

# Scoping Study for REDD+ in Kailash Sacred Landscape of India





# **Scoping Study for REDD+ in Kailash Sacred Landscape of India**

**Indian Council of Forestry Research and Education  
P.O. New Forest, Dehradun – 248 006, India**

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## Message

Reducing emissions from deforestation and forest degradation and role of conservation, sustainable management of forests, and enhancement of forest carbon stocks collectively known as REDD+ is one of the most ambitious land use based programmes under UNFCCC for climate change mitigation. REDD+ intends to provide financial incentives to the communities for their role in conservation and enhancement of forest carbon stocks. A well designed REDD+ has a great potential to provide livelihood benefits to the forest dwelling communities. REDD+ actions become more relevant in case of Uttarakhand where there is a strong involvement of communities in managing their forest resources in the form of *Van Panchayats*. With this pretext it was felt to undertake a scoping study for REDD+ in the Kailash Sacred Landscape in India which is predominantly located in the districts of Pithoragarh and Bageshwar in Uttarakhand.

Under ICFRE–ICIMOD programme on 'REDD+ Himalayas: Developing and using experience in implementing REDD+ in the Himalayas', ICFRE has conducted this REDD+ scoping study for Kailash Sacred Landscape in India. I am pleased to present this study on behalf of ICFRE and would like to congratulate the officers and staff of Biodiversity and Climate Change Division, Directorate of Research, ICFRE to bring this report well in time. I am hopeful that findings of this report will pave way for a successful REDD+ Project in the Kailash Sacred Landscape in India.

(Dr. Shashi Kumar)







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## Foreword

Forest ecosystems are unique as they act as both source and sink of carbon dioxide. Currently about one quarter of anthropogenic green house gas emissions is coming from land use change (primarily deforestation) and agriculture activities. Despite the acknowledged role of forests in green house gas reduction, deforestation in many developing countries continues unabated. The UNFCCC initiated a process for financial incentives to the developing countries for reducing emission from deforestation and forest degradation, and capturing carbon through forest conservation and sustainable management of forests, the instrument collectively known as REDD+. Various REDD+ programmes have been initiated globally under the UNFCCC and also under the voluntary market. In tune with international development on REDD+, Himalayan countries are also taking serious steps to engage in REDD+ programmes. A large population in Himalayan region is dependent on forest resources, but their capacity to meet various standards for participation is constrained.

I am happy to share that ICFRE has initiated a programme 'REDD+ Himalayas: Developing and using experience in implementing REDD+ in the Himalayas' with active collaboration of ICIMOD. It is a trans-boundary programme with overall goal to build the REDD+ capacity. Under this programme ICFRE has conducted the REDD+ scoping study for the Indian part of Kailash Sacred Landscape. Uttarakhand has a tradition of community controlled forest management like Civil and *Soyam* Forests, *Van Panchayats* and JFM Committees. *Van Panchayats* and community based forest management in Uttarakhand have been successful in conserving the forest resources. All these activities and measures of forest management in the Kailash Sacred Landscape have the potential to fit into REDD+ oriented mitigation measures, with sizable potential for increasing the carbon capture and providing livelihood opportunities at the same time.

I am hopeful that findings of the REDD+ scoping study in Kailash Sacred Landscape will be useful for developing a full-fledged REDD+ Project for the region in near future. I appreciate the efforts of Biodiversity and Climate Change Division, Directorate of Research, ICFRE for preparing this report and also acknowledge the financial support from ICIMOD for the study.

(Dr. G.S. Goraya)







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## Preface

Globally, the importance of forests is now increasingly recognized as a mean of climate change mitigation at relatively lower cost with significant co-benefits. Forest conservation has been practiced as a tradition in India, and is amply reflected in the Forest Policies, Acts and Rules of the country. India's efforts in conservation have helped in sequestering substantial amount of carbon, and it is one of the few developing countries where forest sector is a net sink of greenhouse gases. The trend is likely to move further upwards with more and more carbon getting locked in forests, and also in tree cover outside forests.

In Himalayan region specifically, people are largely dependent on forests for their livelihood needs and have always showed a strong bond with forests in their daily life. ICFRE has initiated a programme 'REDD+ Himalayas: Developing and using experience in implementing REDD+ in the Himalayas' with the active collaboration of ICIMOD. Under this programme ICFRE has conducted a Scoping study for REDD+ in the Kailash Sacred Landscape of India. In the current study, a detailed literature review, analysis of relevant policies, stakeholders consultations, meetings with institutions in the Himalayan region was carried out to explore the possibility of developing a REDD+ project in this part of the country.

We are extremely thankful to Dr. Shashi Kumar, Director General, ICFRE for providing his valuable guidance and support for preparing this report. Overall direction and support provided by Dr. G.S. Goraya, Deputy Director General (Research), ICFRE for preparation of this report is also gratefully acknowledged. We are also grateful to Dr. Bhaskar Karky, ICIMOD, Kathmandu (Nepal) and Mr. Kai Windhorst, Chief Technical Advisor, GIZ, Kathmandu (Nepal) for their valuable inputs for preparation of this report. Financial support from ICIMOD, Kathmandu (Nepal) for carrying out this study under the programme 'REDD+ Himalayas: Developing and using experience in implementing REDD+ in the Himalayas' is also gratefully acknowledged. Also thanks to GB Pant National Institute of Himalayan Environment and Sustainable Development, Kosi Katarmal, Almora for providing logistic and technical support during the stakeholder consultations.

We take this opportunity to offer our sincere thanks to all the officers, scientists and staff of Biodiversity and Climate Change Division, Directorate of Research, ICFRE who were directly or indirectly involved in this activity. Without their support it was not possible to accomplish the task and bringing out this report.

(Dr. T.P. Singh)





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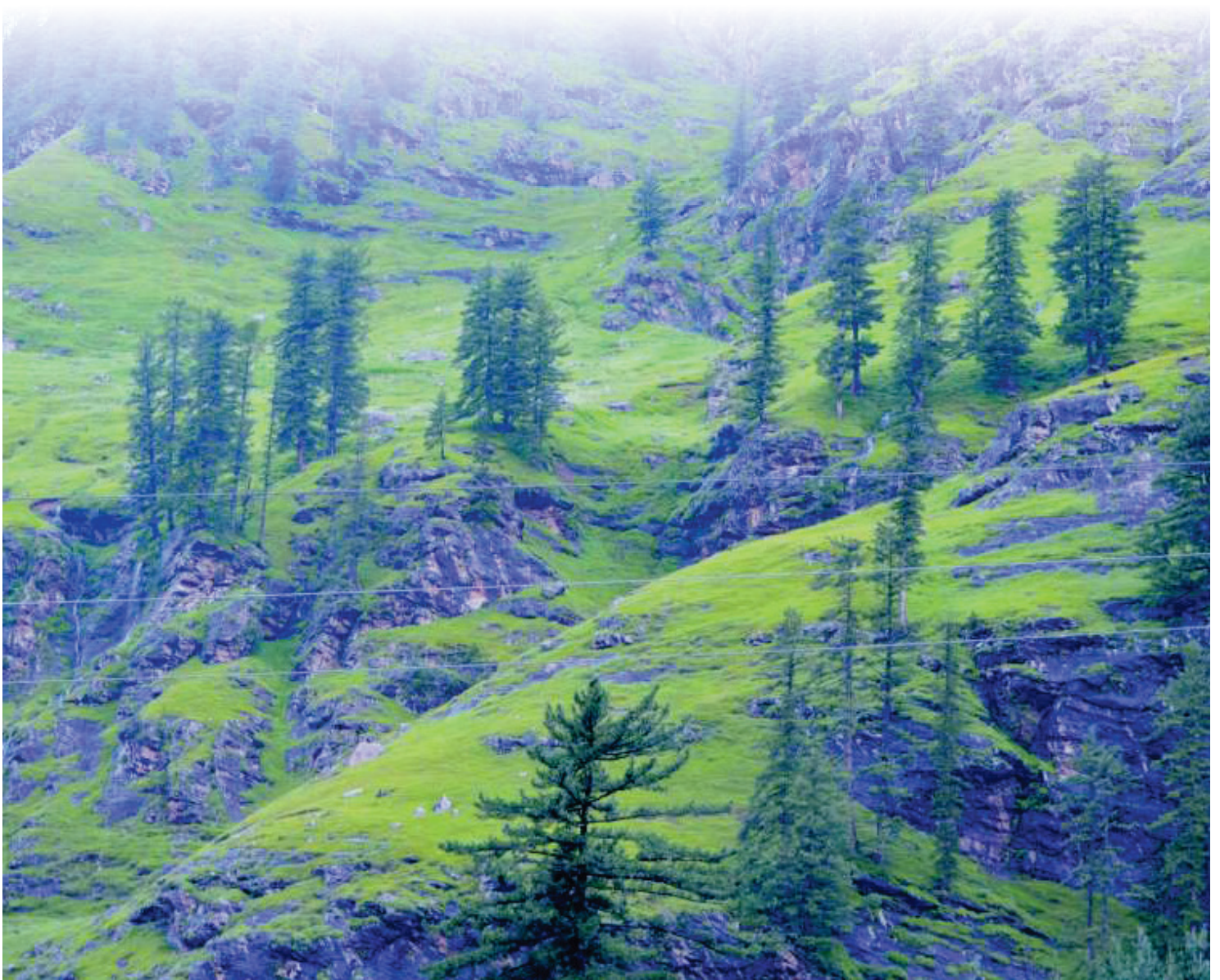
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# Abbreviations Used

