaya is rich in endemic plants (Bahar,2002). The increasing potential threat to biological diversity is an irreversible environment disorder that warrant immediate remedial measures for sustainable conservation of biodiversity. It is believed that the excessive anthropogenic activities are the main cause of decline in population and availability of medicinal and aromatic plants in the Himalayan region (Dhyani and Kala, 2005; Samant *et al.,* 1998; Samant *et al.,* 2000; Samant *et al.,* 2001). The fast pace of tourism in high altitudinal areas are another important factor causing the damage of bio-diverse ecological system (Blangy and Mehta, 2006).

Himalaya is one of the mega biodiversity regions of world (Myers *et al.,* 2000). The north western Himalaya consist unique habitats to sustain several endemic and rare plant taxa. The vegetation comprises evergreen forests with pure stands of *Pinus roxburghii*, *Pinus wallichiana*, *Quercus* spp., *Cedrus deodara*, *Abies pindrow*, *Picea smithiana*, *Taxus wallichiana* and *Juniperus* spp. in dry temperate and alpine regions representing various species composition make the valleys rich in Phyto diversity.

Himachal Pradesh:

According to population census of India 2011, Himachal Pradesh has a population of 6,864,602 with a decadal growth of 12.94%. 8.1% of the total population lives below poverty line. The state has 1,424,950 lakhs as Gross state value added (GSVA) from agriculture and allied sector at constant for the year of 2017-18 (Agriculture Census, 2015-16).

Number and area of operational holdings (Agriculture Census, 2015-16).

For all social groups	**2015-16**		**2010-11**		**% Variation**	
	Number (in '000)	**Area (in '000 ha)**	**Number (in '000)**	**Area (in '000 ha)**	**Number (in '000)**	**Area (in '000 ha)**
Himachal Pradesh	997	944	961	955	3.75	-1.09
For scheduled caste	**2010-11**		**2015-16**		**% Variation**	
	Number (in '000)	**Area (in '000 ha)**	**Number (in '000)**	**Area (in '000 ha)**	**Number (in '000)**	**Area (in '000 ha)**
Himachal Pradesh	219	131	212	132	3.21	-0.61
For scheduled tribes	**2010-11**		**2015-16**		**% Variation**	
	Number (in '000)	**Area (in '000 ha)**	**Number (in '000)**	**Area (in '000 ha)**	**Number (in '000)**	**Area (in '000 ha)**
Himachal Pradesh	57	49	56	50	2.07	-2.28

Lahaul-Pangi Landscape:

Both the subdivisions are governed through a mechanism called the 'single-line administration' whereby all departments functioning there directly work under the Additional District Commissioner (ADC), who is aided by a Sub Divisional Magistrate (SDM) and Tehsildar. This system was necessitated to streamline administration due to the poor connectivity and communication with the state capital of Shimla.

Lahaul-Pangi Landscape combined has a total area of 8237.78 sq.km., which includes Pangi subdivision of Chamba and Lahaul and Udaipur subdivision of Lahaul-Spiti. The landscape region has two Protected Areas, Seichu Tuan Nalla WLS (390 sq. km.) and Chandratal WLS (38.56 sq. km.).

Lahaul:

The Lahaul valley lies between 31˚44'57'' and 32˚59'57''N latitude and 76˚46'29'' and 78˚41'34''E longitude. It is surrounded by the main Himalayan ranges on the North mainly Baralacha Pass, the mid Himalayan range or Pir Punjal on the South, the Kunjum range which separates Lahaul from Spiti on the East and the off shoot of the Pir Punjal range on the West. In its West, the Chenab river flows into Pangi valley, while in the North-East the Yunan river flows into Zanskar. The Rohtang Pass (3978 m), the gate way to valley, connects Lahaul to Kullu district. The valley can be approached through Rohtang Pass (3978 m) by road to Lahaul from Kullu, Kunjum Pass (4740 m) road to Lahaul from Spiti, Baralacha Pass (5019 m) road to

Lahaul from Leh, Kugti Pass (5043 m) partially by road and on foot, and Drati Pass (4725 m) by foot journey from Chaurah-Chamba to Lahaul. The distinctive features of the valley are snow covered peaks, massive glaciers, view of bleak, sunny, higher mountain ranges and narrow river valleys. The valley represents few prominent lakes such as Chandratal, Surajtal, Sissutal and Neelkant along with many glaciers. High mountains, waterfalls, Buddhists Gompas, Hindu Temples and trekking places are some of the attractions for tourists. The inhabitants belong to Hindu and Buddhist community. The district contains 41 Panchayats. The total area of the district is 13,835 km^2, out of which 1,35,369 hectares are under Forests and 4459 hectares are under cultivation. The whole area of Lahaul is divided into four valleys namely, Pattan Valley, Myar Valley, Todh Valley and Tennan Valley.

Soil:

In the valley soil is more or less loam to sandy loam with gravel. In the vicinity of villages and nearby, denuded slopes are subjected to concentrated year-round grazing; hence the soil is equally poor. On the northern aspects, in folds and hollows as also on easier slopes, the soil is fairly deep and fertile for tree growth. It is therefore, the best forests in the valley are on the left bank of the Chanderbhaga River. Due to melting of snow, the soil from the upper slope is carried down to the lower slopes where the depth of the soil is deeper. At present, soil in this tract is partially protected by the vegetation.

Climate:

The climate of the area is dry temperate to alpine types and has distinct seasons. The summer is rainless due to high mountains. The rainy season receive very less rainfall. The winter season is comparatively longer i.e., from late November to early April. During this period, heavy snow fall occurs in the Valley.

The Lahaul valley is also known for its unique faunal diversity. Some of the prominent wild animals and birds are Ibex (Capra ibex), Bharal (*Psueudois nayaur),* Snow Leopard *(Uncia uncia*), Musk Dear (*Moschus chrysogaster),* Ghoral, *(Nemorhaedus goral),* Himalayan Marmot *(Marmota bobak*), Wild Yak (*Bos grunniens),* Himalayan Snow Cock *(Tetragallus himalayensis*), Himalayn Snow Pigean (*Columba leuconota*), Crow (*Corvus caurinus*), Chukor (*Alectoris chukar*) and Bar-headed Goose (*Anser indicus*)

Lahaul Tehsil Population:

Lahaul is a Tehsil located in Lahaul & Spiti district of Himachal Pradesh. It is one of 3 Tehsils of Lahaul & Spiti district. There are 140 villages and 0 towns in Lahaul Tehsil. As per the Census India 2011, Lahaul Tehsil has 2,222 households, population of 10,218 of which 5,415 are males and 4,803 are females. The population of children between age 0-6 is 682 which is 6.67% of total population. The sex-ratio of Lahaul Tehsil is around 887 compared to 972 which is average of Himachal Pradesh state. The literacy rate of Lahaul Tehsil is 71% out of which 80.42% males are literate and 60.38% females are literate. The total area of Lahaul is 4,923.78

sq.km with population density of 2 per sq.km. Out of total population, 100% of population lives in Urban area and 0 lives in Rural area. There are 10.85% Scheduled Caste (SC) and 73.39% Scheduled Tribe (ST) of total population in Lahaul Tehsil. Out of the total population, 67.48% population is Buddhist, 31.56% is Hindu and remaining follows other religion.

Number of Households	2,222
Population	10,218
Male Population	5,415 (52.99%)
Female Population	4,803 (47.01%)
Children Population	682
Area	4,923.78 km2
Population density/km2	2
Sex-ratio	887
Literacy	71%
Male Literacy	80.42%
Female Literacy	60.38%
Scheduled Tribes (ST) %	73.39%
Scheduled Caste (SC) %	10.85%

Lahaul Urban & Rural Population

Out of total population, 0% of population lives in Urban area and 100% lives in Rural area

Description	Urban	Rural
Number of households	0	2,222
Total Population	0	10,218
Population (%)	0	47.01%
Male Population	0	5,415
Female Population	0	4,803
Sex Ratio	0	887
Literacy (%)	0	71%

Pangi:

Politically the State is divided into 12 districts. Chamba is remarkable among the hill districts of the State for its natural features, situated in the north-west of the State between latitude 32°10' -33°13' N and longitude 75°45'-77°33' E. The district Chamba is divided into two Natural divisions namely, Ravi Valley including Chamba and Bharmour sub-tehsils (region between water shed of Dhaula Dhar and Pir Panjal with river Ravi and its tributaries) and Chenab or Pangi Valley including Pangi subtehsil (region between mountain ranges of Pir panjal and Zanskar with river Chander Bhaga and its tributaries).

Pangi is the remotest, rugged, snow bound, inaccessible, land-locked but picturesque and pristine narrow river valley in Himachal Pradesh. It is a small administrative subdivision of Chamba district situated in the northern extreme of the· state where time and space acquired a new dimension. Sandwiched between two mighty mountain ranges, the Zanskar in the North and the Pir Panjal in the South it is an isolated valley. Positioned approximately between 32°11'30"-33°13'06"N and 75°45'-77°03'33"E, it is contiguous with Doda and Zanskar region of Jammu and Kashmir in the North and spreads over an area of 1600sq. Km. Pangi valley is irregularly triangular in shape, each side of which is about 56 kms in distance. It is bounded by Zanskar hills that lie in the Northern part of the valley and Pir Panjal in West. In southern side it shares boundaries with Lahaul and Spiti and in eastern side with Jammu and Kashmir. It is chiefly formed by river Chandrabhaga which cuts across the terrain in deep narrow gorge before entering Doda region of Jammu and Kashmir. With its deep river gorges and barren mountain peaks, it offers a wide range of scenery and vegetation.

Till recently, this valley was the remotest tribal area of Himachal Pradesh where road access to the rest of the state was established only in the mid-1990s. Now, the valley can be accessed from three directions, by crossing the Rohtang pass from Udaipur in Lahaul and Spiti via Karru Nallah, from Kishtwar in Jammu & Kashmir via Sansari Nallah and from Chamba via Sach pass (14478ft) or Cheni pass (14382ft). The 170 km long road link from the district headquarters Chamba to Killar, the headquarters of Pangi sub division via Sach Pass was established only in 2007. Earlier, people were required to undergo an 800 Kms long journey to reach Killar from Chamba via Rohtang Pass. The route through Kishtwar (part of J&K State) up to Killar is 116 kilometers in length. This road link has been recently established and small vehicles can ply up to the boundary of Pangi. These passes remain snow-clad for most part of the year and the valley can only be visited during late summers through these passes. Even during summers, much caution and care has to be exercised while crossing the passes. The weather is unpredictable and the tracks are dangerous, mostly on glaciers. There is always an impending fear of avalanches on the route. Although routes are always in the mercy of weather God as most of the road are narrow, dangerous, not of concrete, very dusty and prone to landslides, besides the many tributaries flowing through it.

Terrain:

The Pangi valley has extremely difficult and rugged terrain with indifferent climatic conditions. The land locked Pangi is squeezed between two subsystems of the Himalaya, the Zanskar and Pir Panjal Range and hence the landscape is mostly tough, mountainous, dotted with a number of valleys. Although Pangi valley comes under the Biogeographic Province 2A (North West Himalaya) (Rodger and Panwar, 1988), the region actually meets the criteria as a transition zone between the Himalaya and Trans-Himalaya (Bhatnagar *et aI, 2008).* The lowest altitudinal limit of Pangi is approx. 2000m at Sansari Nala and ranges over to 6000 m comprising the lofty peaks adjacent to the Zanskar range. There are several peaks within this

valley that have never been climbed and the onward paths lead to Kashmir, Lahaul and Zanskar. There are some beautiful sub valleys in Pangi such as Sural Valley, Hudan Valley, Saichu Valley and Parmar Valley, the way through which leads to Zaskar range. This is very much evident in the faunal composition of the area which exhibits an assortment of elements from both the zones. This makes Pangi valley one of the most faunistically diverse areas in western Himalaya and also a priority area from conservation point of view (Bhatnagar *et al,* 2008). Besides, due to the somewhat inaccessible nature and low population density, vegetation cover is relatively intact which also accentuates its potential as an ideal refuge of wildlife.

Climate:

By virtue of its geographic location beyond the reach of tropical monsoon rains, the agro-climate conditions of Pangi valley come under cold and, dry zone. The overall climate of the valley is semi-arid, typical of the inner Himalaya. It is characterized by cool summers with little rain and severe winters. The winters with heavy snowfall keep the people confined to their houses in winter. However, significant changes have been noticed in the rainfall pattern since mid-nineties with much wetter years. Most of the rainfall (230-740mm) is received during July-August although precipitation has also been recorded in winter months, when direct snowfall usually occurs. During peak winter, minimum temperature throughout the valley plummets much below zero degrees Celsius. Snowfall occurs after mid-October in higher areas and reaching lower altitudes by the middle of December.

Most of the areas receive heavy snowfall (3,000-4,700mm) during December to March with lofty peaks under perpetual snow cover although occasional snowfall also occurs during April. The region on the whole experience severe winters with heavy snowfall, strong winds and frequent avalanches. Most of the streams also freeze during winter. During winter, the valley is locked from all the sides and remains cut off from the rest of the world because of heavy snowfall blocking all the approaches. Weather opens up after April and reaches a comfortable day temperature of around 28 degree Celsius during June-July in the valley. The side valleys of Pangi i.e. Sural, Hudan and Saichu are much colder with generally foggy and cold afternoons even during summer months.

Pangi Tehsil Population

Pangi is a Tehsil located in Chamba district of Himachal Pradesh. It is one of 10 Tehsils of Chamba district. There are 106 villages and 0 towns in Pangi Tehsil. As per the Census India 2011, Pangi Tehsil has 3,952 households, population of 18,868 of which 9,579 are males and 9,289 are females. The population of children between age 0-6 is 2,299 which is 12.18% of total population. The sex-ratio of Pangi Tehsil is around 970 compared to 972 which is average of Himachal Pradesh state. The literacy rate of Pangi Tehsil is 62.37% out of which

72.17% males are literate and 52.27% females are literate. The total area of Pangi is 1,515.46 sq.km with population density of 12 per sq.km. Out of total population, 100% of population lives in rural area. There are 6.6% Scheduled Caste (SC) and 90.18% Scheduled Tribe (ST) of total population in Pangi Tehsil. A total of 94.92% population believes in Hindu religion and 4.68% are Buddhists.

Number of Households	3,952
Population	18,868
Male Population	9,579 (50.77%)
Female Population	9,289 (49.23%)
Children Population	2,299
Area	1,515.46 km2
Population density/km2	12
Sex-ratio	970
Literacy	62.37%
Male Literacy	72.17%
Female Literacy	52.27%
Scheduled Tribes (ST) %	90.18%
Scheduled Caste (SC) %	6.6%

Pangi Urban & Rural Population

Out of total population, 0% of population lives in Urban area and 100% in Rural area

Description	Urban	Rural
Number of households	0	3,952
Total Population	0	18,868
Population (%)	0	49.23%
Male Population	0	9,579
Female Population	0	9,289
Sex Ratio	0	970
Literacy (%)	0	62.37%

Threats to wildlife in the Landscape:

The Himalayan region represents a myriad of human cultures and linguistic diversity that includes several tribal communities. Despite all the ecological, social and cultural richness, Himalayas have not received the required attention to conserve and maintain its environment. The reasons may be lack of knowledge about the region and remoteness.

The evolution of the unsustainable socio-economic patterns has been affecting the fragile landscapes and delicate ecosystems of the Greater and Trans-Himalayan regions making these more susceptible to the natural disasters, biodiversity loss and habitat changes. The landscapes are facing habitat degradation and fragmentation due to unsustainable livestock grazing, impact on indigenous species due to invasive species, forest land diversion, use of unregulated pesticides for agriculture, equipment and techniques to snare wild animals to protect their crops, climate change and forest land diversion, unsustainable resource extraction by local communities of natural resources (fodder, fuelwood, medicinal herbs, grasses, berries for food), economic and infrastructure development, unregulated tourism, poaching of wild animals including snow leopard, blue sheep and illegal extraction and trading of medicinal plants. The threats to habitats due to climate change is accelerating with series of natural disasters caused by unprecedented changes in the patterns of rainfall and dry swells.

Primary and secondary studies in the landscape area have shown the hostile impacts of excessive livestock grazing. Competition for grazing land often leads to conflict between wild ungulates and domestic livestock. In absence of enough food, wild ungulates raid the human settlements and prey on domestic livestock. This may result in retaliatory killing of the wild animals by the locals in vengeance. Crime against wild animals are also increasing. Killing and illegal trading of wild ungulates is taking place, although the cases are not documented anywhere. Another major concern is the extraction (legal as well as illegal) of natural resources for fuel, fodder, medicinal herbs, grasses, etc. Medicinal and aromatic plant (MAPS) are extracted from the landscape unsustainably, creating a toll on the region.

Connectivity of the landscape to the outside world is hindered for almost 6-7 months and even the life in the landscape moves at a slow pace due to heavy snow fall. All generation residing in this high-altitude landscape lost almost half of their lifetime due to winter confinement that could otherwise would have been used to create more wealth, welfare and prosperity for the society. The economic setback experienced by the locals is compensated during summers, when they practice agriculture, horticulture and other livelihood options. Tourism is a viable option for the locals, but it needs to be sustainably developed and managed. Excess tourist inflow can create ecological pressure on the landscape.

There are considerable threats to ecology in the landscape. There is a need to recognise that there should be proactive efforts to maintain wildlife but simultaneously local needs and any conflict that may arise between local and wildlife should be addressed.

Following are the major threats categorised with respect to the landscape.

Overgrazing, Competition with livestock, rangeland degradation and prey declines

Himachal is a predominantly mountainous state. Forests in Himachal Pradesh have a very productive ecological niche. Latitudinally, the state falls in the sub-tropical zone, and its geographical location and good forest cover have further enriched it, both biologically and economically. The forests of Himachal Pradesh are not only of importance for the state, but also have a strong influence on the ecology, climate and bio-resources of the neighbouring states of Punjab, Haryana and Rajasthan. According to the Himachal Forest Report 2002, nearly 16,376 sq.km. or 29.41% of the total geographical area of the state is under alpine pastures and perpetual snow cover (Himachal Forest Report, 2002).

Although human population density in snow leopard landscapes is relatively low, its habitats are heavily used by people whose livelihoods depend on traditional livestock herding. With growing human populations, livestock herds are growing too and, in some places, far exceed the capacity of the land to support them. Himachali Gaddis have traditional rights of grazing including in the highland pastures. Current government efforts to regulate Gaddi herding have their origins in nineteenth-century British interests in commercial timber extraction from the Himalayan coniferous forests. Over the past century, the government has attempted to control the numbers of animals each herder is permitted to graze, to restrict camping and movement during migration, to impose restrictions on the actual areas grazed, and gradually to reduce herd sizes (Saberwal, 1996). The resulting overgrazing leads to degradation of rangeland and may result in soil erosion. Competition for food with large and growing domestic livestock populations also reduces wild prey numbers, which already live at relatively low densities due to the low productivity of the habitat.

There is a lack of current qualitative and quantitative information on the extent of alpine pastures and their carrying capacity, and thus these pasturelands are also under the threat of overgrazing and climate change. Overgrazing does not only affect the health of a pastureland but also the health of the animals grazing there. It has been observed that overgrazing can lead to productivity and health problems in the livestock, like low milk production and unhealthy progeny. With agro-pastoralism extensively practiced across snow leopard range, there is great potential for competition for grazing resources between domestic livestock and the wild herbivores that make up the main prey of the snow leopard. Overgrazing is also affecting the population of blue sheep and ibex that are key not only prey species of the snow leopard but is also key biological indicators for the snow leopard landscape habitat area. There is a comprehensive lack of monitoring the population of the blue sheep and ibex in the landscape area and in absence of a systematised approach, updated statistics are not available.