<b>ABSM</b>	Access and Benefit Sharing Mechanism
<b>ACR</b>	American Carbon Registry
<b>AFOLU</b>	Agriculture, Forestry and Other Land Use
<b>ANR</b>	Assisted Natural Regeneration
<b>APDD</b>	Avoided Planned Deforestation and Degradation
<b>ARR</b>	Afforestation, Reforestation and Revegetation
<b>AUDD</b>	Avoided Planned Deforestation and Degradation
<b>CCB</b>	Climate Community and Biodiversity
<b>CDM</b>	Clean Development Mechanism
<b>CIFOR</b>	Centre for International Forestry Research
<b>COP</b>	Conference of Parties
<b>EDC</b>	Eco-Development Committee
<b>EFCS</b>	Enhancement of Forest Carbon Stock
<b>FCPF</b>	Forest Carbon Partnership Facility
<b>FSI</b>	Forest Survey of India
<b>GBPNIHESD</b>	Govind Ballabh Pant National Institute of Himalayan Environment and Sustainable Development
<b>GHG</b>	Greenhouse Gas
<b>GIM</b>	Green India Mission
<b>ICFRE</b>	Indian Council of Forestry Research and Education
<b>ICIMOD</b>	International Center for Integrated Mountain Development
<b>IPCC</b>	Intergovernmental Panel on Climate Change
<b>ISO</b>	International Organization for Standardization
<b>JFM</b>	Joint Forest Management
<b>JFMC</b>	Joint Forest Management Committee
<b>KSL</b>	Kailash Sacred Landscape
<b>KSLCDI</b>	Kailash Sacred Landscape Conservation and Development Initiative
<b>KW</b>	Kilowatt
<b>km<sup>2</sup></b>	Square Kilometer
<b>LPG</b>	Liquefied Petroleum Gas
<b>MoEF&amp;CC</b>	Ministry of Environment, Forest and Climate Change
<b>MRV</b>	Measuring, Reporting and Verification



<b>NFCAMS</b>	National Forest Carbon Accounting and Monitoring System
<b>NGO</b>	Non Governmental Organization
<b>NTFP</b>	Non Timber Forest Product
<b>REDD</b>	Reducing Emission from Deforestation and Forest Degradation
<b>REDD+</b>	Reducing emissions from deforestation and forest degradation, and role of conservation, sustainable management of forests and enhancement of forest carbon stocks
<b>REL</b>	Reference Emission Level
<b>RL</b>	Reference Level
<b>SFDs</b>	State Forest Departments
<b>SIS</b>	Safeguard Information System
<b>SMF</b>	Sustainable Management of Forest
<b>TERI</b>	The Energy Resource Institute
<b>UNFCCC</b>	United Nation Framework Convention on Climate Change
<b>VCS</b>	Verified Carbon Standard
<b>VP</b>	<i>Van Panchayat</i>




# Executive Summary

Deforestation and forest degradation in tropical forests is one of the major causes of greenhouse gas emissions besides fossil fuel burning. UNFCCC agreed to address this issue under its decision on Reducing Emissions from Deforestation and Forest Degradation in developing countries. Later REDD was upgraded to REDD+ with inclusion of forest conservation. India's draft National REDD+ policy and strategy lays emphasis on developing a robust REDD+ framework at national level through establishing a National REDD+ Authority. This strategy also underscores provisions of REDD+ safeguards, strengthening stakeholders' participation for addressing forest degradation and the role of private sector involvement. In order to facilitate REDD+ at national level among all stakeholders, Government of India has also prepared a 'REDD+ Reference Document' that comprehensively addresses the need of capacity building across all levels of the government, expert organizations, civil society, other organizations and local communities.

In India the national and state governments are jointly responsible for the sustainable management of forest resource. The state forest departments act as the custodian of the public forest resource and the forest are managed under an approved Forest Working Plan. Various acts and legislations are strong testimony to Government of India's commitment to implement REDD+ safeguards through involvement of participating communities and conservation of its natural forests. The National Forest Policy, 1988 ensures environmental stability and maintenance of ecological balance including atmospheric equilibrium which is vital for sustenance of all life forms, human, animal and plant. In 1990 India initiated a very successful Joint Forest Management programme involving local communities for forest protection and management. Through JFM low-productivity forests have been converted to high productivity forests. *Van Panchayats* are a unique system of forest governance in Uttarakhand and they have their method of controlling and managing forests to meet the community demand of fuel wood, fodder, leaf litter for manuring crop and bedding material for cattle, etc. VPs and community based forest management in Uttarakhand have been successful in conserving the forest resources.

Kailash Sacred Landscape (KSL) is a trans-boundary region covering 31,175 km<sup>2</sup> between India, China and Nepal. Indian part of KSL occupies 7,120 km<sup>2</sup> of KSL, covering 6826 km<sup>2</sup> in Pithoragarh district and 294 km<sup>2</sup> in Bageshwar district of Uttarakhand State. Pithoragarh district has 1051 VPs covering a total area of 96014.11 ha while Bageshwar district has 320 VPs covering an area of 7995.31ha under KSL in India. In Uttarakhand, VPs cover about 16% of forest and another 13% is under Civil and *Soyam* Forests. All these activities and measures of forest governance/ management in the KSL can fit into a REDD+ programme with sizable potential for increasing the sequestration of carbon. REDD+ scoping study in KSL of India has been conducted under the aegis of ICFRE-ICIMOD supported programme 'REDD+ Himalayas: Developing and using experience in implementing REDD+ in the Himalayas'. This scoping study of REDD+ in KSL is conducted through review of available literature, expert consultation, stakeholder consultation and field visits.

As per Champion and Seth (1968) Classification System of Forest, Uttarakhand state has 37 forest sub group types which belong to 8 forest type groups. KSL has 19 forest subgroup types which belong to 7 forest type groups. Forest cover in KSL in India has 61672.20 ha under Very Dense Forest (canopy density >70%), 119476.92 ha under Moderately Dense Forest (canopy density 40-70%), 46615.51 ha under Open Forest



category (canopy density 10-40%) and 2790.43 ha under Scrub (canopy density <10%). Forest cover for Pithoragarh and Bageshwar districts of Uttarakhand showed continuous increase in percentage of total geographical area from 2003 to 2015. However, conversion of very dense and moderate dense forest to open forest indicates that forest degradation in Indian part of KSL. A total of 29.90 million tonnes of carbon stock is estimated in KSL using estimates of carbon in different forest types. Afforestation programmes in open forest and Assisted Natural Regeneration (ANR) in moderately dense forest class can have pivotal role in carbon sequestration. Two representative transects (i) Horizontal transect: along the east-west heritage route linking west Nepal with mainland India and (ii) Vertical transect: along Kali-Dhauri river catchments in eastern part of KSL India, have been broadly identified as intensive study sites by the GBPNIHESD, Almora under KSLCDI. In the region, a potential REDD+ project can be implemented in two representative sub-watersheds (Hat-Kalika and Chandak-Aunla Ghat) along the horizontal transect. A lot of work on resources utilization pattern, people's needs, impacts of invasive species on forest, and agricultural resources assessment have already been done by GBPNIHESD. Some *Van Panchyats* in these two sub-watersheds can be selected to understand their participatory role in enhancement of carbon stock, reducing emissions from forest degradation, conservation and sustainable management of forest.