For centuries humans have co-existed with wildlife practicing nomadic or semi-nomadic pastoralism herding sheep and goats' flocks, cattle, horses, yaks and camels. Although relatively few humans live in snow leopard habitat, their use of the land is becoming

increasingly pervasive, resulting in escalating conflicts between conservation and livestock production even within protected areas (Jackson et al 2010).

Extremely few cases of wild snow leopard mortality due to disease have been reported in the literature and it is difficult to evaluate the potential significance of this threat.

Depredation on Livestock and Retaliatory Killing

The intimate interspersion of people in protected areas often results in conflicts between humans and wildlife (Rodgers 1989). Most wildlife protected areas in India support various forms of land use, such as agriculture, livestock grazing, and collection of minor forest produce. Livestock grazing is especially widespread, and livestock holdings form an important component of the local pastoral and agricultural economy. Kothari et al. (1989) report livestock grazing in as many as 73% wildlife sanctuaries and 39% national parks in India (of the 101 and 14 protected areas surveyed respectively in those categories), with livestock densities up to 1500 per km^2.

Studies show that animal husbandry contributes 10 to 32 % of household income in different agro-climatic zones of the state. Importance of livestock sector in the state of Himachal Pradesh is also reflected by fact that 90% of the households keep some bovine and 30% rear goat and sheep (Chand, 1995). But ecologically, it is asserted that livestock pressure in the Indian Himalayas is excessive, which is a major cause of ecological degradation (Shah, 1982). Therefore, emphasis is laid on the need to reduce the biotic pressure of the livestock on the natural resources by replacing less or unproductive animals with improved and healthy stock and reducing excessive grazing of the pastures.

Not surprisingly, livestock often greatly outnumber wild ungulates within many protected areas. Such a disproportionate presence of wild and domestic ungulates results in killing of livestock by wild predators, and thereby a conflict of interests between local communities and wildlife managers. Human-wildlife conflicts are acute when the species involved is highly imperilled while its presence in an area poses a serious threat to human welfare (Saberwal et al. 1994). Such is the conflict between wild carnivores and pastoralists in trans-Himalaya, one of the most fragile, and yet the least represented, of all the biogeographic zones in the Indian protected area network (Rodgers & Panwar 1988).

The trans-Himalaya biogeographic zone harbours at least 12 mammal and bird species listed in Schedule I of the Indian Wildlife (Protection) Act, 1972 (Anon. 1992). Among these, the snow leopard, *Uncia uncia*, is globally threatened, and is categorized as endangered (in danger of extinction) by the IUCN (1990). The Tibetan wolf, Canis lupus chanku, represents another globally-threatened species, categorized as vulnerable (IUCN 1990). Both these species are in conflict with humans in most parts of their range, specifically due to the damage

they cause to livestock (Schaller 1977; Fox et al. 1988; Mallon 1988; Oli et al. 1994; Meriggi & Lovari 1996; Nowell & Jackson 1996).

Depredation rates due to snow leopards and sympatric predators ranges over 12% of livestock holdings in hotspots in India (Bhatnagar et al. 1999; Mishra 1997). Herders are especially angered by events of surplus killing when a snow leopard enters a corral and up to 50 or more of the confined sheep and goats are killed in a single instance (Jackson and Wangchuk 2001). Depredation tends to be highly site specific, with losses varying greatly between successive years and even between nearby settlements (Jackson et al. 2010; Suryawanshi et al. 2013). However, in the landscape area, cases of livestock depredation by snow leopard are very rare. Depredation by brown and black bear are prevalent.

Large depredation losses may create such levels of anger towards snow leopards, wolves and other large predators that local communities lose any tolerance and view predator extermination as the only solution to the conflict (Oli et al. 1994). Therefore, understanding and managing conflicts over livestock depredation represents an important goal for effective snow leopard conservation action. Conflicts involve two important dimensions – the reality of damage caused by snow leopards to livestock, and the resulting perceptions and attitudes of humans impacted by such economic loss (Suryawanshi et al. 2013).

People's attitudes and tolerance for snow leopard varies, depending upon their religious beliefs, income status, educational level, perception of threat that snow leopards pose to their livelihood, and the extent of livestock losses they and their community have suffered (Mishra 1997; Jackson and Wangchuk 2004; Suryawanshi et al. 2013, 2014). Livestock losses attributed to snow leopards may be exaggerated, either mistakenly or deliberately. Nonetheless, perceptions can have strong emotional and political consequences, ultimately leading to the persecution of snow leopards or other carnivores.

Wildlife Tourism

Wildlife provides significant economic opportunities for local communities and the government. Private nature reserves and government-protected areas provide useful complements to each other. In many cases, establishing protected areas for wildlife tourism is bringing fundamental changes to the surrounding lands, increasing the proportion of employment in service and retail sector while significantly reducing the exploitation of natural resources for consumptive uses. Such economic changes do not always come about smoothly, but it has been clearly demonstrated in many parts of the world that recreation related employment can be more than five times greater than employment in resource exploitation in the same territory, and the gross economic benefits are often more than ten times greater. Spurred by quick incoming economic gains and local pride in global recognition of place as a sought-after tourism destination, tourism soon becomes unsustainable irreparably damaging

the pristine landscape. Therefore, all activities related to tourism in the landscape need to be closely watched, monitored and evaluated.

Tourism in snow leopard habitats presents an opportunity to provide a great visitor experience while enhancing support to local livelihoods along with snow leopard and biodiversity conservation. It allows people to experience the uniqueness of these high mountain ecosystems while potentially building public support for, and contributing to their conservation. However, if uncontrolled, tourism also presents a threat to these fragile landscapes and the plants and animals that inhabit them. To ensure that these landscapes remain intact and continue to provide tourism opportunities in the long term, it is crucial that tourism ventures adopt responsible, non-invasive, and sensitive practices with respect to the ecosystem and the local cultures. It is important to manage both tourist density, their journeys to and within the landscape, and their mode of interaction with wildlife. A sudden influx of a large number of tourists within a given area of wildlife habitat is likely to disturb these animals, their breeding, prey base and the vegetation. The amount of waste created by visitors and transport animals combined with physical damage to the habitat can be devastating, often to the very industry (tourism) itself.

Lahaul-Pangi Landscape is rich in scenic, cultural, traditional and ecological diversity. The region has a great potential to be promoted as a wildlife tourism hotspot. However, the landscape is inaccessible from outside world for about 6-7 months during winters due to heavy snowfall. Connectivity to the landscape is snapped even during monsoons due to high risk of landslides. Apart from inaccessibility, an assessment for institutional and infrastructural adequacy for all the major tourist attractions needs to be carried out on priority. Homestays presently are not certified or registered with the government department. Tourism in the landscape is not yet popular and developed but can prove to be a major economic turnaround for the local economy. In addition, the data on tourism inflow in the landscape area is not available that hinders making a suitable planning for the landscape area. However, a methodical promotion and marketing strategy are needed to develop a sustainable tourism in the unique high-altitude landscape.

Handicraft Industry

In Himachal Pradesh, handloom industry plays a very important role in the state economy. The uniqueness and speciality in weaving make them famous on the national and international levels. Due to state government intervention through financial assistance and implementation of various developmental and welfare schemes, now these handloom industries of the state have been able to compete from the power loom and mill sectors. These products reach to the people by selling through setting stalls in fair, exhibition and through setting special shops in different district and states. This sector is contributing towards export earnings also. The handloom sector is the most important earning sector after

agriculture providing direct and indirect employment to the weavers in Kullu, Manali, Chamba, Mandi, Lahaul and Spiti districts of Himachal Pradesh.

Handloom industry is fundamentally labour intensive and utilizes a traditional technique in the manufacturing process which are not cost effective at all and that makes the production at higher cost. The weavers are using “khaddi” as a handloom machine. Although the output of these machines is low as a weaver needs to travel across the breadth of the “khaddi” while laying the thread yet they are producing original product. Some new mills have started operation in Himachal and due to which the conversion time from wool to thread has become shortened but again the power looms are the biggest beneficiaries.

Loom industries in Ludhiana (Punjab) copied the Himachali shawl which has a low cost. A handloom shawl may take about a week to manufacture whereas power looms churn out thousands in a day. This production pose economies for power loom products and it makes a little difference between handloom and power loom for ignorant customer. They not only supplied cheap and inferior varieties of shawls but also offered huge discounts to tourists.
At the market front, most of the buyers fail to understand the difference between handloom and power loom products. Pashmina – a brand name for handloom products some time ago is hijacked by power loom one.

The sheep is sheared twice in a year at specified centres, primarily controlled by the wolfed. A significant proportion of the wool is procured from nomads, who travel from Ropar in Punjab to Manali and above. For a sheep owner the security/care of the sheep is the biggest challenge. Their major concern lies in the ‘Sheep Insurance’ clause that requires the dead body of the sheep to be presented for claiming insurance (it becomes quite impossible for them to get a sheep out of drowned water or to get one from the deep valleys) (Attri, 2017).

NTFP Extraction

There is an increasing recognition that non-timber forest products (NTFP) can fulfil important community needs and improve rural livelihoods. The NTFPs play an important role in the socioeconomic as well as traditional healthcare of local people and livestock (NAEB and Dr YS Parmar University of Horticulture and Forestry). NTFPs are traditionally being collected from the landscape and forests in it by the rural population for meeting their household needs and also for generation of cash income to some extent. In recent years due to increasing demand for natural and herbal products, there has been an increase in demand for NTFPs from this region. Since very little area is under cultivation of NTFP species, most of the demand is met from the landscape and forests in it. Most of the landscape and specifically the forests are in a highly depleted state.

The natural environment is major source of healing remedies worldwide. The use of medicinal plants as a medicine in the past had a good advantage over the present conventional drugs.

Because, many of the traditional folk remedies used in the past are now being manufactured as pharmaceutical preparations prescribed by physicians.

Gaddis, Kinnauras, Pangwal and Lahaulis are the major tribal communities of Himachal Pradesh. These communities inhabit the wet temperate to sub alpine region in the Western Himalayas. Tribal communities have their own ways of life, cultural identities and customary modes of living which they had developed through years of experience by interacting with nature. Non timber forest products also play a major role in their economy. Non timber forest products are used in the form of food, fodder, fibre and household articles, medicines and ornaments and supplement their income especially during lean seasons beside providing religious and aesthetic needs.

To most tribal people, extraction processing and marketing of NTFP is a source of employment and income generation. Plant products especially the non-timber forest products have always been an ever-available first-rate drugstore for the tribal communities. They are dependent on these medicinal plants to cure their ailments. The tribal women folk have the natural inherited knowledge about these medicinal plants as a result of their long-term association with the forests. They find them effective, easily available and cost effective.

For the local communities of the landscape area, NTFPs are a source of medicine, income, and to meet their religious and aesthetic needs. Local people, during discussions, informed that they do not extract NTFPs in an illegal manner, however, stakeholder consultation reflected that outsiders from Churah (Tindi Panchayat) carry out illegal and unsustainable extraction of NTFPs from the forest and other areas of the landscape. It was informed during consultation that to curb this unsustainable practice, BMCs (Biodiversity Management Committees) are being set-up as per the Biological Diversity Act, 2002. This should also solve the problem of non-availability of harvest statistics. BMCs are required to maintain PBRs, BCPs and harvest and growing stock data to ensure sustainable and equitable sharing of the benefits arising from commercial use of NTFPs and other biological resources. During the discussions, people from local communities also inquired if they could grow medicinal plants in their fields rather than extracting MAPs from the forest. This is a good indication, and local people should be made aware of the promotional schemes as also the regulatory provision on the subject.

NTFP has a big market with a high risk of illegal extraction. This extraction is mainly practised through unsustainable means, which not only degrade the area but also put a risk on natural regeneration of the product. A number of rules and regulations are in place by the state and the national government to manage and regulate NTFPs and MAPs extraction such as HP Forest Re-Revised Eco-Tourism Policy of 2017, HP Medicinal Plant Sector Policy of 2006, Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Rules of 2008, HP Forest Sector Policy and Strategy of 2005 and HP Participatory Forest

Management Rules of 2000. Compliance to these rules need to be ensured and monitored in perpetuity to promote a sustainable NTFP market.

Wildlife crime control

Wildlife crime is one of the topmost agendas at the national and international levels. Poaching and illegal wildlife trade is on a rise and the problem is even more aggravated in transboundary areas of the state. Wild animal parts and products are illegally traded. Although illegal trade has always been an issue but this has got unprecedented high attention in last few years because of the threatened and endangered status of the locally important species such as snow leopard. It is, therefore, essential that wildlife crime is tackled as a priority issue for both the conservation and development of the landscape. In Lahaul-Pangi landscape, reports of illegal trade have often been made, but hardly any case is registered.

Apparently, even though such illegal practices are taking place, communities refuse to acknowledge or verify such claims as they are close-knit, and may even be enjoying some benefits from the illegal trade. While some members of the community are willingly involved in this trade, it is the innocent community at large who face restrictions, bans against entering the key areas. This would need to be studied closely. Traditionally, local people used to take part in patrolling to control illegal practices of poaching and illegal trading, but presently this practice is not being followed. There is need to build incentives for the local communities especially for its younger generation in the patrolling mechanism, which will promote stakeholdership of the communities in protection and conservation of the landscape. This will help to some extent in checking the migration of the young generation to outside areas in search of work and employment.

Poaching and illegal trade are not just limited to a country but the traders use transboundary treks and channels to illegally export and sell the products. So, the efforts should be combined and coordinated by the countries sharing the borders. They need to come up with trans-boundary agreements to develop effective mechanism and rules against poaching and illegal wildlife trade.

Feral Dogs:

Competition with feral dogs is an emerging threat in the landscape. Local communities have not reported cases of depredation of wildlife by feral dogs but secondary literature has mentioned the threats that feral dogs pose to wildlife. In Lahaul-Pangi reduced prey as a result of competition with migratory livestock, illegal hunting and wildlife trade by the local community, and immigrant labourer and migratory communities, and depredation by dogs, are the severe threats. Areas grazed by migratory livestock were also prone to illegal hunting

by migratory herders and depredation of wildlife by dogs (migratory herders are accompanied by guard dogs) (Ghoshal et al, 2017).

Feral dogs survive and reproduce independently of human intervention or assistance. While it is true that some feral dogs use human garbage for food, others acquire their primary subsistence by hunting and scavenging like other wild canids. The dogs also compete with the Snow Leopard and Tibetan Wolf for scarce food resources and as these dog's hunt in large packs, they have a significant advantage over the leopard or wolf. The situation is further aggravated by the improper garbage management of security forces and communities, as more garbage provide food for more dogs and sustain bigger populations. Thus, proper waste management needs to be in place.

Waste Management

Solid waste and littering are becoming an environmental menace and more so in hilly areas and terrains of the landscape where the waste ultimately finds its way to the banks of streams and rivers, besides dotting the landscape here and there. Local community, tourists, migratory labour, graziers and security forces are the main players responsible for waste hazard. Hilly towns and cities are impacted more because of the small size of towns, lack of civic facilities, difficult terrain, high influx of tourists, lack of community participation, and awareness amongst all stakeholders. Not just the tourists but also the hotel owners and local people are equally responsible for making the situation so difficult. Waste not only pollutes the river and other water bodies, but it also pollutes the groundwater resources.

The potential impact of a tardy waste management is reflected in choking of drains, streams and rivers, pollution of water, soil and air, health problems, and feral dog menace. While waste and littering may not seem as a big problem right now, but it will soon be a cause of poor air quality, choking water bodies, polluted water, and thus a breeding ground for diseases. While it is the responsibility of the state to intervene and take some long term and quick term steps, including policy and regulatory measures, but the major responsibility would always lie on the local community who are resident of the landscape, and whose livelihoods are intertwined with the health and quality of the landscape environment. Thus, leading role of the community cannot be overlooked. Community should take care of waste collection and segregation at the source and disposal at appropriate sites. Unmanaged and untreated waste generated by security forces in far flung areas of the landscape leading to the feral dog problem threatening not only the humans but, also the prey base, and cubs of snow leopard, needs to be addressed specifically and exclusively.

Connectivity

Himachal Pradesh is predominantly an agriculture intensive state. Most of the contribution to the economy comes from the agriculture. And thus, it gives a grim scenario as agriculture cannot be practised on a yearly basis in the snow-covered areas of Lahaul-Pangi. Even when

the winter is at its peak, tourism opportunities come at a halt because of the closure of roads and inaccessibility of treks. This creates a six-month window off leisure time and not much income for people of these areas. Agriculture acts as an only source of income for these households which lack in training to carry out non-farm activities. This led to pressure on the snow leopard habitat for food, resources and at times become the cause of Human Wildlife conflict. But in last few years, due to shrinking land cover, fragmentation of land, industrialisation the income from the agriculture has reduced drastically and people have started drifting towards non-farm activities. Taken as an alternative to farm sector in terms of making livelihoods and poverty reduction (J.R. Davis, 2003; Reardon, Berdegue, Barrett, Stamoulis, 2007), it has occupied a very prominent place in rural development studies. Nonfarm activities have changed the whole traditional pattern of labour use in rural areas as labour is utilized in striking diverse activities ranging from home-based cottage industries to sophisticated multinational agribusiness firms, from casual labour works to high paid services (Haggblade, 2007; Rahut, 2006).

People generally lack awareness about their rights, and since the area is blocked from any telecommunication, or with the other major town throughout the 6 months, all generation lost almost half of their lifetime that could have been used to prosper the society. In 1984, late Indira Gandhi, then Prime Minister of India had visited Pangi, she offered people to permanently migrate to Dehradun where people would be given land, house, and dignified living as the road construction towards such remote areas for such a small population (back then up to 5000) was too expensive. However, people did not buy into the idea and turned down the offer. She then decided to start cutting the roads and started to connect the area with rest of the HP. Later given the areas proximity with China, J&K, there has been some progress in road construction, however, the results have not been that fast. The BRO as appeared during the interviews is doing the work at snails' speed, what was the condition ten years ago, things have remained the same. The valley and villages nearby have remained relatively less affected to the outside city influences that we see in rest of the India or even other Himalayan towns of India. Clearly there is a less plastic, less dust, less human waste, and almost no overflowing or foul-smelling sewers in the remote areas.

Now, communities have been demanding all-season roads or tunnels to connect the region with the outside world, but the economic and ecological implications of it are high and need proper assessment to provide 12-month connectivity that is not at the cost of the environmental and ecological degradation of the pristine snow leopard landscape. If tunnels or roads are planned, mitigation studies would need to consider the ensuing muck generation and the vehicular traffic on such an ecologically fragile landscape.

Lack of awareness among local people and policymakers

There is a significant lack of awareness and understanding of the plight of the snow leopard; the value of snow leopards, prey, and habitat; and the local and regional consequences of the

on-going degradation of its ecosystems. This is true at all levels of society within and outside the snow leopard range, from local people to leaders of governments and from the private sector to the general public. Globally, snow leopards are less well-known than other charismatic species, such as tigers and elephants; as a result, less funding has been available for snow leopard conservation. There is also a significant lack of awareness regarding the policies, schemes, acts, rules and guidelines in the area relevant to the conservation and protection of the snow leopard.