There are long, complex causal chains that can bring about deforestation or the degradation of forests. Local community in this Himalayan region is heavily dependent on forests for their livelihood. Forests are facing degradation due to various pressures caused by increase in the human population and increasing demand for fuel wood, fodder and timber etc. About, 80-90% rural households are using fuel wood for cooking, while during winters, 90-95% households are using fuel wood for heating purpose. Women travel 3-4 km distance and spent 2.5-3.5 hours for collection of fuel wood from the nearby forests. Daily fuel wood consumption from forests by a household is approximately 25-30 kg. Fodder collection and grazing are also driver of forest degradation. The other main cause of forest degradation is forest fire, which is also routine phenomenon in the region during the summer. REDD+ implementation is an iterative process, requiring regular appraisals and improvements at local (sub-national) and national levels. Involving and passing financial incentives to local communities can make the REDD+ a success at local and National level.

Institutional capacity building/ training programmes for effective implementation of REDD+ are needed to be conducted for all level of forest staff. Involvement of local youth in various REDD+ actions like measurement, field data collection, promoting livelihood activities need to be encouraged. The involvement of VPs is very important to address the drivers of deforestation and forest degradation. Alternatives measures should be provided to them to reduce the dependency on forests for their subsistence. Implementation of pilot project in two sub watersheds will built the capacity of the local community to manage forests for climate change mitigation with an added incentive in the form of REDD+ payments. The pilot project will improve the livelihood of the forest dependent community and provide better options for their subsistence. Drivers of deforestation and forest degradation will be addressed and forest quality will be improved.



# Introduction

## 1.1 Concept of REDD and REDD+

Deforestation and forest degradation in tropical countries are major causes of GHG emissions besides fossil fuel burning. It, therefore, becomes imperative to address deforestation and forest degradation as part of an integrated strategy to reduce global GHG emissions. Despite this knowledge about the role of forests in GHG reduction, deforestation in many developing countries continues unabated. Current, emissions from deforestation and forest degradation in developing countries according to the IPCC constitute about 9-11% of global greenhouse gas emissions (IPCC, 2014). UNFCCC agreed to address this issue under its decision on Reducing Emissions from deforestation and Forest degradation (REDD) in developing countries. Later on conservation of forests as a means of preventing emissions and maintaining and enhancing forest carbon stocks was also recognized, and REDD was upgraded to REDD+. REDD+ moreover, offers considerable biodiversity and sustainable development benefits, and has the scope of being a cost effective mitigation measure. Early action in this regard was solicited by many developing countries. In Indian context, Rawat and Kishwan (2008) presented a forest conservation based climate change mitigation approach for India and advocated for compensating countries for the carbon conserved through sustainable management of forests and enhancement of forest carbon stocks. This Indian approach later on became the '+' part of REDD agenda in UNFCCC. Agarwal *et al.* (2009), Pant *et al.* (2010), TERI (2012), Sud *et al.* (2012), Sharma and Chaudhry (2013), Vijge and Gupta (2014), and Singh *et al.* (2015) have also analysed India's readiness for REDD+.

## 1.2 Evolution of REDD+ under UNFCCC

In Cancun, in 2010, Governments agree to boost action to curb emissions from deforestation and forest degradation in developing countries with technological and financial support. The decision text on REDD paragraph 70 of the decision 1/CP.16 of Cancun Agreements) "Encourages developing country Parties to contribute to mitigation actions in the forest sector by undertaking the following activities, as deemed appropriate by each Party and in accordance with their respective capabilities and national circumstances:

- (a) Reducing emissions from deforestation;
- (b) Reducing emissions from forest degradation;
- (c) Conservation of forest carbon stocks;
- (d) Sustainable management of forest;
- (e) Enhancement of forest carbon stocks;

COP decision further requests developing country Parties to undertake REDD+ activities, in accordance with national circumstances and respective capabilities and are mandated to develop the following elements:

- a. A national strategy or action plan;
- b. A national forest reference emission level and/or forest reference level or, if appropriate, as an interim measure, subnational forest reference emission levels and/or forest reference levels
- c. A robust and transparent national forest monitoring system for the monitoring and reporting of the

- REDD+ activities, if appropriate, subnational monitoring and reporting as an interim measure,
- d. A system for providing information on how the safeguards are being addressed and respected throughout the implementation of the REDD+ activities while respecting sovereignty;

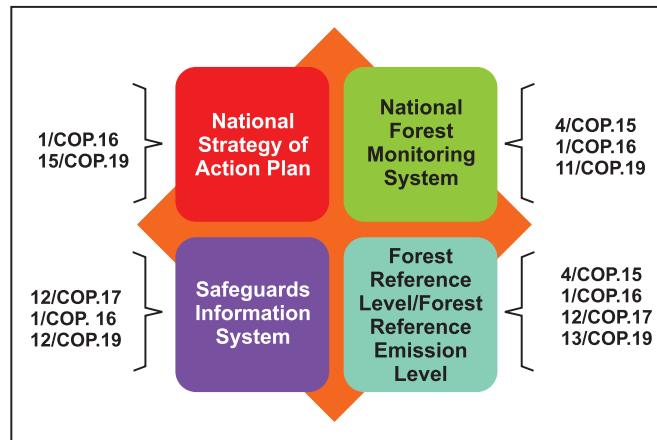



Fig. 1.1: Essential elements of REDD+ and relevant COP decisions

At COP 19 in Warsaw, Parties approved a package of decisions on financial mechanism and methodological guidance for REDD+ which is named as 'Warsaw Framework for REDD+'. The COP decision says 'results-based finance provided to developing country Parties for implementation of REDD+ activities' which may come from a variety of sources, public and private, bilateral and multilateral, including alternative sources. Developing country Parties seeking results-based payments should provide the most recent summary of information on how all REDD+ safeguards have been addressed and respected before they can receive results-based payments'. The decision encourages entities financing the REDD+ activities through the wide variety of sources, including the Green Climate Fund in a key role, to collectively channel adequate and predictable results-based finance in a fair and balanced manner, taking into account different policy approaches (decision 9/CP.19).

On methodological aspect Warsaw Framework agreed on methodological guidance for Measuring Reporting and Verification of REDD+ activities; guidance and procedure for technical assessment of Reference Emission Level/ Reference Level submitted by Parties; timing and frequency of submission of summary of information on how safeguards are addressed and respected; addressing drivers of deforestation and forest degradation and on national forest monitoring systems. After eight years of intense negotiations, parties finally completed a package agreement without establishing a market based mechanism for REDD+ under UNFCCC, however, presently it is leaning toward a fund-based approach.

### 1.3 REDD+ under Paris Agreement

Paris Agreement recognized the role of forests as carbon sink for mitigation of climate change, and devoted a whole section (Article 5) to REDD+, *i.e.*, reducing emissions from deforestation and forest degradation (REDD), and role of conservation, sustainable management of forests and enhancement of forest carbon stocks. 'Article 5' encourages all Parties, developed and developing countries, to take action to conserve and enhance emissions sinks and reservoirs, including forests. It also encourages countries to "take action to implement and support, including through results-based payments" REDD+ activities. The overarching COP "decision" also recognised "the importance of adequate and predictable" finance for REDD+ activities.



Although the broad rules and methodological guidance for REDD+ were already agreed under 'Warsaw Framework for REDD+' and other relevant COP decisions, legitimising and 'regulating' REDD+ activities under the Article 5 of the Paris Agreement is a strong political signal. This will give the added confidence to developing forested countries to continue with REDD+ strategy and readiness activities

Globally REDD+ have been piloted over 300 sub-national initiatives across the topics. CIFOR (2015) has analysed 23 of such sub-national initiatives across Brazil, Peru, Cameroon, Tanzania, Indonesia and Vietnam. Most of these initiatives range between 650 to 6500 km<sup>2</sup> in tropical forests.


#### **1.4 REDD+ Readiness in the National Context**

To complement REDD+ actions there is a need to further reinforce measures aimed at forest conservation, increasing terrestrial carbon pools by promoting afforestation and reforestation, improved forest management, and forest conservation etc. There are also possible synergies between carbon sequestration and adaptation measures, e.g., through afforestation of vulnerable areas, watersheds, and rehabilitation of degraded lands. Singh *et. al.* (2015) discussed in detail as to how various REDD+ actions can be implemented in India, and also listed some key interventions that are required to be taken for forest management in the country.

#### **1.5 India's National REDD+ Policy and Strategy**

Government of India is in the process of developing its National REDD+ policy and strategy. A draft national REDD+ Policy and Strategy for India was prepared by the Ministry of Environment, Forest and Climate Change<sup>1</sup>. Objectives of the draft policy are as follows:

- (i) to create REDD+ architecture at National and Sub-National levels to support REDD+ actions,
- (ii) to develop an appropriate REDD+ strategy and implementation frameworks at sub-national level to represent the diversity of forests in the country,
- (iii) to develop a national forest reference emission level and /or forest reference level,
- (iv) to develop institutional capacity for a robust and transparent National Forest Carbon Accounting and Monitoring System,
- (v) to manage forests for improving and enhancing supply of forest products and ecological and environmental services, that are flowing from the forests including biodiversity and not limited to carbon services alone, benefitting the society leading to increased growing stock and the stored carbon in the forests,
- (vi) to encourage and incentivize local communities for their role in conservation and safeguard their rights and interests including improvement of their livelihood, and develop a system for providing information on how the safeguards are respected,
- (vii) to develop appropriate mechanism for channelling REDD+ funding from public as well as private sources and transfer the accrued financial benefits to the communities in a fair, equitable and transparent manner based on their performance, as is reflected in monitoring,
- (viii) to strengthen coordination among sectors and stakeholders having direct and indirect impacts on land use and forestry,
- (ix) to lay emphasis on achieving various thematic elements of SMF and help in developing action plans



to address the drivers of deforestation and forest degradation, afforestation of degraded areas, adequate protection measures, forest governance and gender considerations etc. while implementing the REDD+ programmes,

- (x) to provide adequate technical and financial resources to implement various phases and action plan of REDD+, especially providing support to small scale projects at JFMC/ EDC level, and
- (xi) to build resilience and adaptation to projected climate change impacts to sustain the carbon sinks under REDD+ and to ensure conservation of biodiversity and ecosystem services.

Draft National REDD+ strategy lays emphasis on developing a robust REDD+ framework through establishing a National REDD+ Authority at national level. Strategy also underscores provisions of REDD+ safeguards, strengthening stakeholders' participation for addressing forest degradation and role of private sector. The important programmes areas identified for REDD+ implementation are as under:

- (i) Developing national forest monitoring system (ii) Setting up of national REDD+ architecture and governance (iii) Creation of a platform for stakeholder engagement, (iv) National REDD+ information system including NFCAMS, (v) System for managing data on valuation and equitable sharing of multiple benefits of forests, (vi) Transparent, equitable and accountable management and (vii) Capacity building.

India's draft national REDD+ strategy aims at enhancing and improving the forest and tree cover of the country thereby enhancing the quantum of forest ecosystem services that flow to the local communities. The services include fuel wood, timber, fodder, NTFP and also carbon sequestration. It is underlined that in the Indian context, carbon service from forest and plantations is one of the co-benefits and not the main or the sole benefit.

To facilitate REDD+ at National level among all stakeholders, government has also prepared a 'REDD+ Reference Document'<sup>1</sup>. This Reference Document discusses required policy framework to support REDD+ implementation as part of the forest management in the country. The document describes in detail the issues and concepts related to definitions as also approach to construct national forest reference level. It also assigns the roles and responsibilities to different government and other organizations, including MoEF&CC, FSI, ICFRE, SFDs, JFMCs, *Panchayats* and *Gram Sabhas*, etc. Governance and safeguards to ensure that REDD+ implementation supports the rights of the local communities and indigenous peoples (tribals) as also conservation of biodiversity in natural forests. Reference Document comprehensively addresses the need of capacity building across all levels of the government, expert organizations, civil society, other organizations and local communities. Important aspects of National Forest Monitoring System comprising MRV and Safeguards Information Systems have been dealt with lucidly in the document. These documents will serve as a reference/guiding document for implementing REDD+ actions in India.

## 1.6 Institutional Mechanism for REDD+ at National Level

The Government of India has established a REDD+ Cell in the Ministry of Environment, Forest and Climate Change having the task of coordinating and guiding REDD+ related actions at the national level, and to discharge the role of guiding, and collaborating with the SFDs on REDD+ preparedness. National REDD+ Cell would also guide formulation, development, funding, implementation, monitoring and evaluation of REDD+ activities in the States. The Cell will also assist the MoEF&CC and its appropriate agencies in developing and implementing appropriate policies relating to REDD+ implementation in the country.

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<sup>1</sup> <http://envfor.nic.in/sites/default/files/press-releases/Reference%20Document%20For%20REDD+%20in%20India.pdf>

## 1.7 Kailash Sacred Landscape

The present work on REDD+ Scoping study in Kailash Sacred Landscape (KSL) of Indian Himalaya was conducted under the aegis of ICFRE-ICIMOD supported programme 'REDD+ Himalaya: Developing and using experience in implementing REDD+ in the Himalayas'. This programme on REDD+ with active collaboration from ICIMOD with a regional mandate, is implemented in India, Bhutan, Nepal and Myanmar. In India, this partnership is for REDD+ capacity building focusing on North East region. The programme will assist in developing and implementing REDD+ projects that will focus on trainings, technology sharing and knowledge dissemination. Pilot REDD projects will be established in each country for all stakeholders. The location of Kailash Sacred Landscape in India is shown in Fig 1.2.

KSL is a transboundary region covering 31,175 sq km between India, China and Nepal. It is a fragile, biological rich and culturally important region which is the home to various diverse groups. Indian Himalayas occupies 7,120 sq km of KSL, covering 6826 sq km in Pithoragarh district and 294 sq km. in Bageshwar district of Uttarakhand State. Altitude of KSL varies from 450 to 7431 m supporting diverse ecosystems like Sub-tropical, Temperate, Alpine, Glaciers etc. Various rivers like Ramganga, Dhauliganga, Goriganga and their tributaries forms major watershed in the region and support livelihood of a large population, biodiversity and form unique ecosystems in the various zone of KSL. KSL in Indian Himalayas consists of 6 watersheds, 16 sub watersheds and 239 micro-watersheds. Lower region of KSL receives low rainfall and high temperature while Middle Himalayan region has more rainfall and less temperature. Greater Himalaya region faces more rainfall and snowfall in winters. Due to variation in topography and climate, the region is rich in flora and fauna and habitat for various endemic species. Concept of Sacred Natural Forests dedicated to local deity by the local community is prevalent in the KSL. These forests are protected and managed by the local community for generations.

Forests in Uttarakhand are managed by three different agencies: Reserved forests under the control of State Forest Department; community forests under the control of *Van Panchayats*; and civil soyam forests under the control of Revenue Department. Of the total forested area of Uttarakhand approximately 84% is either under reserved forests or civil and soyam forests and the rest 16% of the forests area is under community forests. Eight out of the 16 forest type groups (Champion and Seth, 1968) of India exists in the Indian part of KSL. The region is known for its unique flora and fauna. *Berberis lambertii*, *Berberis osmastonii*, *Eria occidentalis*, *Flickingeria hesperis*, *Itea nutans*, *Trachycarpus takil*, *Gentiana tetrasepala*, *Silene kumaonensis* are some of the endemic species present in KSL. Rare and Threatened plants like *Toricella tiliaefolia*, *Tsuga dumosa*, *Onosma pyramidalis*, *Gymnosporia royleana*, *Turpinia nepalensis*, *Osmanthus fragrans*, *Cyathea spinulosa*, *Onosma pyramidalis*, *Hystrix duthiei*, *Duthiea nepalensis*, *Wallichia densiflora*, *Ardisia floribunda*, *Ascocentrum ampullaceum*, *Carex winterbottomii*, *Chonemorpha fragrans*, *Cleyera japonica*, *Clematis smilacifolia*, *Cymbidium hookerianum*, *Dendrobium chrysanthum*, *Dicranopteris linearis*, *Dioscorea kamoonsensis*, *Eria reticosa*, *Glochidion assamicum*, *Henslowia heterantha*, *Leptodermis riparia*, *Oberonia prainiana*, *Oberonia pyrulifera*, *Pteris subquinata*, *Pteroceras suaveolens*, *Vandopsis undulata*, *Cordia macleodii*, *Panax sikkimensis*, *Saussurea graminifolia* are found in this region. KSL is also rich in medicinal and aromatic plants. *Aconitum heterophyllum*, *Dactylorhiza hatagirea*, *Eulophia campestris*, *Picrorhiza kurroa* and *Rauvolfia serpentina* are some of the important medicinal plant present in KSL. KSL region in India is also known for collection of Yarsagumba (*Ophiocordyceps sinensis*). Local population residing in high hills is engaged in collection of this wonder herb which fetches very high price in the market. Askot Wildlife Sanctuary covering an area 599.93 sq km was created owing to its richness, uniqueness,



biological representativeness, naturalness and presence of valuable biodiversity elements.