5. Landscape management strategies and plan

Identified threats	Strategies	Recommended actions (Must include the strengthening of existing policies)	Stakeholders responsible/ nodal department to implement the same	Existing scheme /Program /Report for Action	Observatory notes (capacity needs; linkages needed, communication mechanism
Competition with livestock, rangeland degradation and prey declines	1.Zonation of landscape into compartments 2. Monitoring protocols (from 2.1)	1.1 It may include dividing landscape into core landscape unit where grazing is prohibited and Grazing Area where grazing is allowed and regulated 1.1 Measuring pasture quality, including relative abundance of palatable or preferred forage species, degree of livestock trailing or erosion 1.2 **Rotational mechanism** within grazing compartments for the herders to check the condition of overgrazing. This will give suitable time space for grass varieties to rejuvenate 1.3 Numbers, health and productivity of	**1.** Department of Animal Husbandry **2.** Himachal Pradesh Forest Department **3.** Department of Agriculture **4.** ICIMOD **5.** GB Pant Institute of Himalaya Region	1. HP Grazing Policy 2. HP State Rural Livelihood Mission.	• Department of Animal Husbandry is responsible for the development of improved livestock in the landscape area. The department generally aims to provide sustainable techniques, improved livestock breed, vaccination etc. • HP Forest department generally monitors the human wildlife conflicts through their field staff i.e. range officers, forest guards. • Department can also facilitate the installation of predator proof corals and livestock pens. • Improvement wildlife habitat by

		wild ungulates and domestic livestock 1.4 Preparation and bio-technological tools to prepare gene banks of wild prey for snow leopard 1.5 Include new species that may be grown and may serve as food and fodder 1.6 Check the abundance of the traditional grass varieties and work towards their conservation 1.7 Maintaining seed bank			constructing water pool, repair and other infrastructures like livestock pens and corrals • Make future strategies to make and strengthen gene pool of the local breeds
HWC	**Management** **Conservation**	• Better predator proofing of livestock corrals and livestock pens • Better herding practices and a reward system (incentive) for effective anti-predatory livestock herding • Improved wild-prey availability • Communal guarding along with the mapping and subsequent avoidance	**1.** HP Forest Department **2.** Department of Environment, Science and Technology **3.** WWF India	HP Forest Department has issued guidelines for dispensing compensation for Life/Property Losses During Human-Wildlife Conflict (HWC)	1. HP Forest Department monitors the Human Wildlife conflicts and provide Compensation for any loss incurred due to HWC. **2.** State Biodiversity Board as per Biological Diversity act, 2002 has mandate to address all issues related to biodiversity of state **3.** WWF India has significant

		of depredation hotspots • Establishment of grazing free reserves may be referred to as Core Zones or conservation zones • Identify sources for necessary human resources – materials (community**/** government / NGOs) • Establish community management structure. • Integrate with income generation schemes like wildlife tourism, cottage industry (Homestays) or trophy hunting to provide sustainable revenue stream • Introduction of community managed insurance scheme that ensure appropriate compensation for livestock loss via quick verification and fast delivery mechanism • Enhancing the capacity of local communities by providing			contribution towards research development activities in the landscape area

		appropriate instruments			
Lack of Alternative Livelihood options	**1.Development of Handicraft Industry**	• Help secure technical assistance, including NGO support for product development, introducing machinery for mass production, packaging, skill development and training, marketing & snow leopard friendly product endorsement • Conduct ongoing independent scientific monitoring for relevant biological indicators and to ensure contract compliance • Evaluate skills, capacity, and training needs • Determine demand, profit potential, development & management / accounting needs • The state government may initiate the small enterprises based on the local traditional product. *Results of Snow Leopard Enterprises program in Mongolia could be adopted in order to secure livelihoods of local communities* • Registration of local handicraft, natural	**1.** World Bank **2.** Department of Tourism **3.** Asian Development Bank **4.** Department of Tribal Development **5.** Department of Cooperation **6.** Department of Empowerment of SCs, OBCs, Minorities and Specially Abled **7.** Department of Labour and Employment **8.** Block Development Office	HP Forest Sector Policy and Strategy of 2005 HP Skill Development Policy of 2016 Border Area Development Programme (BADP) Guidelines, 2015 Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Rule, 2008 Organic Farming	**1.** The State Government has launched new scheme "Prakritik Kheti Khushal Kisan Yogna" to encourage "Zero Budget Natural Farming", so as to bring down the cost of cultivation and promote organic farming. **2.** Horticulture Development scheme is the major programme aiming at the creation and maintenance of infrastructural facilities in the rural areas for ensuring equitable access to the resources and inputs required for the promotion of all fruit crops. **3.** Training and Proficiency in Computer Applications and Allied Activities Scheme provides computer training to BPL, SC, ST OBC, Minorities, Special Ability, single woman and widows.

		products as Geographical Indication (GI) with uniqueness and landscape origin e.g. *Kaala Jeera, Chamba Tea, Chulli Oil, etc.* • Develop business plan, market linkage and product distribution strategy • Define conservation actions the community will commit to in exchange for livelihood skills training with income generation opportunities • Protocols for monitoring numbers of local people gaining benefit, financial impact at household and community levels and public attitudes to snow leopards • Involving the role of HP Biodiversity Board to implement ABS (Access and Benefit Sharing) • For promoting the local handicrafts convergence of efforts between Department of art and culture, Department of tourism, Department of commerce and industries and Department of Skill	**9.** NMPB and SMPB **10.** GB Pant National Institute of Himalayan Environment and Sustainable Development (GBPINSED)	Policy of 2010 HP Sustainable Tourism Development Policy of 2013 HP Rural Employment Guarantee Scheme of 2006 HP State Rural Livelihood Mission. Mukhya Mantri Yuva Aajeevika Yojana, 2018 Assistance to Women for self-employment Rules of 2005	**4.** Asian Development Bank has provided millions for promoting vocational training and skill development **5.** Department of Tribal Development and Labour and Employment provide training and capacity building workshops to enhance employment opportunities for local communities. **6.** Block Development office is responsible for securing peoples participation and maintaining of public enthusiasm in the different programme taken by the Blocks. **7.** Implementation of various development schemes for alleviation of poverty and empowering people to have sustainable livelihood **8.** Implementing tribal development projects **9.** Channelize job opportunities **10.** GB Pant Institute has been working in the landscape area focusing on the sustainable

		Development will be required • Festivals like *Yatra, Zukaaru and Vindal Sherjach* could be targeted for the marketing			development of the area by conducting innovative research-based projects.
Lack of Connectivity	Development of Connectivity Framework Regulation of Connectivity	• Appropriate number of machines/ tools must be deployed by BRO to ensure sustained connectivity of these landscape to major towns • To ensure the connectivity with major towns walking trails may be developed. This will also encourage tourism (Snow Leopard Tourism) based activities in the region. • More check points must be established to avoid the overflow of vehicle in the area • Department of tourism and BRO must work together to regulate the number of tourists visiting the landscape area. For this department of tourism need to assess the carrying capacity of the landscape area and formulate a strategy to	1. Border Road Organization 2. Department of Tourism 3. Department of Transport 4. Public works department (PWD) 5. Department of Energy		**1.** Border road organization ensure proper connectivity of border areas in the interest of national security **2.** Department of tourism has a mandate to check the tourist flow into potential tourist destination based on their carrying capacity. **3.** Department of transport is responsible for providing transportation services in the State **4.** For convergence of these departments, BRO must take the accountability seat and ensure the inter departmental meetings, steps to be taken and other

		keep a check on visitors arriving to the landscape area • Afforestation programs along the line of the road can actually help in preventing mitigating landslides.			departments as mentioned would become the helping hand. **5.** Based on the carrying capacity of individual sites by Dept of Tourism, connectivity to areas should be proposed
Unregulated Tourism	**Awareness** **Assessment** **Monitoring**	• Educate decision makers about benefits & pitfalls of ecotourism • **Carrying capacity assessment** of potential sites selected for tourist activities • Integrate with national or international responsible tourism campaigns. • *Go for certification- Third party certification could be introduced with a rating mechanism at the landscape level* • Identify stakeholder groups and their needs, • Assess local capacity to provide services such as guiding, pack animal rental, campsites, homestays, • Determine training needs and sources • Develop wildlife tourism plan and marketing strategy	Dept of Tourism Dept of Forest ENVIS	HP Sustainable Tourism Development Policy of 2013	The Department of Tourism is encouraging private sector to develop tourism related infrastructure in the State under Public Private Partnership (PPP). Department of Tourism is the Nodal Agency for the Tourism Related avenues Department of Forest Could be collaborated with to start new trekking trails, nature-based tourism Development of Tourism must be sustainable Branding of tourism must have the local diversity and snow leopard

		which allows for equitable & transparent benefit distribution, and is market-sensitive • Identify actions to be taken to benefit wildlife, local environment & community (e.g., conservation fund, grazing land set • Biodiversity Impact Assessment (BIA) and EIA must be done in the landscape area.			
Lack of Awareness	**Targeted Campaigns** **Knowledge Transfer**	• Regular workshops should be conducted at landscape level with equal proportion of male and female participants • Organizing field visits (Landscape YATRAS) for policy makers, subject experts from different streams, students, researchers, local experts • Publication of information materials e.g. Pamphlets, brochures, posters and transmission of TV and radio programmes	**1.** Information and Public Relations Department **2.** Department of information technology **3.** Local NGOs and WWF Sarva Siksha Abhiyan		**1.** Information and publicity department can help with information dissemination on wildlife conservation values **2.** Launch awareness campaigns on the advantages of the use of Information and related technologies in enhancing the standard of living and improving quality of life. **3.** WWF has been working from past few years for raising awareness among local communities for conservation and management of local biodiversity

		• Preparation of course material on snow leopard for the students at schools and college level			**4.** Provide quality education and improve infrastructure and innovative schemes **5.** ICIMOD may be directly involved in the Awareness Building with the involvement of GB Pant **6.** Forest department, Department of Education, Department of Language Art & Culture HRD Ministry, Department of tourism may come together to promote the awareness on snow leopard and landscape area **7.** Particular emphasis must be done on herders and migratory communities to make them aware on • Avoiding Lax Herding • Aware about sustainable grazing • Awareness regarding value of higher range biodiversity • Posters/Pamphlets must be showcased in the Airports and other places

Feral Dogs	Population control of Feral Dogs	• **Exclusion-**Protect livestock and poultry from feral and domestic dogs with well-maintained net fences. • **Frightening-**Several visual and auditory devices (yard lights, effigies, loud music, pyrotechnics) have been used to frighten coyotes from livestock pens and pastures, and are likely to be effective with feral dogs. • **Repellents-**Methyl nonyl ketone, mostly in granular form can be used to prevent urination or defecation by dogs in yards and storage areas. • **Shooting-**Aerial shooting is one of the most efficient control techniques available for killing feral dogs. Introduction of Bio decomposer could be adapted. These bio decomposers make combustible gases that could be used further	• Security Forces • State Biodiversity Board • State Forest Department • NCF		1. Indian army have permanent settlements in Border areas. 2. State Biodiversity Board keeps a check on factors effecting the local biodiversity 3. State forest department monitors the population of snow leopard population in the landscape area 4. Improvement of wildlife habitat 5. Carry out vaccination and sterilization programs for the population control of feral dogs

Waste Management	**Waste Collection** **Waste Minimization** **Involvement of EDC**	• Creating a channel for waste collection and disposal. Any violation should be strictly handled. For waste collection formalization of informal sector of ragpickers and kabadiwallas could be a step both for providing employment as well as waste management. • Incentivization on waste recycling could invite private participation as well as reduce volume of waste • A state level/regional Waste management plan is a needed step for proper implementation • Building relevant capacity building module for the community participation and strengthening existing workforce with proper training • A strong legal backhand is crucial for implementation for	• Department of forest • HP Planning Department • HP Municipal cooperation • Department of Health Safety and Regulations • HP State Pollution Control Board • Health and family welfare board	HP Municipal Solid Waste Management Strategy, 2015 Border Area development program (BADP)	**1.** Department of forest maintain plantation nursery where use of organic manure is encouraged. **2.** Planning Department, HP strives to identify a process of development which will raise living standards **3.** HP Municipal cooperation works on waste management and ensure the mitigation of waste of solid and liquid waste. **4.** HP State pollution control board works on checking soil, air and water pollution **5.** Main objective of the BADP is to meet the special developmental needs of the people living in remote and inaccessible areas situated near the international border and to saturate the border areas with the entire essential infrastructure **6.** Proper disposal of biomedical waste **7.** Frequent educational drive in order to educate and aware

		working out on MSW rules. • Generating actual waste statistics at ULB level • Introduction of door-to-door collection, placing garbage bags at regular intervals • Up-gradation fleet of transport vehicles • Utilize the organic waste into manure that could be utilized by nurseries • Making strong provisions of penalties for littering			local communities to take and adopt sustainable practices
Wildlife Crime	**Stakeholder Consultation** **Innovative new approaches**	• Online learning platform can be developed to bring case studies and other resources • The Beyond Enforcement initiative by IIED and, more recently, the Communities and IWT Learning and Action Platform can serve as a template to bring community representatives together from around the Landscape in a	Depart of Forest Security Forces Local Community Organizations like **TRAFFIC, NCF** **ENVIS** **Wildlife Trust of India**		• Department of Forest is the main nodal agency that would provide resources, knowledge as well as inputs to tackle Wildlife Crime • Custom Dept deals with a lot of shipments, imports as well as exports which involve illegal poaching, trading • Security Forces play an important role during transboundary movement

		series of workshops to voice their perspectives on illegal wildlife trade and how best to tackle it • Developing and applying a methodology to understand community perspectives on IWT interventions in the field. A collaborative effort between communities, project developers, designers is needed to bring the first line of defense • Building conservation authority capacity for community engagement: Gram Panchayat Units could be sensitized as well as incentivized and made capable of identifying threats, possible trades as well. • A rapid action task force consisting of forest officials, community members and Wildlife crime Police could be developed for quick and synchronous action. • A local wildlife monitoring committee could be formed which must include people	**WCCB**		• Local Community staying at the fringes of the borders can play imp role in information collection, surveillance • Monitoring Committee could be trained regularly by experts from NCF as they have previous experience in the field • The results of Habitat suitability mapping could be used to set up camera traps • ENVIS can release periodic reports and literature on the status of the wildlife crime in the states with emphasis on the landscape area

		from BMC and local community • Recording and mapping the sites of HWC for better strategy			
Habitat Fragmentation	Preservation/ Recovery of Fragmented Habitat	• **Wildlife corridors**: A connection of at least two significant habitat areas by natural habitat. • **Land acquisition**: Local, state, federal, and private entities purchasing land for habitat preservation. These areas have been declared as National Park, Biosphere Reserve to increase conservation value and reduce Human interference. • **Conservation easements**: A conservation easement is a voluntary, legal agreement that permanently limits uses of the land in order to protect its conservation values. • **Restoration**: Converting once developed land to a natural state. • **Mitigation**: Developers create or preserve	Department of Forest Department of Rural Development Planning Department	Indira Aawas Yojana, 1985 Pradhan Mantri Gramin Sadak Yojana	1.Department of Forest is the main stakeholder in this which needs to bring up innovative ways to deal with this threat • Any kind of construction for commercial, public use should be carefully analyzed and developed keeping in mind the natural habitat

		lands of similar quality and size to that which they impact. • **Zoning**: Adding wildlife and habitat conservation considerations to local development plans. • **Buffer zones**: Areas around viable habitat that reduce the edge effect and protect the interior habitat from disturbances on nearby lands. • More researchers and GIs approaches may be adopted in order to mark the corridors in the area			
NTFP Management	**Value Addition** **ABS** **Documentation**	• Research and development activities for identification of the medicinal and aromatic plants • Training of people about sustainable development practices • Comprehensive Documentation of natural resources available in the area in form of PBRs (Peoples Biodiversity Registers) • Biodiversity Management Committee (BMC)	1.Department of Forest 2.National and State Medicinal plant Board 3.Research Institutions like IARI, universities 4.GB Pant Institute of Himalayan Environment and Development	HP Medicinal Plant Sector Policy of 2006 HP Forest Sector Policy and Strategy of 2005 HP Participatory Forest Management Rules of 2000	HP Forest Department recognizes medicinal plant resources as important forest produce, source of livelihood, and contributor to state's economy. It also aims to develop institutional and legislative mechanisms to develop the sector. Department of Forest manages the forestland as well as other surrounding areas. BMC and EDC have to ensure the documentation of the

		must inform State Biodiversity Board to reporting any misuse or illegal trade of NTFP from their area. Further, BMC will be the main authority to grant permission for extraction of natural resource • Value Chain Analysis of different local products could be done • Production, consumption and trade of important species should be monitored. • Active participation by tribes and other stakeholders having traditional ecological knowledge pertaining to native medicinal plants should be encouraged • Indigenous knowledge, culture and biodiversity should be preserved through education aimed at retaining, reinforcing and revitalizing of this knowledge of plants • Herbal gardens should be established in		Compensatory Afforestation Fund Act of 2016 Efficient irrigation through Micro-irrigation Systems Project, 2016	PBRs as well training and capacity building of the local community with the help of Forest Department Research Institutions can always work towards development of In-situ and ex-situ propagation as well research for commercial scale production of important medicinal plants Reginal Bioinformatics center can maintain gene data base of the local Biodiversity of the Landscape area

		different ecological zones of the state • Cultivation of important medicinal plants especially the endangered species should be encouraged. This can be done by promoting research for commercial scale cultivation and propagation • In Situ propagation of economically important species &Ex situ conservation of medicinal plants should be planned and market-based incentives for consumption of products should be promoted • There should be a gap of at least two to three years between the subsequent extraction and grazing in extraction areas should be banned • Local Youth may be trained as village Botanist to spread the message of conservation			

		• Documentation of Traditional knowledge should be encouraged. • Establishment of local small-scale nurseries to enhance local biodiversity.			

Reference:

- Alexander, J. S. *et al.;* PRINCIPLES AND RECOMMENDATIONS FOR TOURISM WITHIN SNOW LEOPARD HABITATS; Supported by GEF, UNDP, Snow Leopard Trust, Nature Conservation Foundation and Travel Operators for Tigers.
- Chand, R.; 1995; Livestock in Himachal Pradesh: Factors Affecting Growth, Composition and Intensity.
- Forest Sector Review, 2017.
- Ghoshal, A. *et al;* October 2017; Assessing changes in distribution of the Endangered snow leopard Panthera uncia and its wild prey over 2 decades in the Indian Himalaya through interview-based occupancy surveys; *Fauna and Flora International.*
- Global Environment Division; June 1998; Guidelines for Monitoring and Evaluation for Biodiversity Projects.
- Global Snow Leopard and Ecosystem Protection Program; 2013.
- Higginbottom, K.; 2004; Wildlife Tourism: Impacts, Management and Planning
- Himachal Pradesh Human Development Report, 2002.
- Ministry of Forests and Soil Conservation, Government of Nepal; 2017; Snow Leopard and Ecosystem Management Plan (2017-2026).
- National Afforestation and Ecodevelopment Board and Dr YS Parmar University of Horticulture and Forestry; Study on Non-Timber Forest Products Availability, Consumption and Management in Relation to Mother and Child Health Care in Different Tribal and Non-Tribal Communities in Himachal Pradesh.
- Nature Conservation Foundation, Mysore, Snow Leopard Trust-India; 2010; MANAGEMENT PLAN FOR THE UPPER SPITI LANDSCAPE (Including the Kibber Wildlife Sanctuary).
- National Snow Leopard Ecosystem Protection Priorities India; 2016.
- Nyhus, P.; 2016; Biodiversity of the World: Conservation from Genes to Landscapes.
- Project Snow Leopard; 2012; Ministry of Environment & Forests, Government of India.

- PSL; 2012; GUIDELINES FOR PREPARING MANAGEMENT PLAN FOR LANDSCAPES IDENTIFIED UNDER THE PROJECT SNOW LEOPARD. Ministry of Environment & Forests, Government of India, CGO Complex, New Delhi.
- Saberwal, V. K.; 1996; Pastoral Politics: Gaddi Grazing, Degradation, and Biodiversity Conservation in Himachal Pradesh, India.
- Sawarkar, V. B.; 2005; A Guide to Planning Wildlife Management in Protected Areas & Managed Landscapes; Wildlife Institute of India.
- Shah, S. L.; 1982; Ecological Degradation and Future of Agriculture in the Himalayas; *Indian Journal of Agricultural Economics.*
- Thaxton, M.; Shames, S. and Scherr, S.; 2017; INTEGRATED LANDSCAPE MANAGEMENT: An approach to achieve equitable and participatory sustainable development**.**
- UNDP SECURE Himalaya Project Document

Annexure-1:

Questionnaire-I

Sector Specific Government Authorities/Departments

(HPFD, corporations, water, agriculture, tourism, health, wildlife, revenue, crime control, energy, culture etc)

Date and Time of Interview:

Location of Interview:

Name of the Respondent:

Contact Details:

Department:

Qualifications & Name of Service:

Gender and Age

Q1. Are you aware of the proposed Snow Leopard landscape in your state?

a. Yes b. No

Q2. Are you aware of the important wildlife species (including wild plants) existing in the landscape?

a. Yes b. No

Q3. Is there any project/scheme implemented by your department in this landscape?

a. Yes b. No

If yes, name a few of them.

Q4. Are you aware of declining population of flora and faunal species in your area?

a. Yes b. No

Q5. Is there is any noticeable decline in forest area?

a. Significant
b. Insignificant
c. No comment

Q6. Is there any biodiversity hotspot in the proposed snow leopard landscape?

a. Yes
b. No

If yes, please provide names.

Q7. What according to you are the conservation challenges in the landscape?

a. Hunting/ Poaching
b. Decline in important natural resources
c. Harvest of fuelwood and timber
d. NTFP collection
e. Urbanization
f. Human wildlife conflicts
g. Wildlife crime
h. Invasive alien species
i. Unregulated livestock grazing
j. Unregulated Tourism
k. Climate change and shortage of water
l. Others (Please mention)

Q8. Does the existing map of landscape correctly indicate landscape boundary?

a. Yes b. No

Q9. Define extent and boundaries of this landscape?

a. It is larger than actual
b. It is smaller than actual

c. Same as actual

Comments:

Suggestion:

Q10. What is your perception regarding effectiveness of relevant policies and schemes of the government w.r.t conservation and sustaining the livelihood of the people?

a. Relevant
b. Not Relevant

Comments: Suggestion:

Q11. List the important policies and programmes for conservation of snow leopard and its habitat.

S. No	Name of Policy	Duration	Fund allocated	Objectives	Progress till date

Q12. What are the major gaps in policies and their implementation for conservation of snow leopard?

a. Implementation strategies
b. Inadequate coverage
c. Lack of participation by locals
d. Awareness
e. Training
f. Information gaps

Q13. Your perception about the livelihood status of the people living in this landscape?

a. Very good
b. Good
c. Poor
d. Very Poor

Q 14. What is the primary source of Livelihood in the proposed landscape?

A. Traditional practices
B. Agriculture
C. Business/ Trade
D. Government
E. Private Job
F. Animal husbandry
G. Silviculture
H. Tourism

Q15. Challenges related to livelihoods of people living in this area?

A. Insufficient income
B. Restriction to access to natural resources
C. Lack of useful raw material
D. Any restriction by law
E. Lack of interest
F. Other (Please specify)

Q16. Are you aware of human wildlife conflicts in your area?

a. Yes
b. No

If yes, please mention the area, species involved in such conflicts.

Q17. What could be the possible reasons for Human wildlife conflicts?

a. Grazing
b. lack of awareness
c. habitat degradation
d. Lack of food/prey species
e. Human Interference

Q18. Has the department evaluated or monitored the impact and progress of the developmental initiatives?

a. Yes
b. No
c. Planned in future

If yes, please provide details

Q19. Please provide the separate SWOT analysis for Conservation as well as Development for the Landscape in your state. (to be filled by official)

Conservation

Strengths	Opportunities
Weaknesses	Threats

Development

Strengths	Opportunities
Weaknesses	Threats

Comments and suggestions

Q20. If an initiative under GEF-UNDP-GoI is taken for the development of the Landscape, will you/your department will be willing to collaborate or support the initiative? If yes, please indicate possible areas of collaboration.

Q21. Please provide any other remarks or suggestions for effective conservation or development of the landscape. Also provide names and contact details of any other agency/expert/bodies who can be interviewed for useful information pertinent to this project.

Q.22. What are your suggestions in bringing a level of coordination between different stakeholders and agencies?

Questionnaire-II

NGOs, Institutions and organization

Date and Time of Interview:

Location of Interview:

Name of the Respondent:

Contact Details:

organization and Address:

Qualifications:

Area of specialization:

Number of Staff:
Gender and age

Q1. Are you aware of the Project SECURE Himalaya and its objectives funded by UNDP and MoEFCC?

a. Yes
b. No

If yes, please mention some of key objectives of this assignment

Q2. How did you come to know about this project?

a. Newspaper/ magazine/Radio/TV
b. UNDP website
c. Workshop/ conference
d. Others (Please mention)

Q3. Are you the part of this project?

Q4. Are you aware of any Human-wildlife conflict in your area?

a. Yes
b. No

If yes, please mention location of these incidences and species involved

Q5. What are the possible reasons for Human Wild life conflicts?

f. Grazing
g. habitat degradation
h. Lack of food/prey species
e. Human Interference
i. Invasion of alien species

Q6. Are you aware of the landscape that exists in your state which is an important habitat for species like Snow Leopard?

1. Yes
2. No

Q7. Can you name some important species existing in this landscape?

- Tree Species of economic importance (oil and timber resources):
- Highly traded Medicinal Plants:
- RET species**:**

Q8. Which are the important conservation policies and initiatives of the state government or other agencies in this landscape?

S. No	**Name of Policy**	**Duration**	**Fund allocated**	**Objectives**	**Progress till date**

Q9. What according to you are the conservation challenges in this landscape?

a. Hunting/ Poaching
b. Decline in important natural resources
c. Harvest of fuelwood and timber
d. NTFP collection
e. Urbanization
f. Human wildlife conflicts
g. Wildlife crime
h. Invasive alien species
i. Unregulated livestock grazing
j. Unregulated Tourism
k. Climate change and shortage of water
l. Others (Please mention)

Q9. Does the existing map of the proposed snow leopard conservation landscape correctly indicate its boundary?

a. Yes
b. No

Q10. Define extent and boundaries of this landscape?

a. It is larger than actual

b. It is smaller than actual
c. Same as actual

Comments

Suggestions:

Q11. What according to you are the sources of income/livelihood of the people residing in and around the Snow Leopard habitat?

A. Traditional practices
B. Agriculture
C. Business/ Trade
D. Government
E. Private Job
F. Animal husbandry
G. Silviculture
H. Tourism

Q 12. Challenges related to livelihoods of people living in this area?

G. Insufficient income
H. Restrictions to access to natural resources
I. Lack of awareness
J. Lack of useful raw material
K. Any implications by State/ central government
L. Lack of interest
M. Other (Please specify)

Q13. What is your perception regarding effectiveness of relevant policies and schemes of the government w.r.t conservation and sustaining the livelihood of the people?

c. Relevant
d. Not Relevant

Q14. What are the major gaps in policies being implemented in proposed landscape area and their implementation for conservation of snow leopard?

d. Strategies in implementation
e. Inadequate coverage
f. Lack of participation by locals
g. Training
e. Awareness
f. Information gap

Q15.What are the programmes, schemes, studies, projects etc. being implemented by your organization in the proposed landscape?

S. No	Name of Project/ programme	Duration	Fund allocated	Objectives	Progress till* date

Q16. Has your organization evaluated or monitored the impact and progress of these initiatives?

a. Yes
b. No
c. Planned in future

copies of important report/figures for reference

Comments

Suggestions:

Q17. Please provide the separate SWOT analysis for Conservation as well as Development for the Landscape in your state.

Conservation

Strengths	Opportunities
Weaknesses	Threats

Development

Strengths	Opportunities
Weaknesses	Threats

Comments and Suggestions:

Q18. If an initiative under GEF-UNDP-GoI is taken for the development of the Landscape, will your organization be willing to collaborate or support the initiative? If yes, please indicate possible areas of collaboration.

Q19. Suggestions for effective conservation or development of the landscape.

Q.20What are your suggestions in bringing a level of coordination between different stakeholders and agencies?

Questionnaire-III

Industry/Trade/Business Entities

Date and Time of Interview:

Location of Interview:

Name of the Respondent:

Contact Details:

Organisation/Company:

Work scope:

Number of staffs:

Organisation Type: MSME, Navratan, Pvt. Ltd., others:

Gender and age

All questions w-r-t to landscape (snow leopard landscape)

Q1. How your company is dependent upon resources available in the proposed landscape area?

Particulars	**Location/Area**	**Quantity Required per year/Month**	**Products Manufactured**

Q2. Are you aware of access and benefit sharing system (ABS) and its regulations?

a. Yes
b. No

Q3. Are you aware of the concept of sustainable use of natural resources?

a. Yes
b. No

Q4. What is the ratio of women to men ratio of staff in your organization?

Q5. What according to you is the scope of inclusion of local species of flora in your industry?

a. Very good
b. Average
c. Poor
d. Potentially dangerous
e. Not Recommended

Q6. What, in your opinion, are the best options to increase the livelihood opportunity for local people?

a. Capacity building and training
b. Introduction of alternative livelihood

c. Less restriction to access to natural resources
d. Promoting traditional culture and practices
e. Other, please specify

Q7. What are potential modules/options that could be adopted by locals to improve their livelihoods

Q8. Are you aware of habitat landscape for species like Snow Leopard in the state?

a. Yes
b. No

Q.9 Have you heard about Human Wildlife conflicts?

a. Yes
b. No

If yes, please specify the area and wildlife species involved in such conflicts

Q10. How your company/ organization is helping locals to secure their livelihoods?

A. Providing Jobs
B. Trainings at regular intervals
C. Provide free sapling/ seeds
D. Provide free equipment/ instrument etc.
E. Others (Please specify)

Q11. What according to you are the biodiversity and forest conservation challenges in this landscape?

a. Hunting/ Poaching
b. Decline in important natural resources
c. Harvest of fuelwood and timber
d. NTFP collection
e. Urbanization
f. Human wildlife conflicts
g. Wildlife crime
h. Unregulated livestock grazing
i. Unregulated Tourism
j. Climate change and shortage of water
k. Others (Please mention)

Q12. How many of your employee come from the aforementioned landscape?

No of Employee from Landscape	Man	Woman

Comments and Suggestions

Q13. What is your perception about the socio-economic status of the people living in this landscape?

Q14. What other initiatives are required from government to improve the livelihood of locals?

Q15. What have been the impacts of the developmental initiatives in the state by the government/other agencies on the industry? Please provide list of any landmark event or initiative that had a direct/indirect impact on industrial productivity in the state? Can you define specific impacts on the aforementioned landscape?

Q16. What are the potential Goods and Ecosystem Services produced by the natural areas of the aforementioned landscape?

Q17. Please provide the separate SWOT analysis for Conservation as well as Development for the proposed Landscape in your state.

Conservation

Strengths	Opportunities
Weaknesses	Threats

Development

Strengths	Opportunities
Weaknesses	Threats

Q18. If an initiative under GEF-UNDP-GoI is taken for the development of the Landscape, will your company be willing to collaborate or support the initiative? If yes, please indicate possible areas of collaboration.

Q19. Please provide any other remarks or suggestions for effective conservation or development of the landscape.

Q.20. What are your suggestions in bringing a level of coordination between different stakeholders and agencies?

Questionnaire-IV

Local Experts and Leaders

Date and Time of Interview:

Location of Interview:

Name of the Respondent:

Contact Details:

Affiliation, if any:

Sector of work/experience:

Qualifications:

Gender and age:

Q1. Are you aware of the UNDP-MoEF and GEF initiative to propose some area in your state as Snow Leopard Conservation Landscape?

a. Yes
b. No

Q2. Can you name some other important flora and fauna present in the proposed landscape?

Flora:

Fauna:

Q3. Which are the important conservation areas present in the proposed landscape?

Q4. What are the major sources of income of local communities?

a. Agriculture
b. Animal Husbandry
c. Traditional work
d. Private or Government Jobs
e. Silviculture
f. Business
g. Other (Please specify)

Q5. What according to you are the major conservation challenges in this landscape?

a. Hunting/ Poaching
b. Decline in important natural resources
c. Harvest of fuelwood and timber
d. NTFP collection
e. Urbanization
f. Human wildlife conflicts
g. Wildlife crime
h. Unregulated livestock grazing
i. Unregulated Tourism
j. Climate change and shortage of water
k. Others (Please mention)

Q6. How significant have been development activities funded by government departments in the past?

a. Significant
b. Average

c. Insignificant

Q7. What are the major gaps in policies/ Laws and their implementation?

a. Implementation strategies
b. Inadequate coverage
c. Lack of participation by locals
d. Lack of vision
e. Awareness
f. Training
g. Information gaps

Q8. How livelihood of local communities can be improved?

a. Introducing agriculture
b. Industries
c. Encouraging alternative livelihoods
d. Training and capacity building of locals
e. Other (Please mention)

Q9. What is your perception about the livelihood status of the people living in this landscape?

A. Good
B. Poor
C. Very Poor

Q10. Name some of the potential options that could be adopted by locals to improve their livelihood?

Q11. Existing practices and challenges related to livelihoods of people living in this area?

N. Insufficient income
O. Access to natural resources
P. Lack of useful raw material
Q. Any restriction by laws
R. Lack of interest
S. Other (Please specify)

Q12. What are the important projects/programs implemented in conservation area?

Name of Project/Scheme	**Implementing agency**	**Duration**	**Major outcomes**	**Key Gaps**

Q13. How policies/ programs improved the economic status of local communities

a. Significantly
b. Moderately
c. Insignificant

Q14. What is your perception and views on historical trends of natural resources, livelihoods and developmental status of the state and the aforementioned landscape?

Factor	**Response (1,2,3,4)***
Forest area	
Per capita income	
Traditional culture and practices	
Agriculture land	
Traditional Governance	
Development status at village level	
Biodiversity (flora and fauna)	

*1: increased, 2: Decreased 3: No change 4: Can't say

Q15. Please provide the separate SWOT analysis for Conservation as well as Development for the Landscape in your state.

<u>Conservation</u>

Strengths	Opportunities
Weaknesses	Threats

Development

Strengths	Opportunities
Weaknesses	Threats

Q16. Does the landscape boundary correctly justify extension of proposed snow leopard conservation landscape?

a. Correctly indicated
b. It is more w.r.t represented map
c. It is less w.r.t represented map

Q17. Have you heard about Human Wildlife Conflicts in the proposed?

a. Yes
b. No

If yes, please specify the area and wildlife species involved

Q18. What are the possible reasons of Human wildlife conflicts?

a. Grazing
b. lack of awareness
c. habitat degradation
d. Lack of prey
e. Human Interference

Comment and Suggestions

Q19. If an initiative under GEF-UNDP-GoI is taken for the development of the proposed landscape, will you/your department will be willing to collaborate or support the initiative? If yes, please indicate possible areas of collaboration.

Q20. Your remarks or suggestions for effective conservation or development of the landscape.

Q.21. What are your suggestions in bringing a level of coordination between different stakeholders and agencies?

Questionnaire V

Household Survey

Date and time of interview: **Name of village:**

Name: **Age:**

Gender: **Category: SC/ST/OBC/MBC**

Faith: **Education (last attended):**

Occupation: **Alternate livelihood:**

Total annual income of respondent: **APL/BPL:**

Debt:

Name of family member	**Relation with respondent**	**Age**	**Education**	**Occupation**	**Average annual income**	**Beneficiary of any gov. scheme**

Household characteristics:

Type of house- Kuchha/Pucca **Roof type:**

Television: Yes/No **Mobile phone-** Yes/No

Radio- Yes/No **Vehicle-** Cycle/2-wheeler/4-wheeler/Other

Toilets- Constructed/ Not constructed/ Community toilet

Water Source- Personal handpump/Community handpump/Government tap/Well/River

Heating: Wood/Coal/Dung cakes/Electricity/Kerosene/Coil heater/Others

Cooking: Wood/Coal/Dung cakes/Kerosene/LPG/Biogas/Solar cooker/Others

Lighting: Solar panel/Kerosene lamp/Solar lamp/Electricity/Others

Type of cooking stove: Traditional chullah/Coil heater/ Smokeless chullah/Kerosene stove/ Gas stove/Others

Benefit from:	**Name**	**Year**	**Benefit**
NGO			
Self-help Group			
Government Scheme			

Fuelwood Collection:

Plant species	**Quantity/Year**	**Place of collection**	**Frequency of collection**

Livestock:

	Cow	Ox	Mule	Buffalo	Dzo	Horse	Yak	Chicken	Sheep	Goat	Others
Number											
Purpose											
Product											
Quantity											
Self-consumption											
Sell											
Rate											
Income											

Fodder:

Fodder	Source of fodder	Rate of fodder

Agroforestry: Yes/No **Species:** **Self-consumption/Sell** **Income:**

Bee-keeping: Yes/No **Self-consumption/Sell** **Income:**

Fruits: Yes/No **Species:** **Self-consumption/Sell** **Income:**

Agriculture:

Crop	Season	Quantity	Initial input	Self-consumption/Sell	Rate	Income	Net profit/Loss

Land ownership: Personal/Lease **Size of land:**

Seeds: Personal/Government/Others **Fertilizers used:**

Pesticides used: **Irrigation method:**

Health:

Type of hospital	**Vaccine(Y/N)**	**Distance of Hospital**	**Any disease/ailment**

Perception Questionnaire:

Q 1: Are you aware that Snow Leopard is found in your area?

a. Yes
b. No

Q 2: Have you ever sighted a snow leopard in the area? If yes, how many?

a. 0-1
b. 2-4

c. 5-8
d. More than 8

Q 3: Name of the area where snow leopard has been sighted?

Q 4: What has been the trend of snow leopard population?

a. Increasing
b. Decreasing
c. No change

Q.5.Are you a victim of Human-wildlife conflict?

Q 6: Have you witnessed any incidence of human-wildlife conflict?

a. Yes
b. No

Q 7: What are the wildlife species involved?

Q 8: What do you think is the reason for such conflicts?

a. Grazing
b. lack of awareness
c. habitat degradation
d. Lack of prey
e. Human Interference
f. Any other

Q 8: What are the other important wildlife species that you have sighted in the area?

Q 9: What are the important plant species that can be found in the area?

Q 10: Are you aware of the UNDP-GoI-GEF “Project SECURE Himalaya”?

a. Yes
b. No

Q 11: Are you aware that your area is under the proposed snow leopard landscape?

a. Yes
b. No

Q.12.Were you the part of the recent population estimation initiative of the FEWMD?

Q.13.Have you taken part in the wildlife conservation activities? Name it

Q.14.What are your suggestions in bringing a level of coordination between different stakeholders and agencies?