## 1.8 The Methodology Followed

Scoping study of REDD+ in KSL is conducted through review of available literature, expert consultation, stakeholder consultation and field visit. National forest laws, rules and acts as applicable to the region are studied to develop the understanding on policies facilitating REDD+. Draft National REDD+ policy and strategy has also been analyzed to find out the possibilities of developing of REDD+ in KSL in Indian Himalayas.

Consultation regarding REDD+ scoping study in Kailash Sacred Landscape was organized on 04 May 2016 at GBPNIHESD, Almora. GBPNIHESD is the nodal agency associated with ICIMOD. The main objective of consultation was to discuss the possibility of implementing REDD+ in KSL and also to get first-hand knowledge of the activities and programmes conducted by GBPNIHESD in KSL under Indian part of Kailash Sacred Landscape Conservation and Development Initiative (KSLCDI) project implemented by GBPNIHESD.

A Stakeholder consultation was also conducted with Villagers of Naukina Village under Chandak Aounla Sub-watershed in Pithoragarh on 05 May 2016. The objective of the consultation was to understand the role and functioning of *Van Panchayats* in managing forests and their role in forest conservation. Drivers of forest degradation were also discussed with the local community. Stakeholder consultation was also aimed to create the awareness of REDD+ and to find out the possibilities of developing a REDD+ project in association with the local community. Potential interest of local community for a REDD+ project was also analyzed. A local Non-Government Organization Himlayan Sewa Samiti (HSS), working for the livelihood improvement of the local community also took part in the consultations. Officials of Uttarakhand State Forest Department were also consulted to understand the anthropogenic pressure faced by the forests of KSL. Information generated during the consultation and field visit was very useful to analyze the possibilities and interest of the stakeholders that will help in implementing the REDD+ project in KSL. The detailed report of consultation is annexed as annexure I. Review of literature was also conducted to find the carbon stocks and potential of implementing REDD+ programmes. Carbon stock was estimated using the average value of carbon stock provided by FSI (n.d.) to estimate the total carbon stock in KSL. Estimate of forest cover change was done using various reports of Forest Survey of India.

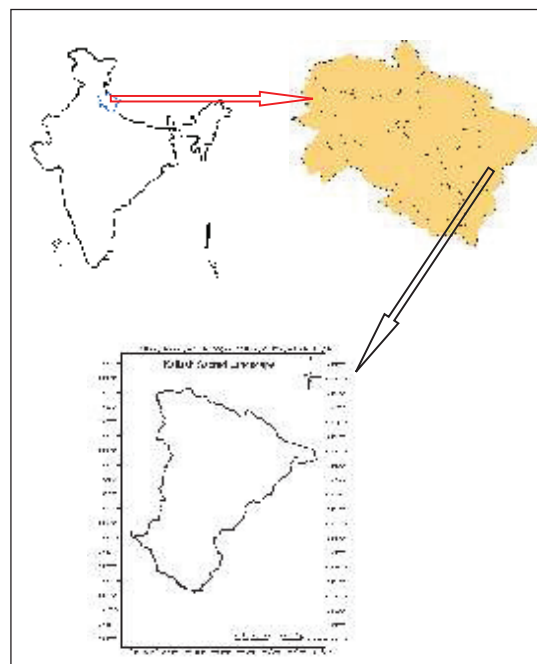


Fig 1.2: Location of Kailash Sacred Landscape

# Forest Institutions, Policies, Law and Regulations


## 2

### 2.1 Forest Governance in India

The Ministry of Environment, Forest and Climate Change is the nodal agency in the administrative structure of the Central Government for the planning, promotion, co-ordination and overseeing the implementation of India's environmental and forestry policies and programmes. The primary concerns of the Ministry are implementation of policies and programmes relating to conservation of the country's natural resources. While implementing these policies and programmes, the Ministry is guided by the principle of sustainable development and enhancement of human well-being<sup>2</sup>. The administration of forests lies with the State government with their Forest Departments. In India the national and state governments are jointly responsible for the sustainable management of the forest resource. In a practical sense, the state forest departments act as the custodians of the public forest resource and as the forest authorities, managing the forest resources on the basis of forest management plans also known as Forest Working Plan that they submit to the central government. Often the state authorities also perform a commercial function, becoming involved in production, processing and trade through forest development corporations responsible for production within the public forest estate. Some of the forestry laws are described below:


- (i) **The Indian Forest Act, 1927** seeks to consolidate the laws relating to forests, the transit of forest produce and the duty that can be levied on timber and other forest produce. This Act provides definitions for forest-produce and includes: trees and leaves, flowers and fruits, and all other parts or produce not hereinbefore mentioned, of trees plants not being trees (including grass, creepers, reeds and moss), and all parts or produce of such plants, wild animals and skins, tusks, horns, bones, silk, cocoons, honey and wax, and all other parts or produce of animals, and peat, surface soil, rock and minerals (including limestone, laterite, mineral oils, and all products of mines or quarries).
- (ii) **The Wild Life (Protection) Act, 1972**, amended in 1993 was enacted for protection of plants and animal species. Before 1972, India only had five designated national parks and after enactment of this act about 105 national parks exist in the country. Among other reforms, the Act established schedules of protected plant and animal species; hunting or harvesting these species was largely outlawed. The Act provides for the protection of wild animals, birds and plants; and for matters connected therewith or ancillary or incidental thereto. It has six schedules which give varying degrees of protection. Schedule I and part II of Schedule II provide absolute protection - offences under these are prescribed the highest penalties. Species listed in Schedule III and Schedule IV are also protected, but the penalties are much lower. Schedule V includes the animals which may be hunted. The plants in Schedule VI are prohibited from cultivation and planting.
- (iii) **The Forest Conservation Act, 1980** amended in 1988 has five sections which deal with conservation of forests. It was enacted with the twin objectives of restricting the use of forest land for non-forest purposes, and preventing the de-reservation of forests that have been reserved under the Indian Forest Act, 1927. However, in 1988 the Act was further amended to include two new provisions

<sup>2</sup> <http://www.moef.gov.in/>



where it sought to restrict leasing of forest land to private individuals, authorities, corporations not owned by the Government, and to prevent clear felling of naturally grown trees. The Act provides punishment, including imprisonment, for the contravention of the provisions of the Act.

- (iv) **The Environment (Protection) Act, 1986** amended in 1991 came into force on November 19, 1986. It is an act to provide the protection and improvement of environment and for matters related to it. Environment Protection Act, 1986 came into force soon after the Bhopal gas tragedy. It specifies that the state shall protect and improve the environment and also to safeguard the forests and wildlife of the country.
- (v) **The National Forest Policy, 1988** ensures environmental stability and maintenance of ecological balance including atmospheric equilibrium which is vital for sustenance of all life forms, human, animal and plant. The basic objectives of the policy was maintenance of environmental stability through preservation, conserving the natural heritage of the country by preserving the remaining natural forests with the vast variety of flora and fauna, checking soil erosion and denudation in the catchments areas of rivers, lakes, reservoirs in the interest of soil and water conservation, for mitigating floods and droughts and for the retardation of siltation of reservoirs, checking the extension of sand-dunes in the desert areas of Rajasthan and along the coastal tracts, increasing substantially the forest/tree cover in the country through massive afforestation and social forestry programmes, especially on all denuded, degraded and unproductive lands, meeting the requirements of fuel wood, fodder, minor forest produce and small timber of the rural and tribal populations, increasing the productivity of forests to meet essential national needs, encouraging efficient utilisation of forest produce and maximizing substitution of wood and creating a massive people's movement with the involvement of women, for achieving these objectives and to minimize pressure on existing forests.
- (vi) **The National Environment Tribunal Act, 1995** provides for strict liability for damages arising out of any accident occurring while handling any hazardous substance and for the establishment of a National Environment Tribunal for effective and expeditious disposal of cases arising from such accidents, with a view to giving relief and compensation for damages to persons, property and the environment and for matters connected therewith or incidental thereto. This act is based on decisions were taken at the United Nations Conference on Environment and Development held at Rio de Janeiro in June, 1992, in which India participated, calling upon the States to develop national laws regarding liability and compensation for the victims of pollution and other environmental damages.
- (vii) **Biological Diversity Act, 2002** is an Act of Parliament for conservation of biological diversity in India. The Act was enacted to meet the obligations under Convention on Biological Diversity, to which India is a Party. It provides conservation of biological diversity, sustainable use of its components and fair and equitable sharing of the benefits arising out of the use of biological resources, knowledge and for matters connected therewith or incidental thereto.
- (viii) **Biological Diversity Rules, 2004** outline the procedures to be followed for access to biological resources (wild plants and animals, crops, medicinal plants, livestock, etc), their commercial utilization, transfer of rights of research, and intellectual property rights related to biodiversity. It also explains that every local body shall constitute a Biodiversity Management Committee with in its area for the purpose of promoting conservation, sustainable use and documentation of biological




diversity including preservation of habitats, conservation of land races, folk varieties and cultivars, domesticated stocks and breeds of animals and microorganisms and chronicling of knowledge relating to biological diversity” (NBA, 2008). So far 37,769 Biodiversity Management Committees have been formed in India<sup>3</sup>.

- (ix) **National Environment Policy, 2006** is one of the main documents concerning environmental policy of India. It encourages imposing of more stringent local level water and air quality standards for receptors. The objectives of the National Environment Policy include conservation of critical environmental resources, intra-generational equity, and livelihood security for the poor, inter-generational equity, integration of environmental concerns in economic and social development, efficiency in environmental resource use and enhancement of resources for environmental conservation.
- (x) **The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006** is a result of the protracted struggle by the marginal and tribal communities of India to assert their rights over the forestland on which they were traditionally dependent. The notification of Rules for the implementation of the Forest Rights Act, 2006 on 1st January, 2008 has finally paved the way to secure community rights or rights over common property resources of the communities in addition to their individual rights. The Act enjoins upon the local communities, to recognize their role in forest and biodiversity protection through sustainable management practices, which will yield long term benefits to them (Dash, 2010). The Act is significant as it provides scope and historic opportunity of integrating conservation and livelihood rights of the people. The rules under the Act encourage transition from regulatory mode of forest governance to decentralized forest governance in India.
- (xi) **The National Green Tribunal Act, 2010** is an act of Parliament which enables creation of a special tribunal to handle the expeditious disposal of the cases pertaining to environmental issues. It was enacted under India's constitutional provision of Article 21, which assures the citizens of India the right to a healthy environment. The National Green Tribunal was established on October 18, 2010. The objective of the Tribunal is to provide a specialized forum for effective and speedy disposal of cases pertaining to environment protection, conservation of forests and for seeking compensation for damages caused to people or property due to violation of environmental laws or conditions specified while granting permissions.
- (xii) **The Compensatory Afforestation Fund Act, 2016:** This act has been recently enacted and deals the “establishment of funds under the public accounts of India and the public accounts of each State and crediting thereto the monies received from the user agencies towards compensatory afforestation, additional compensatory afforestation, penal compensatory afforestation, net present value and all other amounts recovered from such agencies under the Forest (Conservation) Act, 1980; constitution of an authority at national level and at each of the State and Union Territory Administration for administration of the funds and to utilise the monies so collected for undertaking artificial regeneration (plantations), assisted natural regeneration, protection of forests, forest related infrastructure development, Green India Programme, wildlife protection and other related activities and for matters connected therewith or incidental thereto”.

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<sup>3</sup> <http://nbaindia.org/content/20/35/1/bmc.html>





The first forest policy of independent India was formulated in 1952. The Forest Policy of 1952 declared that village communities should not be permitted to use forests at the expense of national interest. The enactment of the Forest Conservation Act 1980 was the first transition in forest governance from commercialized use of forest to conservation. The pace of diversion of forest land for non-forest purposes was around 1,60,000 hectares per annum from 1951 to 1976. However, after the implementation of Forest (Conservation) Act, 1980, the rate of diversion of forests has come down drastically to 35,000 ha annually during 1980-2011 (ICFRE, 2010).

The existing policy and legislative framework as discussed above which includes National Forest Policy 1988, Indian Forest Act 1927, Wild life (Protection) Act, 1972, Forest (Conservation) Act, 1980, Environment (Protection) Act, 1986, Biological Diversity Act, 2002 etc. and rules there under for guiding forest conservation and management are supportive of REDD+ elements. The goals of REDD+ are in conformity with India's National Forest Policy, 1988, which aims to ensure environmental stability and maintenance of ecological balance through protecting, conserving and enhancing the existing forests of the country. As early as in the year 1988, the National Forest Policy first time brought out participation of people in protection, improvement and management of forests and also meeting their bonafide needs as the first charge on the forest produce. The Forest (Conservation) Act, 1980 regulates diversion of forest land for non forestry purpose and provides for compensatory afforestation. Safeguarding Rights of Local communities is also addressed in the National Forest Policy as well as in the recently enacted the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006. Prior consent of local communities/Gram Sabha is mandatory before the proposals for diversion of forests are approved by the Central Government. Thus the existing policy framework is supportive of implementation of REDD+. The National Forest Policy, 1988, the Forest Conservation Act, 1980, The Biological Diversity Act, 2002 and the Forest Rights Act, 2006 taken together adequately address the various safeguards mentioned under the REDD+ activities. Though the rules and laws were enacted before the concept of REDD+, Government of India is under the preparation of National Policy on REDD+ to include the principles and mechanism of REDD+. Draft of the National Policy on REDD+ is web hosted but yet to be finalized by the Government of India. Draft National REDD+ Policy and Strategy lays emphasis on developing a robust REDD+ framework through establishing a National REDD+ Authority at national level. Strategy also underscores provisions of REDD+ safeguards, strengthening stakeholder participation for addressing forest degradation and role of private sector.

## **2.2 Joint Forest Management**

In 1990 India initiated a Joint Forest Management Programme for protection and management of forests through involving local communities. The local communities and the State Forest Department jointly plan and implement forest regeneration and development programmes, and the communities are rewarded with substantial share in forest produce in return for their efforts in protection and management of forests. JFM functions through its three systems- the forest supporting system, life supporting system and JFM supporting system (Paulraj, 2012). So far, more than 1,12,816 JFM committees have been formed covering about 25 million ha of forest area (ICFRE, 2010). JFM has enabled protection and regeneration of existing forests, and raising of forest plantations, which is contributing in conservation of existing forests as also the carbon stocks. Over the years, the involvement of the local communities in the management of forests has increased manifold due to setting up of JFMCs in many parts the country. In India, 59.31% forestland is administered by the government and 28.5% is designated for use by communities and indigenous groups (RRI, 2011).

### 2.3 Van Panchayats: A Unique System of Forest Governance in Uttarakhand

State of Uttarakhand in India is known for its tenets of forest conservation. The world famous *Chipko* Movement set a legendary example for forest conservation and role of women in protecting their forests. High dependence on forests has led to the evolution of Community Forestry which is maintained through village community forests council (*Van Panchayat*).

The *Van Panchayat* were borne out of local conflict to colonial forest management in the early twentieth century when the reservation of forest was met with extensive agitation and in some cases incendiary protest (Guha, 1989). The recommendation of Kumaon Forest Grievances Committee was taken to constitute Forest *Panchayats* (*Van Panchayats*) with the villages, Forest *Panchayat* rules and regulations were made in the year 1931 and were subsequently replaced by *Uttaranchal Panchayati Van Rule*, 2005. The devolution of authority from the state to local community for the management of forest resources started, when large forest areas from the newly reserved forests in Kumaon were entrusted to VP for management. The VPs have their method of controlling and managing forests to meet the community demand of fuelwood, fodder, leaf litter for manuring crop and bedding material for cattle, etc. Since their establishment on 1931, VP numbers first rose slowly but have grown exponentially in the last few years. From 429 in 1949 it had risen to 3635 in 1993, doubling this by 2001, and had reached the 12089 by 2006 (Tompsett, 2014) managing the total forest area of about 5,44,964 hectares (Uttarakhand Forest Statistics, 2012-13) which is about 14 percent of the total area of the state. Pithoragarh district in KSL has 1051 *Van Panchayats* covering a total area of 96,014.11 ha while Bageshwar district has 320 VP covering an area of 7995.312 ha (Table 2.1).