Comments:

Suggestions:

Annexure-2:

Review of Research Papers

S. No	Title	Main focus	Key Outcomes	Reference
Wild Life (Snow Leopard and Prey Management)				
1	Assessing socioeconomic status of the Indigenous local community; A case study from Dzongu in Khanchandzonga Landscape, India	The study was conducted to analyze the socioeconomic status of *Lepchas* of the *Dzongu*. The study also represented the current socioeconomic status of the community and the dimensions for the further studies w.r.t to tribe and region	**1.** Based on the Primary surveys, FGDs and PRA conducted in the study area the authors pointed out the significance of the agriculture and livestock rearing as the driving force for sustaining the livelihoods of the Lepchas. **2.** The cardamom being as the main cash provide more benefits to the local farmers in comparison to other crops i.e. ginger and orange. **3.** There has been significant increase in production of ginger in the area and has shown positive trend **4.** The production of rice has shown significant decline due to high investment and low production **5.** Unavailability of seeds, diseases, infestation of red ants are the main problems faced by farmers **6.** Among the most profitable crop, ginger and cardamom ranked highest followed	Jhony Lepcha, Sheila Sinha, Kialsah Gaira and HK Badola (2017)

			by orange whereas all the vegetables occupied lowest rank **7.** Pig, Hen, goat and cows are other options **8.** There has been significant reduction in farmer's interest towards the traditional crops i.e. rice, maize, wheat, millets which is a matter of concern in the context of agrobiodiversity.	
2	Impact of wild prey availability on livestock predation by snow leopard	This study was mainly focused on the effect of frequency and intensity of livestock predation by snow leopard with the variation of wild prey population	**1.** This study indicates that an increase in wild ungulate population leads to decline in snow leopard livestock predation. That ultimately becomes constant **2.** The livestock predation increases with increase in livestock density **3.** Large livestock density and low prey population leads to high livestock predation by endangered snow leopard population	Kulbhushan singh, Stephan M. Redpath, Yash veer Bhatnagar, Uma Ramakrishnan, Vibhav Chaturvedi, Sophie C. Smout, Charu Datt Mishra (2017)
3	Assessing changes in distribution of the endangered snow leopard ***Panthera uncia*** and its wild prey over 2 decades in the Indian Himalaya through interview based occupancy surveys	The study was conducted in Lahaul Spiti areas of Himachal Pradesh. Interviews of local people were taken into consideration to study distribution pattern of snow leopard population and its prey in last few years Authors have studied the pattern of prey distribution in two reference periods i.e. 1985-1992 (when green pea crop were introduced in Lahaul and Spiti and when Lahaul	**1.** **Kinnaur:** The major threats identified in study area involved reduced prey population resulted due to local and migratory livestock followed by illegal hunting, illegal wildlife trade by both local as well as immigrant labours and free wandering dogs **2.** **Lahaul and Spiti:** reduced prey population have been reported due to migratory livestock and free wandering dogs **3.** **Pangi:** Migratory livestock grazing, hunting by the local community and immigrant labors are the major factors ***4. Overall distribution of wild prey have declined by 8% between two study periods i.e. 1985- 1992*** **5.** In Pangi, Lahaul and Spiti Ibex is the only large prey of snow leopard	Abhsihek Ghoshal, YV Bhatnagar, Bivash Pandav, Kaustubh Sharma, Charu Dutt Mishra, R. Raghunath, Kulbhushan Singh, R. Suryawanshi (2018)

		spiti were opened for tourists) and 2008-2012	**6.** Blue sheep occurs extensively and in high density in eastern banks of the spiti river and parts of western river where ibex is absent. **7.** Patches of high probability of snow leopard were identified and shown in Maps.	
4	People, Predators and Perceptions; Patterns of livestock depredation by snow leopard and wolves	• The study focused on reality check on human perception regarding depredation of livestock by the carnivores • Identification of key variables influencing livestock depredation using multiple regression and hierarchical partitioning	• Human perception could be at considerable odds with actual pattern of livestock depredation • While using the one on one interaction method to ascertain human wild life conflict **additional** and independent studies must be conducted to measure such issues • Generally, the wild prey population abundance leads to intensify the livestock depredation by snow leopard and wolf population. • The relation between the snow leopard depredation of livestock and wild prey abundance may be bimodal. In other words, the livestock depredation increases as the wild prey population increases.	KR Suryavanshi, YV Bhanagar, S. Redpath and C. Mishra (2013)
5	Living with snow leopard; A pluralistic approach to wildlife conservation	This paper provides brief introduction about the key issues prevailing in snow leopard landscapes especially in the context of HP. This paper have also discussed important issues under the heading: - **1.** People and Pastoralism **2.** People and wildlife **3.** Attitude towards wildlife; Social carrying capacity	• There two types of herders in this area, Nomadic and Sedentary. • The sedentary grazing is extreme form of the herding. The herders move to high altitudes and low altitudes based on seasons i.e. summer and winters respectively • Nomadic pastoralist use two forms of livestock grazing i.e. in first form the nomads move through large areas to graze their cashmere goas and sheep. The herders rotate between one or two areas usually separated by few kilometers. • The other form is generally “vertical” in which during summers herders moves from lower to higher altitudes	K. Suryavanshi, 2018

		4. Minimizing impact of pastoralist	• The paper described the important examples and interventions adopted in different villages of HP like Kibber village, Hikkim where compensations have been provided to community on the occasion of livestock loss • The paper have also illustrated the various side effects of overgrazing and possible measure to mitigate the same	
7	Status report on snow leopard in India	This report presents information on the major biogeographical areas of the Indian Himalayas; the Trans Himalayas. Further, data is given on snow leopard presence and broad information on their habitats	• The snow leopard habitat in Sikkim and Arunanchal Pradesh are small but they are the most potential and secure areas for the snow leopard conservation • More studies emphasize with inclusions of trekkers, mountaineers and experience wildlife experts	R.S Chundawat, W.A Rodgers and HS Panwar (2007)
8	Snow Leopard (Panthera Uncia) surveys in the western Himalayas, India	Surveys were conducted in eight protected areas (3000 m) of Uttarakhand and Himachal Pradesh on the basis of indirect evidence such as pugmark and scat.	• Survey revealed that livestock depredation (mule, goat and sheep) is the only cause of snow leopard-human conflicts and contributed 36% of the diet of the snow leopard. • Also 68.1 of the surveyed area were used for pastoral activities in Uttarakhand and Himachal Pradesh and 12.3 was under tourism, defense and development activities.	Aishwarya Maheshwari , Diwakar Sharma, S. Sathyakumar
9	The role of incentive program in conserving the snow leopard			Charudatt Mishra, Priscilla Allen, Tom McCarthy, MD Madhusudan , Agvaantserengiin Bayarjargal and Herbert HT Prins

10	Analysis and Mapping snow leopard habitat in the Sikkim Landscape, India	The author has attempted to study the probability area of snow leopard occurrence in Sikkim. Important maps have been illustrated in the article that could be taken up for further considerations.	**1.** The Sikkim landscape offers a relatively small but rich habitat for snow leopard, critical to metapopulation connectivity in the Himalayan mountain range (over 1000Km^2 of breeding habitat and nearly 2000 Km^2 of dispersal habitat. **2.** Transboundary management is the key. Effective corridor management, Human wildlife conflict management is required. **3.** The western portion of the landscape is well-protected by Khanchandzonga National Park. The area east of the Teesta River is not well managed and requires attention. **4.** The eastern portion of the landscape is subject to higher impacts from the settlements and roads than the western part of the landscape **5.** The Sikkim landscape is predicted to be warmer and wetter under a changing climate with severe impacts of snow leopard habitat. These areas will transform from grasslands to favoring forest ecosystems **6.** Habitats that are considered resilient to full ecosystem shifts will likely experience effects of climate change resulting from shorter winters	Partha S Ghose, 2017
11	Unveiling a wildlife haven; Status and distribution of four Trans Himalayan ungulates in Sikkim, India	• Authors conducted surveys in trans Himalayan region Tso Lahamo plateau to identify the distribution pattern of 4 ungulate species • The authors have also provided brief introduction about Tso Lahamo plateau	***1.*** *Authors have mentioned that Tso Lhamo Plateau is known regionally for its verdant pastures for grazing livestock, its value for threatened wildlife is largely unrecognized and it has not been gazette as protected area.* **2.** Some of the threats identified by authors to regional wildlife includes presence of fragmented population, transboundary concerns, deterioration of habitats, competition from livestock, diseases (unrevealed) due to frequent interactions	Pranav Chanchani , Gopal S. Rawat and Surender Goel (2010)

			with livestock, feral dogs, tourism, roads and disturbances **(Provided under table 5)**	
12	Does livestock benefit or harm snow leopard?	This article illustrated the interrelationships in between the wild prey populations, livestock densities and snow leopard habitat use	**1.** In absence of snow leopard disturbance the productive habitats with healthy wild prey populations seems to be suitable for snow leopard even after the excess livestock **2.** After a certain threshold of livestock the wild prey population densities decreases as the anthropogenic pressure and competition increases. **3.** Continued co-existence between people and snow leopard is possible till a particular threshold where the livestock and associated anthropogenic pressure do not affect the wild prey population.	Rishi Kumar Sharma, Yash Veer Bhatnagar and Charudutt Mishra, 2015
13	Conflicts between traditional pastoralism and conservation of Himalayan ibex (*Capra sibirica*) in the Trans-Himalayan mountains	The authors estimated the influence of the spatial distribution of livestock on habitat and diet choice of ibex by examining their co-occurrence patterns in cells overlaid on the pastures	**1.** Ibex, free ranging horses and goat/sheep utilize the same habitat properties and do not differentiate in their diets **2.** ***Migratory goat/sheep impose resource-limitation on ibex*** and such multiple-use is not compatible with ibex conservation in Pin Valley **3.** The issue of migratory grazing must become an urgent concern of conservation management in Pin Valley **4.** Livestock, however, currently do not impose serious resource limitations on ibex since most species show habitat separation, while horses are relatively few and are declining in number.	Sumanta Bagchi, Charudutt Mishra and Y. V. Bhatnagar
14	Role of incentive programs in conserving the snow leopard	This paper have elaborated two major incentive programs and their impact on the snow leopard conservation	• Centrally administered programs focusing on forcing to attain conservation goals have limited applicability in areas owned by traditional communities • Without any tangible economic returns, communities are less willing to participate in conservation programs • Curtailing retaliatory killings and restoring wild prey populations are the most	Charudatt Mishra, Priscilla Allen, Tom McCarthy, M.D Madhusudan , 2016

			important conservation needs of the carnivores today • In Spiti the increasing incidences of snow leopard human beings conflicts have been resulted due to relatively large population of wild prey and ***poor antipredatory livestock management*** • The value of livestock lose by family is almost half of the average per capita income • Most of the existing compensation schemes are ineffective as a result of the ***bureaucratic apathy, time and cost involved in securing the compensation*** and ***low compensation rates*** • **Locally Managed Communal Insurance Program (2002):** It is one the important initiative funded by **NCF** in an attempt to minimize the dependence on local grazing area. • **Snow leopard enterprise (SLE)** Program in Mangolia is the program for the enhancing snow leopard population in the region. The SLE signed a contract with local people for value addition to their products and buys back the manufactured products, and further bonus amount were provided to community for their conservation efforts. In return the community commits themselves for the conservation of the snow leopard in the region.	
15	Has the Community based livestock insurance scheme minimized human snow leopard conflict in Kanchenjunga Conservation	The objectives of this study was to understand the livestock depredation intensity by snow leopard and examine the results of community based livestock insurance program	As per the results obtained based on one on one interview with the herders, the performance of the insurance scheme has not been up to the mark. The following are reasons behind this finding:- **1.** Ineffective network of verification **2.** Lack of representations from community in the committee **3.** Insufficient compensations	Ramesh Paudiyal, 2010

	Area of Nepal Himalaya		**4.** Poor and tedious procedure of processing compensations.	
16	Snow Leopard, local people and livelihood losses	The article describes key outcomes of a meeting organized by The Mountain Institute and International snow leopard trust.	Based on the recent killing in the areas and downfall of the compensation scheme, the main outcomes was- **1.** Preparation of efficient corals to stem further loss of livestock.	Rodney Jackson, 1999
17	Ecology and conservation of ungulates In ***Tso lhamo***, north sikkim	This essay delineates habitat use and food section of the region's four wild ungulates - Tibetan argali, Tibetan gazelle, Kiang, and Blue sheep as well as its seasonal population of domesticated yak and sheep; and it graphs select interactions between and among all these species	**1.** Tso Lhamo, which lies mostly at an altitude of over 4500 meters, remarkably contains more than sixty-five glacial lakes, twelve glaciers, and four peaks that rise above 6700 meters. These are Mount Paunhunri (7125m), Mount Chomo Yummo (6829m), Mount Khangchengyao (6889m) and Mount Gurudongmar (6715m) **2.** ***This region has its origins in the prehistoric Sea of Tethys. Evidence of its watery origins survive today in the persistence of the brackish Gyamtshona lake and in fossils of oceanic mollusks which lie scattered on slopes and in gullies*** **3.** Tso Lhamo is home to a number of species that are listed as 'endangered' (schedule I) in the Indian Wildlife Protection Act (IWPA). **4.** Currently, these herders migrate to the Tso Lhamo cold desert with its limited snow-cover in October-November and return to their summer ranges in the adjacent Lasher-Giagong regions by early May. This system ensures a sustainable use of the grassland and provide healthy habitat for the prevalent species in this area. **5.** The presence of army in the area has restricted the entry of casual visitors, tourists and livestock grazers the army is refraining from hunting and is committed to preventing from	Pranav Chanchani, G.S.Rawat and S.P.Goyal (***Publication year not mentioned)***

			Others from doing so. **6.** The development of infrastructure by army has been observed in area in form of roads, paved and unpaved roads. **7.** The authors have also recommend that some critical wildlife habitats areas - most notably the Mirdo Kongra La valley, the Chomodo Bamcho La region, and the Oloten Sese La region up to the Teesta Khangste Glacier be protected from heavy grazing and undue anthropogenic pressures.	
18	Overstocking in the trans-Himalayan rangelands of India	The authors have attempted to study the correlations of fecundity of adult female livestock to total livestock biomass density in Spiti District of Himachal Pradesh	**1.** The authors based on their standard models concluded that there is inverse correlation between fecundity and livestock. **2.** Being an agro-pastoral system as against a purely pastoral one, maximizing milk or meat production is not the only objective of livestock rearing in Spiti. Livestock are also needed for ploughing fields (yak and dzo), as draught animals (donkey), and for producing dung used as manure and fuel (all species). Furthermore, high levels of livestock loss to wild predator's means that a relatively larger livestock holding is required to maintain herd constancy at the family level. Rertrtrtr1`	Charu Datt Mishra, Herbert Prins, Spike Wieren (2001)
19	Snow leopard; conflict and conservation	This article deals with the key issues and desirable actions for the conservation of snow leopard	**1.** Lack of enforcement of management strategies and plans, lack of awareness, political will, and lack of fund are the some of the key issues for the same. **2.** Livestock depredation by the snow leopard is the main cause of the snow leopard-Human conflicts **3.** Irregular proportion i.e. low proportion of livestock to wild prey is mainly responsible for the conflicts. **4.** Offsetting the loss of the livestock by the snow leopard is a must for increasing	Rodney M. Jackson, Charudatt Mishra, Thomas M. Mc Carthy and Som B. Ale

			tolerance towards the wildlife since, the Wild life depredation is a constant factor **5.** Instead of Guns and Fences approaches there is a need of implementing the participatory approach for the conservation of snow leopard **6.** There is inherent requirement for a mechanism to monitor the snow leopard and its population.	
20	Grass-root measures to Protect the Endangered Snow Leopard from Herder Retribution: Lesson learnt from Predator-Proofing corrals in Ladhak	This paper describes community based initiatives being undertaken in India's Hemis National Park aimed at predator proofing livestock corrals and encouraging local herders to become more effective stewards of the snow leopard, its prey and Habitat		Rodney Jackson, Rinchen Wangchuk and Darla Hillard
21	Protected areas and snow leopards: Their distribution and status	This paper describes community based initiatives being undertaken in India's ***Hemis National Park*** aimed at predator-proofing livestock corrals and encouraging local herders to become more effective stewards of the snow leopard, its prey and habitat	**1.** Highly participatory, 4 step process known as Appreciative Participatory Planning and Action Plan (APPA) provides the primary mechanism for assisting communities to develop Action Plans to reduce livestock depredation losses, increase in household income and strengthen environment stewardship **2.** APPA comprise of following 4 D's i.e. ***Discovery, Dreaming, Design and Delivery*** (Identification of root cause, participants vision, devise actions and implementing actions respectively) **3.** The benefits of APPA are as follows- • APPA is a the most cost effective option for reducing livestock depredation • Community participation process provides most efficient results • By providing predator proof corrals, chances of 5-10 snow leopard from high	Michael J.B Green

			risk of retaliatory killings could be minimized • Solutions could be simple and cost effective (e.g livestock pens) • Externally driven initiatives fails to achieve their goals • NGOs are effective mediums for facilitation of conservation programs	
22	A community based approach to mitigate livestock depredation by snow leopards	The article describes a community based conservation initiative to address the problem of livestock depredation in Hemis National Park The authors have used AAPA as the mode of ensuring extensive community participation in decision making process	**1.** The results of this study indicates that by encouraging the predator proof livestock pens, enhancing household incomes in environmentally and culturally suitable ways, livestock depredation and Human wild life conflicts could be minimized	Rodney Jackson and Rinchen wangchuck, 2004
23	National snow leopard ecosystem protection priorities, India	Author has elaborated the key issues in conservation of snow leopards in India. The authors have also elaborated the key aspects of the Project Snow Leopard implemented in India	**1.** Conservation of snow leopard is being challenged by both traditional and modern threats. **2.** The prominent threats includes conflicts from herders, poaching for bones and skins, reduction in prey population, habitat degradation due to anthropogenic pressure, shortage of trained frontline staff, strong communication strategy, poor infrastructure and logistic support and science based information for adaptive management.	**NA**
24	Managing people-wildlife conflict on Alpine Pastures in the Himalaya	This paper summarizes the methods used and results obtained and provide a "***tool box***" for simple participatory technique and project planning criteria that could be applied to the	**1.** Increasing vehicular access has resulted in more penetration and use of uninhabited and very remote rich wildlife areas. **2.** Protected area and the allied welfare of contained wildlife population will be at greater risk of loss with continued loss of crops and livestock which is a rapidly	Rodney Jackson (year not mentioned)

		problem throughout Himalayas	emerging as leading source of conflict between human beings and snow leopard. **3.** Predators are frequently blamed for the loss actually resulting from other source of mortality such as diseases, consumption of poisonous plants, or accidents. **4.** Generally losses occurs more in winters and springs **5.** Protected area management can be only effective if and only the basic concern, needs and aspirations of local people are addressed, in parallel with those of wildlife. **6.** Natural prey base need to be enhanced so that dependency of Snow leopard on domestic livestock is reduced and conflicts could be reduced. **7.** Additional factors involves erosion of traditional knowledge, reduced herder vigilance,, increased livestock numbers and changes in animal husbandry systems **8.** Livestock depredation is generally not evenly distributed, but rather associated with the nearby presence of cliffs, rocky areas and good cover **9.** Snow leopard which brings their cubs to a kill may be reinforcing the takings of livestock as prey, while ***the tendency of snow leopard to remain at a kill and consume all available meat increases their vulnerability to human retribution***. **10.** Authors recommended the following criteria's for the management plan **1.** Environmentally sound **2.** Economically sustainable **3.** Socially responsible **4.** Embedded with clear responsibilities and transparent budget allocations ***11. As an internationally recognized, the snow leopard may serve as a barometer for measuring the environment health***	

			and possibly as indicator alpine biodiversity. **12.** Few points that could be adopted in drafting must include preventive as well as remedial measures that includes- **a.** Improving guarding of livestock **b.** Encouraging communities to hire skilled shepherds **c.** Including improved breeds of guard dogs **d.** Creating core zones for snow leopard and their prey **e.** Assisting herders by proving alternative livelihoods **f.** Offering incentives **g.** Transparency in filing claims due to livestock depredation	
Socio economic issues				
25	Transhumance, livelihood and sustainable development and conflict between formal institution and communal governance: An evaluative Note on East Himalayan state of Sikkim	Through this article attempt has been made to study the transhumance activity known as "Gothwala system" as a way of securing livelihood which is prevalent in Lachung Valley of North Sikkim. The article deals with the conflicts conflict of Dzumsa towards managing forest and fodder in a sustainable manner and act implemented by Government of Sikkim that tends to demolish this system.	• Temporary / permanent cattle shed made up of locally available forest material is known as *goth*. The local people using goth are known as Gothwala • Dzumsa is a traditional governance system which is almost 200 years old • Ground observations have revealed the following negative impacts of banning the pastoral activities in Lachung valley- **a.** Gothwala are selling their livestock as there is prohibition of grazing activities **b.** People are now working as wage laborers. **c.** Lack of use of cow dung is leading to loss of organic tradition **d.** People are not getting sufficient meat supplies **e.** Negative impact on fodder supply	
26	Pastures and Forages in North Western Himalayas	This paper represents the status of status of pasture and forage in North Western	**1.** Total annual requirement of green and dry fodder in Himachal Pradesh is about 6206000 and 19838000 tons respectively which is against the availability in the state	Sudesh Radotra, Inder Dev, Suheel

	Region: Current Status and Future strategies	Himalayan Region with special emphasis on Himachal Pradesh	i.e. 3145000 and 5298000 tons respectively **2.** In Himachal Pradesh 15,18,030 ha of land in the state is covered under pastures and grasslands which is 35.44 % of the total area. **3.** Chamba district has higher fodder availability followed by Kangra and Mandi **4.** Considerable gaps are present in policy, administrative and research frameworks required for the strengthening rangeland resources **5.** Absence of pasture management and grazing policy at national and state level have rendered the pasture lands in to grazing pastures **6.** There is no designated agency to steer the management of grazing lands and fodder resources. This has resulted in land use agencies and research organization implementing their own agenda for the management of grazing lands. **7.** There is acute deficiency of fodder for livestock, and further fodder development on grazing land has not been encouraged **8.** Where livestock depends heavily on grazing forage availability is not encouraging **9.** There is no grazing management plan available as for now which must be planned with the proper participation of communities **10.** Most of the research studies pertaining to grassland and pastures are fragmented and are difficult to apply on large scale.	Ahmad, A. Kannan
27	Shift from transhumance and subtle livelihood patterns of the *bhotia*	This paper highlights the need assessment of conservation efforts pertaining to Tibetan sheep population	**1.** Tibetan sheep has been a major source of livelihood of majority of populations. The younger generation has been now started to shift towards the alternate source of livelihood	Sandip Banerjee, 2009

	community and its impact on Tibetan sheep population in Sikkim		**2.** Lack of access to grazing land is leading to decline in proper food availability to sheep **3.** Lack of fodder results in mortality among the sheep population. This has resulted in financial distress amongst the livestock grazers **4.** The woolen carpets produced by the traditional craft person are finding fewer buyers. These carpets are being replaced by synthetic woolen carpets **5.** In order to revive the old traditional sheep rearing there is a need to rejuvenate market channel and production channels. **6.** Other recommendations are- • Generation of self-employment opportunities • Integration of medicinal plant • Encouraging breeding practices • Wise adaptation of crossbreeds • Multidisciplinary approach from various organizations • Establishment of community level fodder depots	
28	A note on transhumant pastoralism in Niti valley, western Himalaya, India			Moonideepa Mitra, Amit Kumar, Bhupender S Adhikari and Gopal S. Rawat
29	People's opinion on the impacts of Ban on Grazing in Barsey Rhododendron Sanctury, Sikkim, India	This paper represents the impacts of banning the grazing in Barsey Rhododendron sanctuary. The main objective of this study was- 1. Assessing pastoralism system	**1.** Before banning the grazing the area around the cattle shed became barren due to trampling and overgrazing **2.** Availability of medicinal plan got reduced due to overgrazing **3.** Due to competition with livestock wild animals also became very scarce **4.** The process of phasing off the pasture were highly participatory in which small meeting were organized and community	Sandeep Tambe and Nima Tashi Bhutia and Murrari Arrawatia (2005)

		2. To elaborate the process of offsetting herding practice 3. People's perception of making barsey sanctuary "***cattle free"***	perception were recorded for the responsible factors causing overgrazing **5.** Awareness programmes, audio visuals show and nature games were organized in order to aware local community people **6.** Forest officials, locals were allotted with responsibilities for monitoring the ban enforcement **7.** Implementation of eco-development policy in the state enabled the state to regulate the eco development committees (EDC). Through Eco development policy community were provided with rights to prepare their own core of conduct **8.** The government also assisted the herders who phased out their cattle voluntarily and in a timely manner **9.** 91% of the herders perceived positive impacts from a well settled life in the village. They have a better social life, their farm has better availability of manure and their children have access to formal education **10.** The positive impact on the Barsey is better natural regeneration of forest, more biomass, rejuvenation of springs and increase in wild life population	
30	Indigenous knowledge on bio resources management for the livelihood of the people of Sikkim	This article provides the past and existing farming and agriculture system in Sikkim	A total of 15 indigenous system of farming has been documented in this document	JR Subba, 2008
31	Sustainable livelihoods for high altitude mountain communities case studies	This article provides the information regarding the main constraints to development of local communities residing in Himalayan Landscapes	**1.** The main issues in front of developing communities socioeconomically are:- Geographical, remoteness, poor basic infrastructure, inequality of exchange, non-participation in community events due to geographical limitation	Gargi Banerji and Mashqura Fareedi (*Date Not available*)

	from the Himalayas		**2.** The two key principles followed in this development strategies are :- ***Endogenous development*** ***Development cum conservation*** **3.** The key opportunity and options available are:- • Alternate occupation • Value addition • Niche sector clusters **4.** A five step methodology could be adopted to develop livelihood development :- **1.** Assessment and design **2.** Capacity Building **3.** Planning **4.** Collaboration and development (Networking) **5.** Upgradation (cluster development and market linkage)	
32	Non-Farm based livelihood in Rural Sikkim; an analysis	This paper provides situation of non-farm livelihood in rural Sikkim	**1.** The non-farm livelihood activities occupies highest share in household income in most of the household **2.** The main cause of this finding is attributed to average income of households, average education, credits and finance and Family size **3.** The majority of the nonfarm activities are in existence for the period of less than 8 years. The main reason of this finding is attributed to introduction of MGNREGA scheme. **4.** The scale of nonfarm activity is very small and therefor the opportunities are very less. **5.** Apart from government, private and business other modules have not developed and therefore are limited in their human resource **6.** Due to sparse population, enterprise formation is not very lucrative, thus enterprise have to be urban dependent and makes it seasonal.	Santosh sharma, Rajendra Mistri and Manesh Choubay, 2017

			7. The dearth of skills and capital among people makes non-farming activities less lucrative.	
33	Agricultural transformation in Trans Himalayan region of Himachal Pradesh: cropping pattern, technology adoption and emerging challenges	This paper on agricultural transformation has studied changes in cropping pattern, adoption process of new technologies, sources of information about new technology and emerging threats to the existing cropping pattern in Lahaul spiti district of Himachal Pradesh	**1.** The significant drivers of enhancing crop diversity were improved road connectivity and better means of transportation ***2. There has been decline in demand of traditional crops like black pea, barley and local wheat due to changing food habits*** **3.** The availability of hybrid seeds, chemicals and fertilizers also enhanced the change in cropping pattern **4.** Emergence of new markets has facilitated marketing of produce and fetching higher price, especially for green peas **5.** Continuous technological innovations in terms of latest technologies of packaging and practices, development of disease resistant varieties are responsible for promoting economic viability and sustainability in Himachal Pradesh.	H.R Sharma and S.K Chauhan (2013)

Annexure-3:

Stakeholder Mapping

Institutes:

Name of Institutes	Contact Person	Contact Number	E-mail
Universities			
Himachal Pradesh University, Shimla	Prof. Sikander Kumar, VC	2831363, 2830924	vc_hpu@hotmail.com
CSK HP Agriculture University, Palampur	Prof. Ashok Kumar Sarial, VC	+91 1894 230521, +91 1894 230522	vc@hillagric.ac.in
Dr. YS Parmar University of Horticulture and Forestry, Solan	Dr. H. C. Sharma, VC	01792-252363(O), 252357(O), 252343(R)	vcuhf@yspuniversity.ac.in, hcsharma@yspuniversity.ac.in
Himachal Pradesh Technical University	Prof. S.P. Bansal, VC	01972-224152	vchptu@gmail.com
Central University Himachal Pradesh	Prof. Kuldip Chand Agnihotri	01892-229330	vc.cuhimachal@gmail.com
Deemed universities			
NIIT, Hamirpur	Prof. Vinod Yadava, Director	222308, 254001	director@nith.ac.in
rashtriya Sanskrit Sansthan, Garli Pragpur	PROF. PARAMESH WARA NARAYANA SHASTRY	011-28523949 (Tel.)	rskspvc@yahoo.com
Institutions			

IIT, Mandi	Timothy A Gonsalves, Director	+91 1905-267001	diroffice@iitmandi.ac.in
CRI, kasauli	Dr. Ajay kumar Tahlan	+91-1792-273105, +91-1792-272114	director-crik-hp@gov.in
G.B. Pant Institute of Himalayan Environment and Climate Chnage, Palampur	Dr. S.S. Samant, Scientist In-Charge	(01902) 225329	hpunit@gbpihed.nic.in, samantss2@rediffmail.com
Defence Research and Development organisation (DRDO)			
Himalayan Forest Research Institute (HFRI), Shimla	Dr. VP Tewari, Director	2626778, 2624392, 9418422769	vptewari@icfre.org
Central Potato Research Institute (CPRI), Shimla	Dr SK Chakrabarti , Director	91-177-2625073	director.cpri@icar.gov.in; directorcpri@gmail.com
Institute of Advanced Study (IIAS), Shimla	Prof. Makarand R. Paranjape, Director	(0177) 2831376, 2832930	director@iias.ac.in
Wildlife Institute of India (WII), Uttarakhand	Dr. V. B. Mathur, Director	+91 135-2640910(D), +91 135-2640114	dwii@wii.gov.in
Other Prestigious Institutions			
NIFT, Kangra	Prof. Dr.Sibichan. K. Mathew, Director	01892-260872	director.kangra@nift.ac.in

Himachal Research Institute, Chakmoh, Hamirpur			
CSIR-IHBT, Palampur	Dr. Sanjay Kumar, Director	0-1894-230411	director@ihbt.res.in
National Afforestation & Eco-Development Board	Pankaj Asthana, Inspector General of Forests	24367404	pankaj.asthana@nic.in
Snow and Avalanches Study Establishment, Manali			
IARI, katrain	Dr. Raj Kumar, Head, Principal Scientist	01902 - 241280	head_katrain@iari.res.in
ICAR-Directorate of Mushroom Research			
Indian Institute of Wheat and Barley Research	Dr. Subhash C. Bhardwaj, Principal Scientist & In Charge	+91772621978(O);+9194 18129900(M)	scbfdl@yahoo.co.in,scbfdl09@gmail.com
Highland Agriculture Research and Extension Cell	Dr. Vinod Sharma, Associate Director	94181 39639	vinodpatadhi@gmail.com
IVRI, Palampur	Dr. G. Mal , Scientist-in-charge & Principal Scientist	+91-0184-230526 (O),	gorakh14@yahoo.com

Asian Institute for Society, Law and Economics	Prof. Dr. Amar Singh		
Tibet Policy Institute		+91-1892-223556, 222403	tpiadmin@tibet.net
AGRO-ECONOMIC RESEARCH CENTER	Prof. Arvind Kalia	0177- 2830457	aerchpushimla@gmail.com
CSIR - Institute of Himalayan Bioresource Technology, Palampur	Dr. Sanjay Kumar, Director	01894-230411	director@ihbt.res.in
Kayakalp, Palampur	SH. SHANTA KUMAR		info@kayakalppalampur.in
The Institute of Integrated Himalayan Studies	Prof. Vijay Kumar Sharma	+91 177 2633017	director@himalayanstudies.com
Regional Horticultural Research & Training Station	Dr Ajay Kumar Joshi, Associate Director (R & E)		joshiajayram@yahoo.co.in

Government Department:

Name of the Department	**Contact person**	**Contact Number**	**E-mail**
Administrative Reforms Department	Dr. Purnima Chauhan, Sec., Add. Sec.	2621715, 2622187	arsecy-hp@nic.in
Department of Agriculture	Sh.Onkar Chand Sharma, Principal Sec.	0177-2622269, 94182-30009	krishibhawan-hp@gov.in

Department of Ayurveda	Mr. Sanjay Gupta, Addl. Chief Sec.	0177-2622262	ayur-hp@nic.in
Department of Advocate general	Mr. Ashok Sharma	2800195 (O), 2620056, 9418028010 (R)	
Department of Animal Husbandry	Mr. Sanjay Gupta, Addl. Chief Sec.	2621871, 2880716 (O), 2620451 9459575451 (R)	dir-ah-hp@nic.in
Department of Economics and Statistics	Sh. Anupam Sharma, Joint Director	94183-42237	rosml.2007@yahoo.co.in
Department of Co-operation	Mr. Sanjay Gupta, Principal Chief Sec.	0177 2620970	rcs-hp@nic.in
Department of Eductaion	Kamlesh Kumar Pant, Principal Sec.	2880792	secy-hedu-hp@nic.in
Department of Estates	Dr Amar jeet Singh, director	2622132	estate-hp@nic.in
Department of Elementary Education	Sh. Rohit Jamwal, HPAS	2812464	eleedu-hp@gov.in
Department of Environment, Science and Technology	Sh. R. D. Dhiman, IAS, Addl. Chief Secretary	0177-2621911	envsecy-hp@nic.in
Department of Finance	Anil Kumar Khachi, IAS, Addl. Chief Sec.	0177-2620560	finsecy-hp@nic.in
Department of Excise and Taxation	Sh. J.C. Sharma IAS, Principal Sec.	177-2621897	etc-hp@nic.in
Department of Fisheries	Sh. Satpal Mehta, Director-Warden of Fisheries	01978-224068, 94180-0-7615	Fisheries-hp@nic.in
Department of Fire service	Dr. Atul Verma, IPS, Director	0177-2811453, 7018255555	dgp-hg-hp@@nic.in

Department of Forest	Dr. Savita Rani, PCCF	91-177-2624186, 2623147, 0177-2623155	pccf-hp@nic.in
Department of food, Civil supplies and Consumer Affairs	ONKAR CHAND SHARMA, IAS, Principal Sec.	0177-2622269	fssecy-hp@nic.in
Department of General Administration	B.K. Agarwal, Chief Sec.		
Department of Health and Family welfare	Sh. R. D. Dhiman, IAS, Addl. Chief Secretary	2621911, 94180-26646	dirhealthdhs@gmail.com
State Department of Horticulture		0177-2842390	horticul-hp@nic.in
Department of Information and Public Relations	Dr. Shrikant Baldi, ACS, UC Kaundal, Dy. Director	2620625, 627, 94181-61133	uttamkaundal@gmail.com
Department of Irrigation and Public Health	Sh. Devesh Kumar, Sec	2621904, 9805500005	iphsecy-hp@nic.in
Department of Home GAurds		0177-2658531	hgshimla@gmail.com
Department of Industries	Mr. Manoj Kumar	2621586	indussecy-hp@nic.in
Department of Language, Art and Culture	Mr. Naresh Thakur, Joint Secretary	0177-2805044	
Department of Information Technology	Sh. Jagdish Chander IAS, Principal Secy.	+91-177-2621897, 2880769	itsecy-hp@nic.in
Department of Local Audit	Dr. Suneel Kumar Angra, Joint Director	0177-2620046, 93188-75012	additionaldirectorlad@gmail.com, jtdirectorlad@gmail.com
Department of Personnel	Shri RD Dhiman, IAS, Addl. chief sec.	0177-2621911, 0177-2880751	perssecy-hp@nic.in
Department of Health Safety and Regulations	Sh.B.K.Agarwal	0177-2621022	

Department of Labour ad Employment	Nisha Singh	0177-2625085, 8800761114	lep-hp@.nic.in
Department of Law	Sh. Yashwant Singh, L.R.-cum-Pr. Sec.	0177-2621544	lawsecy-hp@nic.in
Department of Planning	Sh. Anil Kumar Khachi, Addl. Chief Sec.	0177-2620560	finsecy-hp@nic.in, planningsecy-hp@nic.in
Department of Public Works	Er. R.P. Verma, Engineer-in-Chief	2621401, 2628239, 94186-98008	pwd-hp@nic.in
Department of Printing and Stationery		0177-2830373, 2830402	ps-hp@nic.in
Department of Rural Development	Sh.Sachin Kanwal, Addl. Director -cum-Joint Secretary	0177-2623830	rddhimachal@gmail.com
Department of Revenue		0177-2622382, 0177-2623678	revsecy-hp@nic.in, dlr-hp@nic.in
Department of Prosecution	Sh. Ravi Kant Kaushal, Director	0177 - 2623871, 2620147, 98169-50447, 82191-93560	prosecution-hp@nic.in
Department of Secretariat Administration	Sh. B K Agarwal, Chief Sec.	2621022	cs-hp@nic.in
Directorate for the Empowerment of Scheduled Castes, Other Backward Classes, Minorities and Sepecially Abled	Nisha Singh, Addl. chief Sec.	0177-2621877	socialjesecy-hp@nic.in
Department of Technical education, Vocational and Industrial training	Sh. Manoj Kumar, Addl. Chief Sec.	2621586, 01907-266120	dtevithp@hotmail.com, techedu-hp@nic.in
Department of Urban Development	Sh. Anupam Kashyap , HAS, director	0177-2626518	ud-hp@nic.in
Department of Transport		0177-2621897	tptsecy-hp@nic.in

Department of Tribal Development		0177-2622269, 0177 2621997	ctd-hp@nic.in
Department of Women, Child Development	Smt. Nisha Singh, ACS	2621877, 2621904	wcd-hp@nic.in
Department of Social Justice and Empowerment	Nisha Singh, Addl. chief Sec.	0177-2621877	socialjesecy-hp@nic.in
Department of Youth Services and Sports	Sh. Dinesh Malhotra, Secretary	0177- 2620043, 9418077244	
Department of Tourism and Civil aviation	Surjeet Kumar, Nodal Officer	0177-2625924	tourism.hp@nic.in
Department of Treasuries, Accounts and Lotteries	Sh. D D Sharma	0177-2637779, 2620887	dirtre-hp@nic.in, secy-fin-hp@nic.in
Department of Small Savings	Sh. Kewal Sharma, Director	0177-2625117	saving-hp@nic.in
State Development Medicial Plants			
State Biodiversity Board	Shri B.K.Agarwal, Chairman		
Directorate of Panchayati raj	Dr. R.N. Batta, Sec.	0177-2621903, 94180-83222	jointdirector-pr-hp@gov.in
HIMCOST	Sh. R. D. Dhiman, IAS, Addl. Chief Secretary	0177-2621911	envsecy-hp@nic.in

NGOs:

Name Of NGOs	**Contact Person**	**Contact Number**	**E-mail**
District Padma Chhokharling Both Tibetan Gompa Association Bhanodi, Chamba	Bawa Sonam Yatso	91-94180 10622	bhanodigompa@gmail.com
Himalayan Village Education Trust, Chamba	Alok Mahendroo	91-94180 90301	alokisabelle@gmail.com