Table 2.1: Status of *Van Panchayat* in KSL

District	Block	Number of <i>Van Panchayat</i>	Area (ha.)
Pithoragarh	Kanalicheena	125	6,365.41
	Didihaat	105	6,823.31
	Berinaag	97	3,473.18
	Dharchula	110	15,867.27
	Vin	151	9,951.91
	Gangolihaat	154	11,508.47
	Munakot	147	21,954.81
	Munsyari	162	20,069.75
Bageshwar	Kapkot	43	2,056.25
	Bhaisiyachana	11	243.84
	Takula	04	58.95
	Garur Baijnath	95	1,311.01
	Bagheswar	167	4,325.25

Despite of success in management of *Van Panchyat* achieved over last 80 years, presently, the institution has been facing several challenges such as smaller forest area: nearly 60% VPs are of <15 ha, while 13% VPs are having <3 ha forest area under their management; lack of adequate financial resources and appropriate incentives; low awareness and capacity; less social recognition of *Van Panchyat Sarpanch* (Head man) and Van Panchyat Management Committee due to curtailed autonomy; non-holding of timely elections; shortage of trained staff in participatory forestry in forest department; complexities to link livelihoods with



forest conservation; increased pressure due to ever increasing population; inadequate mechanisms for constant monitoring; large scale encroachments; timber pilferage; and lack of dedicated and clearly spelt out mechanisms to link VPs horizontally with *Panchayat Raj* Institutions to bring forestry in development agenda. Policy, institutional, technical and financial interventions are required besides adequate attention on determining viable size of VPs, and other field realities to take action to meet the aforementioned challenges (Semwal *et al.*, 2012).

Power to frame bye-laws of the Uttaranchal Panchayati Forest Rules, 2001 (Rule 21) states that the *Van Panchayat* may frame by laws for the distribution of forest produce among persons entitled thereof, for regulating, grazing, cutting of grass and collection of fuel, to levy fee to meet its administrative expenditure and for any other purpose consistent with these rules. The main objective behind the *Van Panchayat* system was to protect and manage the forest and to distribute the benefits from the forest in an equitable manner among the local communities. The state government has improved and modified the set of rules under the Forest Council Rules of 1931 from time to time.



# Forest Status and Carbon Stocks in Kailash Sacred Landscape

## 3

Uttarakhand the 27<sup>th</sup> state of Republic of India lies between 28° 44' & 31° 28' N Latitude and 77° 35' & 81° 01' East longitude. The geographical area of the state is 53,483 sq. km and the terrain and topography of the state is largely hilly with large areas under snow cover and steep slopes. Himalayan forests are extensive and diverse and they differ significantly from both tropical and temperate forests with respect to structure, phenology and function; as well as in terms of ecosystem processes (Zobel and Singh, 1997). The forest vegetation in the Himalayan region ranges from tropical dry deciduous forests in the foothills to alpine meadows above timberline (Champion and Seth, 1968). As per Champion and Seth (1968) Classification System of forests, Uttarakhand has 34 forest sub group types which belong to 8 forest type group viz. (i) Tropical Moist Deciduous Forest, (ii) Tropical Dry Deciduous Forest, (iii) Subtropical Pine Forest, (iv) Himalayan Moist Temperate Forest, (v) Himalayan Dry Temperate Forest, (vi) Sub Alpine Forests, (vii) Moist Alpine Scrub and (viii) Dry Alpine Scrub.

### 3.1 Forest Types

KSL which extends between Pithoragarh and Bageshwar districts of Uttarakhand has 19 forest subgroup types which belong to 7 forest type groups (Fig 3.1 & Table 3.1). Forest sub group types (Champion and Seth, 1968) along with the composition of dominant tree species found in the KSL in Uttarakhand are described below:


**Moist Siwalik Sal Forest (3C/C2a):** Moist Siwalik Sal Forest extends up to about 1000 m in the hills meeting the subtropical forests of pine. Main species of this type are *Shorea robusta*, *Anogeissus latifolia*, *Terminalia tomentosa*, *Adina cordifolia*, *Pinus roxburghii*, *Lannea coromandelica*, *Garuga pinnata*, *Terminalia bellirica*, *Diospyros tomentosa*, *Ougeinia oojeinensis*, *Buchanania lanzan*, *Ehretia laevis*, *Cassia fistula*, *Phyllanthus emblica*, *Dendrocalamus strictus*, *Colebrookia oppositifolia*, *Woodfordia fruticosa* and *Murraya koenigii* etc.

**West Gangetic Moist Mixed Deciduous Forest (3C/C3a):** This type is scattered widely through the hilly tracts occupied by the moist Sal. Species association is *Shorea robusta*, *Albizia procera*, *Adina cordifolia*, *Terminalia tomentosa*, *T. bellirica*, *Toona ciliata*, *Mallotus philippensis*, *Ougeinia oojeinensis*, *Phyllanthus emblica*, *Justicia adhatoda*, *Colebrookia oppositifolia*, *Bauhinia vahlii* etc.

**Northern Dry Mixed Deciduous Forest (5B/C2):** This type is mainly found in the transition between dry to moist types. Species association includes *Anogeissus latifolia*, *Acacia catechu*, *Shorea robusta*, *Bauhinia* spp., *Terminalia tomentosa*, *Buchanania lanzan*, *Diospyros tomentosa*, *Terminalia bellirica*, *Garuga pinnata*, *Mitragyna parviflora*, *Bridelia retusa*, *Ougeinia oojeinensis*, *Ehretia laevis*, *Aegle marmelos*, *Phyllanthus emblica*, *Holarrhena antidysenterica*, *Cordia dichotoma*, *Zizyphus* spp., *Cassia fistula*, *Butea monosperma*, *Flacourtia indica*, *Woodfordia fruticosa* and *Eulaliopsis binnata* etc.

**Khair-Sissu Forest (5/1S2):** In this forest composition, influence soil is more pronounced than climate. There is ample water supply at a moderate depth though the upper soil may be very porous hot and dry during the summers and devoid of humus. Species associations are *Acacia catechu*, *Dalbergia sissoo*, *Holoptelea integrifolia* and *Murraya koenigii*.





**Upper or Himalayan Chir Pine Forest (9/C1b) :** Occurs on Himalayas between 1200 to 1800 m, sometimes ascending up to 2300 m on Southern aspects. It is absent on the slopes of the outer ranges of Himalayas due to combination of excessive heat and high humidity in monsoon period, inimical to seedling regeneration of Chir Pine. Over wood consists of pure crop of Chir Pine. Towards the upper limit it is mixed with Deodar and Kail while on the lower limit it is mixed with *Anogeissus latifolia*. The middle storey consists of *Quercus leucotrichophora*, *Lyonia ovalifolia*, *Rhododendron arboreum* and *Pyrus pashia* etc.

**Himalayan Subtropical Scrub (9/C1/DS1):** Found in Shivalik Chir zone, extending upto the Himalayan Chir Pine Forest. Both edaphic and biotic factors are responsible for this residual scrub. Commonly occurring species are *Carrisa* spp, *Dodonea* spp and *Rhus parviflora*.

**Banj Oak (*Quercus leucotrichophora*) Forest (12/C1a):** Occupies lowest portion of the temperate belt, particularly in the outer ranges of southern aspects. There is a wide overlap with the Chir pine forest which may extend up the ridges even to 2300 m. *Quercus glauca* is locally abundant species especially along the shady ravines. Other associations include *Carpinus viminea*, *Cedrela serrata*, *Pyrus pashia*, *Rhododendron arboreum*, *Lyonia ovalifolia*, *Betula alnoides*, *Ilex dipyrena*, *Viburnum cotinifolium*, *Smilax parviflora* and *Vitis* spp.

**Moru Oak (*Quercus floribunda*) Forest (12/C1b):** It is found mostly on the damp sites as luxuriant growth. There is great admixture of secondary species in the top storey, mainly of deciduous trees and a well marked evergreen second storey of *Rhododendron* spp., species of Lauraceae family, *Euonymus* spp, *Ilex* spp etc. This is more mesophytic type than the Banj oak which displaces it on dry ridges and hot southern aspect. The altitude is around 2000 m. The consociation species are *Quercus leucotrichophora*, *Q. semecarpifolia*, *Abies pindrow*, *A. spectabilis*, *Betula alnoides*, *Acer caesium*, *Aesculus* spp, *Celtis australis*, *Cedrus deodara*, *Rhamnus purpurea*, *Arundinaria* spp and *Taxus baccata* at higher altitude.

**Moist Deodar Forest (12/C1c):** The forest is nearly pure but at places it is found in association with Blue Pine and Spruce. Tree height of 30 m to 40 m is usual. The deodar forests cover practically the same altitudinal range as the Banj Oak and Moru Oak, viz. 1700 to 2500 m, similarly extending appreciably lower on cool aspects and much higher even to 3000m or more on sunny ridges.