Sarva Shiksha Foundation, Chamba	Sheikh Takveer	91-94189 69528	takveer2008@gmail.com
Yog Manav Vikas trust, Chamba	Kiran Dudeja	91-1899-254767	yogmanavtrust@yahoo.co.in
Logothan Kinnaur Culture Society			
Upaukt Karyalays Karmchari Kinnaur Khel Sangh			
Zila Ashram Kalyan Samiti			
The Institute of Studies in Budhhist Philosophy and Tribal Cultural Society	Tseten Zangpo	+91 1906 223 315, 91 94189 63082	tabomonastery@yahoo.com
Collective Efforts for Volutary Action (CEVA)		9418791109	cevahimalayan@gmail.com
High Tech Education and Welfare Society, Pangi	Hem Raj Sharma	0189-7244086, 898 82 81433	hightechngohimachal@gmail.com
Ambuja Cement Foundation		022 - 40667500	
The Spiti Development Charitable Society	Chharing Raptan	01906-262308, 9418556107	rapten7@yahoo.com
Human Interest in Rural Advancement in Keylong			
The Mooring Agro Khadi Gramodyog Samiti	prem lal dogra	01902-240220, 9817043486	mooringagro@gmail.com
Guru Ghanter Buddhist Monastery Management Committee			
Jan Shikshan Sansthan, (Rinchen zangpo society for spiti development)		01906-200103	rinchenhp@hotmail.com
Kachen Dugyal Memorial Old Age Handicapped Society	lobjang gelek	01906-262073	kdmoh society@yahoo.com
Nav Chetna, Chamba	Puneet Bakshi	01899-224357, 09418461222	navchetnaindia@gmail.com
Himkush Educational Society, Chamba	mohd azam sheikh	01899-222965, 9816870086	himkushchamba@yahoo.com

Bhavya Jyoti, Chamba	bhajan singh	8988029933	bhajansingh167@gmail.com
Gramya Institute Rural Development Himachal Pradesh Society			
Mahila Vikas Manch	Sadhna Gautam	01899-222789, 9013259232	sandhana_g@yahoo.com

Agencies:

Name Of Agencies	**Contact Person**	**Contact Number**	**E-mail**
Japan Information Cooperation Agency (JICA)		(91-11) 4909-7000	id_oso_rep@jica.go.jp
Direct Aid Program (DAP), Australian Government, Managed by Department of Foreign Affairs and Trade (DFAT)		+91 11 4139 9900	ahc.newdelhi@dfat.gov.au
United Nations Development Programme (UNDP)	Manoj Thakur	9418421270	manoj.thakur@undp.org
Asian Development Bank (ADB)	Kenichi YOKOYAMA, Country Director	+91 11 24107200	
World Bank			

Annexure-4:

Policy Gap Sheet:

S. No.	Legislation/Policy	Brief Description	Gaps and Issues
1	Organic Farming Policy of 2010	To promote organic farming sector by developing appropriate plans, support services, supply chain, marketing, investment environment and organic agro tourism.	Lacks a comprehensive certification mechanism and supply chain and marketing strategy. Lacks strategy to lessen chemical use.
2	HP Forest Re-Revised Eco-Tourism Policy of 2017	Work towards conservation of natural resources and sustainable development and opportunities to enhance livelihood of local people.	Implication of tourism on the protected areas. Management of vehicular traffic.
3	HP Medicinal Plant Sector Policy of 2006	Recognizes medicinal plant resources as important forest produce, source of livelihood, and contributor to state's economy. Develops institutional and legislative mechanisms to develop the sector.	Policy implications of developing medicinal plant areas on and around Protected Areas.
4	State Policy on Payment for Eco-System Services, 2013	For sustainable production of ecosystem services; generating economic incentives to community for conservation.	Implementation???
5	HP Skill Development Policy of 2016	The policy recognizes the need to empower the individuals to enhance learning and lifelong employment opportunities to increase the productive wage force of the state.	Assurance of providing jobs after training is absent. Monitoring procedures are also lacking.
6	Indira AwaasYojana(IAY)	To provide the rural-poor living below the poverty line with financial aid for the construction of the house.	Lack of transparency in selection of candidates, low quality of houses, lack of technical support, weak mechanism for monitoring. Loans are not available by beneficiaries. Lack of

			convergence between different programs.
7	*Rajiv AwaasYojana* (RAY)	On the analogy of IAY.	On the analogy of IAY.
8	HP Rural Employment Guarantee Scheme of 2006	Under the scheme applicants are entitled to 100 days of guaranteed employment in the financial year.	Lack of transparency in selection of candidates. Lack of convergence between different schemes and programs.
9	Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Rule, 2008	Talks about granting the right to land where scheduled tribes and other forest dwellers have been living and practicing their livelihood. They need to provide the evidence for the claiming of the land.	No special provisions for the land that is falling under or intersecting with protected areas. No conflict solving regulation where two claimants claim the same piece of land.
10	Border Area Development Programme (BADP) Guidelines, 2015	It aims to cover all the special development needs and well-being of the people living near international borders in inaccessible areas and provide them with the basic infrastructure through the convergence of various schemes and participatory approach.	Environment???
11	Compensatory Afforestation Fund Act of 2016	Fund is provided for assisted natural and artificial regeneration, protection, management and conservation of the forest. It also works towards improved wildlife habitat, capacity building and monitoring.	Community access to natural reservoir is not mentioned. Eradication and monitoring of weeds are absent.
12	HP Forest Sector Policy and Strategy of 2005	Aims to achieve sustainable forest management. It also works towards maintenance and rehabilitation of its environment and enhanced livelihood opportunities of the people.	Grazing regulations for local glaziers are absent (available grazing ground is less than required grazing ground). No policy regulation for high-range pasturelands. No regulations for cultivation and trading of threatened MAPs. Lack of research on linking the climate change with change in forest.

13	HP Participatory Forest Management Rules of 2000	Talks about managing a selected area jointly by the Society and the Department based on the terms and conditions of the agreement between them.	No transparency on how the funds and yield are being used and distributed. No implementation, assessment and monitoring framework. What are the criteria for announcing an area under PFM?
14	Rules regulating the Grant-in-Aid to the village forest department Societies and the PFM scheme	Aims at achieving the objectives of PFM and its implementation.	Assessment and monitoring frameworks are absent.
15	Sanjhi Van Yojna	The main objective is the regeneration of the degraded forest area, conservation and sustainable use of forests through community participation.	No methodology for implementation, monitoring and assessment. No transparency in distribution of income. If the area is being used for plantation, then what about flora and fauna already exists there?
16	Rules regulating the Grant-in-Aid to the village forest department Societies and the SVY	Aims at achieving the objectives of *SanjhiVanYojna*and its implementation.	Methodology for assessing the use of sanctioned grant and transparency while sanctioning the grant is absent.
17	HP State Rural Livelihood Mission.	It aims at poverty alleviation through social mobilization, institutions and capacity building, financial inclusion, skill generation and a portfolio of sustainable livelihoods.	No indication if it is reaching the high-rangelands. No transparency in selection of SHG for investment, assessment and monitoring.
18	MukhyaMantriYuvaAajeevikaYojana, 2018	To promote self-employment opportunities and provide livelihood to local youth by encouraging local entrepreneurship.	No transparency while choosing the business to invest.

19	HP Sustainable Tourism Development Policy of 2013	It aims at making HP a leading global sustainable tourism destination and makes it a primary source of socio-economic growth in the state.	Monitoring criteria is not clear and no transparency while choosing the business for investment.
20	Efficient irrigation through Micro-irrigation Systems Project, 2016	It promotes equitable water distribution by using efficient irrigation systems.	No transparency in monitoring. No provision of capacity building.
21	Assistance to Women for self-employment Rules of 2005	It aims at aiding women to set up their own business trade in order to earn their livelihood.	No transparency while selecting the business. No monitoring system. No indication if it is accessible to high rangelands.
22	Policy for Project Staff engaged under the HPMHWDP, Swan River Project, Kandi Project I&II and Indo-German Changer Project.	The policy is for the Project Staff who have been working on the mentioned projects on full-time basis and needs to be re-engaged and re-appointed under other societies, departments or projects.	
23	The Scheduled Castes and Scheduled Tribes (Prevention of Atrocities) Rules, 1995	Provisions set up to prevent any atrocities towards Scheduled Castes and Scheduled Tribes and to bring justice to them if any atrocity has been committed.	There are no Special Courts, Special Police Stations; Surveys conducted to assess the working of the Provisions of the Act, legal Aid set up to help the victims of the atrocities. The Modal Contingency Plan is still under consideration.
24	HP State Water Policy of 2013	It talks about equitable and systematic distribution and usage of water, public awareness about conservation and maintenance of water quality.	Why the irrigation potential has not been reached till now and how to do it? No news regarding water adalats. Economic value (tariff) for the resource is not adequate, which may lead to overutilization.
25	HP Rural Employment Guarantee Scheme of 2006	It aims at guaranteed 100 days of employment in a financial year in terms of households.	People get paid even if they are not working or the project is not completed within the timelines. Who is accountable for this? Not all people belong to same economic strata, so who should get the benefit?

26	Guidelines for National Lake Conservation Plan	It uses an integrated ecosystem approach to restore and conserve the lakes of India which have been degraded due to waste water discharge.	No implementation and monitoring criteria. No strict provision regarding solid waste management and dhobi ghats.
27	Rural Housing Interest Subsidy Scheme (RHISS) Guidelines of 2017	Aims at providing pucca house with all basic amenities to all houseless and households living in kutcha houses by 2022.	No transparency in selection of candidates. Monitoring procedure is not specified.
28	Guidelines for Declaration of Eco-Sensitive Zones Around National Parks and Wildlife Sanctuaries (2011)	Areas around National Parks and Wildlife Sanctuaries are of high biodiversity significance, so they also need to be conserved.	Verification, implementation, management and monitoring criteria are absent.
29	National Conservation Strategy and Policy Statement on Environment and Development.	The purpose is to include and reinforce our traditional ethos and to build up a conservation society and making efficient use of resources.	Responsibilities of central, state and local governments are not clearly identified. Enforcement mechanism for employing tools and techniques (EIA) and implementation methodology for several key sectors are absent. Mid-term assessment of policy in absent
30	Guidelines on State Compensatory Afforestation Fund and Planning Authority (State CAMPA)	It is an instrument to accelerate the activities for preservation of natural forests, management of wildlife, infrastructure development in the sector and other works.	How are the communities living in the area are being involved and incentives and rewards awarded to them?

Annexure-5:

Proceedings of the First Stakeholder Workshop on Participatory Integrated Landscape Level Management Strategy and Plan for the Lahaul-Pangi Snow Leopard Landscape

---

Date: 4th July 2019

Time: 09:30.A.M to 04:30.P.M

Venue: Hotel Marina, Shimla, HP

The Agenda of the Workshop and List of Participants are in Annexure-1 and 2 respectively.

A. Welcome Remarks

Dr Jagdish Kishwan, Chief Advisor, GICIA India Pvt. Ltd. and Project Lead, UNDP Integrated Landscape Project

Dr Jagdish Kishwan, Chief Project Advisor welcomed all the participants. He extended his thanks to Dr Savita, IFS, PCCF (WL) & Chief Wildlife Warden, HP Forest Department and Dr Ajay Srivastav, IFS, Addl. PCCF (WL) cum State Nodal Officer for sparing their time to attend the first stakeholder workshop organized by GICIA. He gave the overview of the process of preparation of participatory integrated landscape-based strategy. He informed that GIPL and all the consortium partners have been working in the landscape area for last 6 months through their field survey teams and State Project Officer Mr Sudhanshu Arjeria. He informed that a total of 35 villages have been covered in the Lahaul-Pangi landscape by .... field teams of the GIPL. These teams have gathered a lot of information pertaining to conservation and development of snow leopard landscape area through FGDs, questionnaires-based survey and secondary literature review pertaining to the landscape.

Dr Savita, PCCF (WL) and Chief Project Director, SECURE Himalaya

Dr Savita, Chairperson of the SLTC & State Project Director introduced the participants about the ongoing activities under the SECURE Himalaya Project. She emphasised that amongst all the studies commissioned by the UNDP, preparation of participatory and integrated landscape-based strategy and plan holds the key to integrate all the line departments and their policies to work in tandem for the purpose of conservation and management of Snow Leopard Landscape in Pangi-Lahaul area.

Dr Savita, further focussed on the need of stakeholder dialogue and justified the necessity of carrying out frequent stakeholder consultations to prepare a rational strategy by integrating mandate of conservation of biodiversity of landscape with focus on securing community rights and local livelihoods for the larger agenda of SL Landscape conservation.

For the preparation of Strategy and Plan, she emphasised the use of standard reference documents, like the Sawarkar Guidelines.

Dr Ajay Srivastav, IFS, Addl. PCCF (WL) cum State Nodal Officer, SECURE Himalaya

Dr Srivastav explained the need of landscape vision while integrating the existing strategies, plan and schemes of different department and agencies. He emphasised on the need of converging different department and frameworks that will ensure the role of multiple stakeholders while mitigating the existing challenges pertaining to conservation and management of SL Landscape area. In this context, he gave example of viable collaboration between Forest Department and Animal Husbandry Department for vaccination of livestock on the fringes of PAs.

Mr Pankaj Pant, Manager, GICIA

Mr Pankaj Pant elaborated the objective of GIPL-UNDP Project. He also explained details of issues like overgrazing, livestock depredation, waste management, connectivity, and livelihood improvement identified during their primary and secondary studies.

Key Discussions:

Human Wildlife Conflict and Overgrazing:

- Growing livestock population is leading to overgrazing and competition with SL prey base. This competition is not limited to livestock only.
- Dr Ghoshal emphasized that overgrazing is not only degrading the landscape but also the health of animals like sheep, which face problems like low milk production and unhealthy progeny.
- Dr Srivastav informed that local community has rights of grazing in the landscape, and at present impact of tourism is low.
- Dr Jagdish Kishwan informed that issues of overgrazing and excess population of livestock may not be a major problem right now but this may affect the ecological balance of the landscape in future. Grazing rights and number of animals permitted should be closely regulated to keep a check on the situation.

- Mr. Dem Chand, local representative from Pangi informed that in Pangi, Human-wildlife conflict is a major issue. People spray poison on carcasses, and leave these in forest for Snow Leopard to feed that results in the predators' instant death. They also use traps to kill bears. Monkey population is also increasing and they feed on crops. The Local Communities are now more interested in rearing cows and ox rather than sheep.
- Mr Dem Chand further inquired, if killing monkeys could be permitted to save crops of locals. In response, Mr Dhaulta (DFO Wildlife, HQ) informed that as per latest circulars of HP SFD, monkey has not been declared as vermin in Pangi, and, therefore, it's killing presently is not permissible in Pangi. But the department can always consider request of the local communities of Pangi.
- Mr Tog Chand, local representative of Lahaul highlighted the issues like overgrazing and HW conflict are almost absent in Lahaul District.
- Dr Srivatav opined that pastoralism is on a decline in HP, and a few migratory graziers move to high rangelands for livestock grazing (*Gaddis* from Churah).
- Earlier local community used to be involved in regular patrolling but of late the traditional system has broken down, and now locals do not come forward for the purpose.
- Dr Minhas, Chairman HIMOARD stated that smuggling of wild animal parts for commercial gains is also emerging as an issue and needs immediate attention.

Tourism:

- Dr Srivastav suggested that tourism should be promoted as "Eco-tourism" or "Nature Tourism" as HP is more famous for its scenic beauty. To this Dr Kishwan explained that tourism and Eco-tourism are different entities and are under jurisdiction of different line departments, the convergence for which is a huge task, but there is need to synergise the actions and policies of the two departments.
- Activities for eco-tourism and wildlife tourism should be diversified and should be made more sustainable with benefits majorly flowing to the local communities.

Livelihood:

- Dr Minhas, HIMOARD suggested that the participation of local artisans should be highlighted rather than the schemes. Exposure should be given to them at International Exhibitions like "**BioFach**"
- Value addition activities like designing, packaging and branding can help local artisans to grow and promote their trade.
- People have excess raw material like wool but appropriate price and market procurement of the same are an issue.
- Mr Dem Chand informed that there is lot of potential in trading of Janglee Lahsun (*Allium spp*) and Jungle Tulsi (*Ocimum basilicum*).

- Duplication of handicraft products is a serious concern as outsiders mass produce duplicates of the local craft, and sell it under false local brand. To this, Dr Ghoshal suggested that strategic marketing should be adopted through which product identification and marking, like providing of holograms, could be emphasised. He further suggested that, to integrate snow leopard conservation with livelihood improvement, NCF Enterprise Programme in Spiti Landscape could be referred to for guidance.

Unsustainable trade of Natural Resources:

- Local community representatives from Lahaul and Pangi informed that Illegal extraction of MAPs is taking place in Pangi by outsiders from Churah (Tindi Panchayat).
- Mr Tog Chand from Lahaul inquired if through the help of *Mahila* and *Yuvak Mandals* they can intercept defaulters passing through their village who illegally extract MAPs. To this Mr Dhaulta, DFO, WL, responded that perhaps State Biodiversity Board could guide in this matter. Dr Kishwan suggested that this issue can be flagged under legal and policy gaps.
- Mr Tog Chand also inquired whether they could take up Forest Land for MAPs plantation. Dr Srivastava suggested that it may be possible but for community only, not for individuals. He also invited proposal for it.
- Kuth and other medicinal spp plantation are present but lack marketing strategy. Proper awareness and capacity building of locals is required for this purpose.
- Middlemen, who buy the product from farmers at low price, sell it at a much higher price in the market, cornering the major part of profit from the produce. Thus, with the present system of middlemen there is no significant improvement in farmers' income.

Waste Management:

- Dr Ajay Srivastav told that since there is limited connectivity to the SL landscape, the issue of waste management is not a pressing issue at present. However, the problem of waste management becomes more prevalent during tourist season.
- Dr Kishwan expressed his concerns over problem of waste accumulation along the stream banks in the State, and suggested that continuous monitoring of the Snow leopard landscape was needed to see that the problem of waste management did not become a problem in future. He suggested that the problem of waste management requires a regular check and monitoring.

Feral Dogs:

- Dr Abhishek Ghoshal informed that the problem of feral dogs is very prominent in snow leopard landscape area, mostly in Spiti. He further informed that feral dogs generally feed on refuge and garbage.

- Dr Kishwan pointed out that stray dogs foraging on kitchen and canteen waste of the security forces' establishments in the high-altitude bordering areas were a menace to the prey base of SL.
- Mr Sudhanshu Arjeria, informed that during his visit to Lahaul-Pangi SL landscape area, there has been a decline in feral dog population after being poisoned by the local Communities.
- An incident of an SL cub having been fatally injured by feral dogs in Spiti was mentioned in the workshop.

Migratory Labourers:

- Migratory labour poses a threat as they hunt animals and set up their base in or near forest. Dr Ghoshal mentioned that these labourers also live in difficult situation needing energy food, and their compulsion should be understood before taking actions against them.
- Major concern of the stakeholders was inadequate participation from the government departments especially in consultation workshops. They called for active participation and dialogue from all for framing a converged plan of action.

Suggested Plan of Action:

- Dr Kishwan stated that the problem of inadequate participation of the government departments was a matter of fact, but to overcome this situation, his team had already chalked out a schedule of one-to-one meetings with the concerned departments in next 2 days after the stakeholder workshop[1] to invite suggestions on the draft management strategy and plan.
- To address problem of overgrazing and conflict in the SL landscape, an empowered committee with participation from local community and government departments should be constituted.
- Dr Ajay Srivastav suggested that instead of eco-tourism, nature tourism should be promoted in the SL landscape to promote visitation of scenic places in the high range landscape.
- Capacity building of all stakeholders including government officials and a proper institutional mechanism for the purpose should also be included in the action plan.
- Mr Dem Chand from Pangi suggested that workshops and small meetings should be regularly organised with participations of an active representative from every village in the SL landscape. The villages may be covered in a rotational format.

[1] On 5th and 6th the GIPL team met officials of agriculture, animal husbandry, goat and sheep departments, HIMCOSTE and Wool Federation in Shimla, and collected their views on the Draft Integrated Strategy and Plan for the Pangi-Lahaul SL Landscape.

- Grazing Rights for local and migratory graziers should be critically analysed and regulated.
- Zonation for grazing can be considered to prevent uncontrolled grazing.
- Guidance and assistance from local influential figures like *Lamas* of prominent monasteries should be sought and institutionalized to create awareness amongst local people and to mould their opinion in favour of conservation of landscape along with its biodiversity.
- ***Praja Mandal, Mahila Mandal, Yuvak Mandal and Environment Committee*** can be institutionalised to give more responsibilities as local communities respect and fear their decisions.
- Properly empowered local committees can work with Forest Department for better coordination and management of snow leopard landscape area.
- Dr Kishwan suggested that an internal reporting system should be present in every village to report illegal activities like NTFP extraction and killings.
- People although have constituted BMC but they need to be made aware about the roles and responsibilities of the BMCs along with their powers.
- Dr Minhas, HIMOARD informed about CIH (Confederation of Indian Horticulture) that organises farmer-producer groups to make marketing accessible. Agencies can work with CIH to take advantage of such groups at village level.
- Dr Minhas also informed that Organically Certifying the villages can be helpful as it not only reduces the use of fertilizers and pesticides but also helps in fetching a higher market price for the produce compared to non-certified products. He has already certified 2 villages with coverage of around 5000 people.
- Local storage facilities based on local innovative technologies should be developed in SL landscape villages to prevent glut of products, and to regulate supply of local seasonal products in the markets to enable the local farmers to get a better price.
- GI certification should be considered for locally grown plant species and products. HIMCOSTE can be engaged to help the process as they have already registered (GI tag) a number of local products like Chulli Oil, Chamba Tea, Kala Zeera, etc.
- Dr Abhishek informed that to deal with problem of feral dogs, NCF has installed **Bio-digester modules** in Spiti area, and similar bio-digesters could be installed in feral dogs affected areas of Project SECURE Landscape.
- Dr Abhishek also mentioned about the SL Enterprise programme being implemented by NCF in Spiti (contact person Mr Ajay Bijur), and learning and experience from the same could be made use of, as appropriate, while developing the 'Participatory landscape level integrated strategy and plan' for Pangi-Lahaul SL landscape.
- There should be better awareness about government schemes. Local communities are not well aware of schemes being implemented by government and other agencies for their benefit. Compensation schemes for livestock killed by wild animals of forest department are such examples.
- Incentives should be provided for grooming and encouraging local champions, who should also be recognised. Monetary incentives can also be considered for the purpose.

- Wool Federation, HP can contribute significantly towards the improvement of sheep, vaccination, providing modern tools for shearing and generating market linkage for raw wool.
- Local festivals like *Yatra, Zukaaru and Vindal Sherjach* could be used as a potential platform to showcase the snow leopard conservation and raise awareness about various issues connected with its conservation and management. Local influential personalities, like Lamas, other religious leaders, preachers and other community leaders can be invited in the events during the festivals to give to local communities, the message of conservation.
- Mr Tog Chand from Lahaul suggested strengthening and convergence of societies like *Lahaul-Spiti Paryavaran Suraksha Samiti, Udaipur* would be a much-needed step. The *Lahaul-Spiti Paryavaran Suraksha Samiti* works with all the departments and other agencies to converge their initiatives for better management of the landscape.
- Dr Abhishek Ghoshal recommended to replicate the convergence mechanism which is being implemented in Spiti. Spiti has landscape level implementation committee with CF/DCF as head and serving officers of government departments, senior officers of District Administration, NGOs, community-based organisations and members from Village Councils/Gram Sabhas as members. They also have village level committees. This could provide good insight for conceiving a good coordination mechanism for integrated approach for conservation and development of the Pangi-Lahaul SL landscape.

Vote of thanks

On behalf of GICIA India Pvt. Ltd., Mr Sudhanshu Arjeria, State Project Officer thanked Dr Savita, PCCF (WL), Dr Srivastav, Addl. PCCF (WL), S/shri Dem Chand and Tog Chand, community representatives, and all the other participants for attending the workshop and providing their useful insights, comments and suggestions on all aspects of the integrated strategy and management of the SL landscape. He especially expressed his gratitude for community members from Lahaul and Pangi, who travelled all the way from landscape area to attend the workshop, and share their views.

Encl:

Annexure 1: Agenda of the Workshop

Annexure 2: List of Participants

Annexure 1: Agenda of the Workshop

First Stakeholder Workshop under SECURE Himalaya Project

Organized by: GICIA India Pvt. Ltd, NCCF & ICIMOD

Name of Project: *Prepare Participatory Integrated Landscape Level Management Strategy and Plan by defining extent of landscape (alpine and sub-alpine) and evaluating landscape level existing strategies in selected districts of Himachal Pradesh*

Date: 04.07.2019 (Thursday)

Venue: Hotel Marina, Shimla, H.P.

Rapporteurs: Mr Pankaj Pant, Ms Pooja Dagar, Mr Ishaan Chahal

Agenda	Time	Contact Person
Inaugural Session		
Registration	9:30- 10:00 am	Mr Ishaan Chahal, Project Associate
Welcome and Introduction	10:00 to 10:15 am	Dr Jagdish Kishwan, Chief Project Advisor, GIPL
Welcome Note	10:15 to 10:30 am	Dr Savita, Chief Wildlife Warden cum State Project Director
Brief on the objectives of the Workshop	10:30 to 11:00 am	Mr Pankaj Pant, Manager, GIPL

Technical Session-1		
Management Strategy and Plan for Lahaul-Pangi Snow Leopard Landscape	11:00 am- 12:00 am	Ms Pooja Dagar, Mr Pankaj Pant
Open Discussion	12:00 am-01:00 pm	Mr Pankaj Pant
Lunch 01.:00 pm to 2:00 pm		
Technical session-2		
Landscape extent maps	02:00 to 02:30 pm	Mr Pankaj Pant, Ms Pooja Dagar, Mr Ishaan Chahal
Group Activity	02:30 to 03:30 pm	Mr Pankaj Pant, Ms Pooja Dagar, Mr Ishaan Chahal
Wrap up session	03:30 to 4:15 pm	Dr Jagdish Kishwan, Chief Project Advisor
Vote of Thanks	4:15 to 04:30 pm	Mr Pankaj Pant, Manager, GIPL

Annexure 2: List of Participants

Name	Department	Email Id and Contact Number
Dr. Savita	HP Forest Department	Pccf-wl@nic.in 9410110759
Dr. Ajay Srivastav	HP Forest Department	Ajay.srivastav1@gmail.com 9418462618, 8057981755
Dr. Jagdish Kishwan	Chief Advisor, GICIA India Pvt Ltd	jkishwan@gmail.com 9899930484
Dr Ranjit Kumar	Scientist, HFRI	ranjeetsinha@gmail.com 8988378338
Abhimanyu Mann	GICIA India Pvt. Ltd.	abhimanyumann@gmail.com 9999410099
Sachin Sharma	HIMOARD Ramdur Bushahr	7018555799
Subhash Thakur	Ceva, Pangi	9459987032
Dem Chand	Ceva, Pangi	8988023405
Prem Singh	Pangi Kisan Co., Sach, Phindro	8988969500
Dr. R. S. Minhas	Chairman, HIMOARD	drrsminhas@gmail.com
Manoj Thakur	State Project Officer, UNDP	Manoj.thakur@undp.org
Dr. Abhishek Ghoshal	UNDP-MOEFCC	Abhishek.ghoshal@undp.org 8197398987
NPS Dhaulta	DFO (HQ) o/o PCCF (WL), HP	npsdhaulta@gmail.com
M. K. Thaplyal	Range Officer, Killar, Pangi	m.k.thaplial@gmail.com
Tog Chand Thakur	Lahaul-Spiti	9418318364
Sher Lal Sharma	Lahaul-Spiti	8988779630
Dr. Rajan Uppal	DHS, HPFD, Shimla	deputydirector@gmail.com
Kirti	NAF Herbals	nafherbals@gmail.com
Pankaj Kumar Pant	GICIA India Pvt Ltd	Pant.pankaj@gmail.com 9205012612

Sudhanshu Arjeria	GICIA India Pvt Ltd	arjeria@hotmail.com 7869949477
Ishaan Chahal	GICIA India Pvt Ltd	projectsecure@gicia.org 7042453145
Pooja Dagar	GICIA India Pvt Ltd	projectsecure@gicia.org 9813456705

Annexure-6:

Proceedings of the Stakeholder Workshop on Participatory Integrated Landscape Level Management Strategy and Plan for districts of Lahaul-Pangi, HP

Date: 21st August 2019

Time: 10:00 A.M to 03:45 P.M

Venue: Library Hall, Killar (Chamba) HP

Agenda of the workshop and list of participants are in Annexure-1 and 2 respectively.

A. Welcome Remarks

Sudhanshu Arjeria, State Project Officer, GIPL/NCCF welcomed all the participants and thanked them for sparing some time from their busy schedule to attend the stakeholder consultation conducted by GIPL/NCCF. After the welcome note, Mr Arjeria took permission from SDM, Pangi to start the proceedings. Mr Arjeria gave the overview of the process of preparing participatory integrated landscape-based strategy and plan, and the role of stakeholder consultation. He informed that in last 6 months the GIPL team travelled in the landscape area and have gathered a lot of information about this landscape. He further added that GIPL team had carried out a number of discussions with different Government officials, organisations, individual experts and local communities from the landscape pertaining to conservation and management of Snow Leopard and its landscape.

Mr Arjeria explained that landscape-based strategy and plan desire an appropriate framework and mechanism to integrate different departments, agencies, NGOs and institutions working in the landscape area. The role of local community in managing the landscape area is crucial since they are the ultimate custodians of the regional biodiversity.

B. Key Discussion

1. Livelihood (Agriculture and Horticulture):

- Discussion started with main agricultural crops of the area. Many participants expressed their concern that due to lack of proper transportation mechanism most of the farmers are not being able to sell their perishable produce like Cauliflower, Green pea at right time.
- Some participants also said that farmers are interested in cultivation and marketing of MAPs but lack a common understanding of market scenario and cultivation methods.
- Bhag Singh, Dy. Pradhan of Chask, told that they have to pay more than Rs.200 per bag due to lack of proper road transportation.
- Most of the participants were unaware of fact that that organic certification of agricultural produce of the landscape has already started. The knowledge of local community pertaining to pros and cons of organic certification was very less.
- Participants also discussed about "**Zero Budget Farming"** Concept promoted by HP Government. Mr. Bhanu Pratap Singh from Agriculture department explained the participants about the working of this scheme but it was observed that level of awareness about this scheme was very low.
- Mr. Bhanu also raised a question about SECURE Himalaya Project. He said as lot of consultations had already been done with local communities what would be the timelines for implementation of the activities planned under the project?
- Mr. Premchand of Gubari shed some light on importance of bees in agriculture and horticulture especially in Apple cultivation. Participants felt that Bee-keeping must be promoted in the landscape.

2. Animal Husbandry:

- Dr. Rana, Director, Department of Animal Husbandry took the lead in this discussion. He discussed about recent news of virus of rabies and FMD (Foot and Mouth Disease). These problems were very rare in the landscape, but in last few year reports related to rabies and FMD have increased many folds. Failure of vaccination is an important reason of this increase. Inadequate cold-chain facilities are the major reason behind overall failure of vaccination programme.
- It was also observed that some *Gaddis* are not using their traditional routes for their seasonal migration. This is also a major concern for the animal husbandry department. Because of this change in route, animal husbandry officials are not being able to vaccinate all the migratory animals.
- During the implementation phase of Government schemes to promote the indigenous breed of the area, it was observed that traditional breeds have become very rare in the landscape

area. Crossbreeding has covered almost all the cows. *Sahiwal* variety has been induced in landscape and result of this introduction will appear in next two or three years.

- Scarcity of fodder is a very big issue in the landscape. Participants discussed about development of fodder banks in every village.
- Participants also suggested the organisation of *livestock melas*, where villagers can sell and buy animals.
- Participants asked about an agreement between SECURE Project and Animal Husbandry department in Lahaul area. Participants wanted to know the result of this agreement although most of the line departments were totally unaware about this agreement.

3. Tourism:

- Participants agreed that landscape has tremendous scope of tourism but till date only one officially recognized home-stay is available in the whole Pangi area. They informed that about 30 applications for Home-stay registration are pending with tourism department in Chamba.
- Participants emphasized that lack of proper training and knowledge about Tourism, Eco-tourism or sustainable tourism is a big concern for this landscape.

4. NTFP (Non-Timber Forest Products):

- NTFP collection is an important source of income for most of the villagers in this landscape. Participants told that people from *Churah*, other places and even from Nepal are involved in illegal collection of valuable NTFPs.
- Most of the NTFP collectors are not aware about sustainable collection of many NTFPs. They are also not fetching proper price for the collected herbs.
- There is a need of providing a Collection centre and primary processing centre of local herbs in the landscape.

5. Biodiversity and BMC (Biodiversity Management Committee):

- Most of the participants were unaware of importance of biodiversity and its role in their life.
- Although BMCs have been constituted in all the *Panchayats*, still people are unaware of its role and importance. Participants discussed about capacity building and strengthening of BMCs. BMC members need primary training about functioning of BMCs and preparation of PBRs.

C. Vote of Thanks:

On behalf of GICIA India Pvt. Ltd., Mr Sudhanshu Arjeria, State Project Officer thanked all the representatives from the line departments, community representatives, and all the other participants for attending the workshop and providing their useful insights, comments and suggestions on all aspects of the integrated strategy and management of the SL landscape. He especially expressed his gratitude for community members from Lahaul and Pangi, who travelled all the way from landscape area to attend the workshop, and share their views.

Encl:

Annexure-1: Agenda of the Workshop

Annexure-2: List of Participants

Annexure-3: Snapshots from the event

Annexure-1: Agenda of the Workshop

Stakeholder Workshop under SECURE Himalaya Project

Organized by: GICIA India Pvt. Ltd, NCCF & ICIMOD

Name of Project: Prepare Participatory Integrated Landscape Level Management Strategy and Plan by defining extent of landscape (alpine and sub-alpine) and evaluating landscape level existing strategies in selected districts of Himachal Pradesh

Date: 21.08.2019 (Wednesday)

Venue: Conference Hall of Library, Killar, Chamba, HP (21.08.2019)

Rapporteurs: Mr Pankaj Pant, Ms Pooja Dagar, Mr Ishaan Chahal, Mr Sudhanshu Arjeria

Agenda	Time	Contact Person
Inaugural Session		
Registration	10:00 to 10:30 am	Mr Ishaan Chahal, Project Associate
Welcome and Introduction	10:30 to 11:00 am	Mr Sudhanshu Arjeria, State Project Officer, GIPL
Brief on the objectives of the Workshop	11:00 to 11:30 am	Mr Pankaj Pant, Manager, GIPL
Technical Session-1		
Management Strategy and Plan for Lahaul-Pangi Snow Leopard Landscape	11:30 am to 12:30 pm	Ms Pooja Dagar, Mr Pankaj Pant
Lunch 12.:30 to 01:30 pm		

Technical session-2		
Open Discussion	01:30 to 03:00 pm	Mr Pankaj Pant, Ms Pooja Dagar, Mr Ishaan Chahal
Wrap up session	03:00 to 03:30 pm	Mr Pankaj Pant, Manager, GIPL

Vote of Thanks	03:30 to 03:45 pm	Mr Sudhanshu Arjeria, State Project Officer, GIPL

Annexure-2: List of Participants

S. No.	Name of Participants	Address	Contact Number
1	Kishan Chand	Vill. Gubari	7657061580
2	Guru Dev	Vill. Phindroo	9418430418
3	Satish Kumar	Vill. sach	9459990767
4	Devi Singh	Vill. Kulaal	9418442582
5	Dem Chand	Vill. Phindroo	8988023405
6	Jivan Singh	Vill. Hudan	9418777163
7	Chuni Lal	Vill. phindpar	8988884613
8	Jagdish kumar	Vill. Phindroo	9418238757
9	Chain Singh	Vill. Gubari	8988689592
10	Yog Raj	Vill. Kulaal	8988413060
11	Shiv Kumar	Vill. Sach	9418845296
12	Ishwar Dutt	Vill. Gubari	9418714276
13	Manjit Kumar	FO Purthi	9418542586
14	Ashwin Sharma	Pradhan GP Sahli	9182407000
15	Mohinder Sharma	PSS GP Kurmar	9418995204
16	Bhag Singh	Up Pradhan GP Sechu	9418639609
17	Chuni Lal Thakur	Retd, Deputy Sec. HP Vidhan Sabha	9418400688
18	Brij Lal Thakur	Rtd. BEEO Pangi	9418466217
19	M C Sharma	A A E (E) Killar	9418550171
20	Roshni Devi	Vill. Hudan Bhatori	9459660198
21	Nima Tengan	Vill. Hudan Bhatori	9418429251
22	Rajinder Sharma	FGd Punto	8988706515
23	Roop Singh Thakur	FGd FSD Killar	8988786769
24	Neeraj kumar	FGd Killar	9418781088
25	Rajesh Kumar	Fgd Rei	9418716821
26	Prem Singh	BO B/Beni	9418462491

27	Bishan Dutt Sharma	Vill. Phindroo	9418667486
28	G S Chauhan	Rtd. Principal, Vill. Karwas	9418314565
29	Pratap Singh	Pradhan Mindhal	8988538858
30	Yog Singh Dhyani	SBFO	9418430421
31	Bhanu Pratap Singh	ADO	9418238107
32	Dr Sanjeev Rana	SVO and AD, Animal Husbandry, Killar	9418004335
33	Amar Nath	HEO (HOAi) Killar	9418903910
34	Anoop Singh	TWO Pangi	845434765
35	Anjana Negi	Pradhan GP Luj	9418772742
36	Vishant Bharati	SDM Pangi	8219035950
37	Yog Sing Sharma	BDC Chairman, Pangi	9459402400
38	Praveen Sharma	Naib Tehsildar Pangi	9418354389
39	Sparsh Sharma	BDO Pangi	0418955506
40	Surender Sharma	Moushi	8988076511
41	Prem Chand Sharma	Zuwari	9459278585
42	Inder Prakash Sharma	Ex Pradhan GP Mindhal	9418718325
43	Pyare Lal	Pradhan SP Rei	9418372692
44	Jai Singh		9418337161
45	Rinki	Vill. Phindroo	9459599995
46	Kamal kumari	Vill. Hundan	8988698541
47	Sebo Kumari	Vill. Kulaal	
48	Meena Kumari	Vill. Guwari	9459184688
49	Asha kumari	Vill. Chask	9459948661
50	Bhan Dei	Vill. Chask	
51	Nar Dei	Vill. Kulaal	9459548691
52	Ringla	Killar	

Annexure-3: Snapshots from the event at Killar, Pangi (HP)

Stakeholder participating in the workshop participants expressing their views

Mr Sudhanshu Arjeria giving introductory remarks