**Western Mixed Coniferous Forest (Spruce, Blue Pine, Silver) (12/C1d):** These forests in the Himalayas are found with a varying mixture of coniferous trees often of very fine growth: Spruce, Silver Fir, Blue Pine and Deodar and a varying intermixture of evergreen and deciduous broadleaved trees and strips and patches of broadleaved forests. This type occurs mainly above the Deodar forests at altitudes of about 2400 to 3000 m or more. The species association includes *Abies pindrow*, *Picea smithiana*, *Quercus semecarpifolia* and *Thamnocalamus spathiflorus*.

**Moist Temperate Deciduous Forests (12/C1e):** This type is commonly found from 1800 to 2750 m in moist hollows and depressions often as strips along the hill streams and also on many of the gentler slopes. The type extends well into the dry temperate zone. Species consociation is *Aesculus indica*, *Acer caesium*, *A. pictum*, *Corylus colurna*, *Taxus baccata*, *Prunus* spp., *Celtis australis*, *Juglans regia* and *Fraxinus micrantha* etc.

**Kharsu Oak Forest (*Quercus semecarpifolia*) (12/C2a):** Found all along the outer and moisture ranges of the Himalayan between 2500-2900m, particularly on southern aspects and sharp slopes. In these forests, Silver Fir occurs, and sometimes some Blue Pine and Spruce also occurs, and in sheltered sites the Oak is displaced by the Fir forests. At the top of the altitudinal range it merges into the sub-alpine forests of Fir,

*Rhododendron* and Birch. Common association includes *Quercus semecarpifolia*, *Q. floribunda*, *Betula alnoides*, *Pyrus lanata*, *Acer caesium*, *Abies pindrow*, *Rhododendron arboreum*, *Betula utilis*, *Prunus padu* and *Taxus baccata* etc.

**West Himalayan Upper Oak/Fir Forest (12/C2b):** This type is typically a two storeyed high forest with the silver fir standing singly or in strips and groups over oak and other evergreen and deciduous trees. Found along the higher ranges between 2600 to 3400 m especially on the northern aspects and on the sheltered sites. Common species association is *Abies pindrow*, *Quercus semecarpifolia*, *Q. floribunda*, *Pyrus lanata*, *Rhododendron arboreum*, *Picea smithiana*, *Ulmus wallichiana*, *Aesculus indica* and *Taxus baccata*.

**Moist Temperate Deciduous Forest (12/C2c):** This type is commonly found from 1800m to 2750m in moist hollows and depressions often as strips along the hill streams and also on many of the gentler slopes. The type extends well into the dry temperate zone. Species consociation is *Aesculus indica*, *Acer caesium*, *A. pictum*, *Corylus colurna*, *Taxus baccata*, *Prunus spp.*, *Celtis australis*, *Juglans regia* and *Fraxinus micrantha* etc.

**West Himalayan Sub-Alpine Birch/Fir Forest (14/C1b):** Found above 3200 m. Common species are *Betula utilis*, *Abies spectabilis*, *Quercus semecarpifolia*, *Rhododendron campanulatum* and *Sorbus foliolosa* etc.

**Deciduous Sub-Alpine Scrub (14/1S2):** Found above 3350 m occasionally extending lower and adjoining the subalpine and temperate forests. The climate is too cold and severe for tree growth. The precipitation is mostly in the form of snow. Species commonly occurring are *Betula utilis*, *Aconitum* spp, *Rosa* spp, and *Berberis* spp. etc.

**Birch/Rhododendron Forest (15/C1):** Found on the western and northern aspects at elevation between 3600 to 3800 m. The growth habit of the *Rhododendron* is well adapted to withstand snow pressure. Common species are *Betula utilis*, *Rhododendron campanulatum*, *R. lepidotum*, *Berberis* spp. and *Lonicera parviflora* etc.

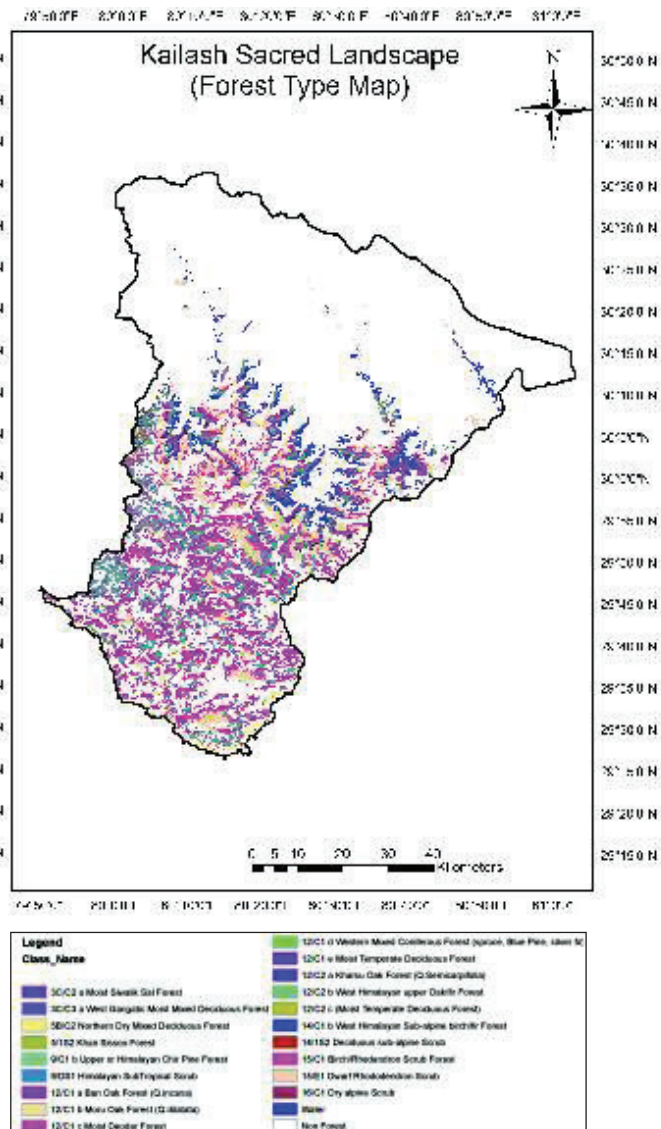


Fig 3.1: Forest type map of Kailash Sacred Landscape

**Dwarf Rhododendron Scrub (15/E1):** Found between 3350 to 3800 m mainly in the dry cold and arid region. Forest of this type is generally confined to small patches. Vegetation consists of *Rhododendron anthopogon*, *R. campanulatum*, *Berberis kumaonensis* and *Salix* spp.

**Dry Alpine Scrub (16/C1):** The type is present on the dry alpine zone. Species show xerophytic adaptation in its structure. Species association includes *Eurotia* spp, *Juniperus wallichiana*, *Artemisia maritima*, *Lonicera* spp, *Potentilla fruticosa*, *Saxifraga imbricata* and *Primula minutissima* etc.

Table 3.: Area under different forest types in Kailash Sacred Landscape.

Forest Type Group	Forest Type	Area (ha)
Tropical Moist Deciduous Forests	3C/C2 a Moist Siwalik Sal Forest	2682
	3C/C3 a West Gangatic Moist Mixed Deciduous Forest	459
Tropical Dry Deciduous Forests	5B/C2 Northern Dry Mixed Deciduous Forest	8850
	5/1S2 Khair Sissoo Forest	37
Subtropical Pine Forests	9/C1 b Upper or Himalayan Chir Pine Forest	38489
	9/DS1 Himalayan SubTropical Scrub	1433
Himalayan Moist Temperate Forests	12/C1 a Banj Oak Forest ( <i>Quercus leucotrichophora</i> )	70952
	12/C1 b Moru Oak Forest ( <i>Quercus floribunda</i> )	29946
	12/C1 c Moist Deodar Forest	14855
	12/C1 d Western Mixed Coniferous Forest (Spruce, Blue Pine, Silver Fir)	2119
	12/C1 e Moist Temperate Deciduous Forest	3460
	12/C2 a Kharsu Oak Forest ( <i>Quercus semecarpifolia</i> )	5687
	12/C2 b West Himalayan upper Oak/Fir Forest	14819
	12/C2 c (Moist Temperate Deciduous Forest)	431
Sub Alpine Forests	14/C1 b West Himalayan Sub-alpine Birch/Fir Forest	16348
	14/1S2 Deciduous Sub-alpine Scrub	279
Moist Alpine Scrub	15/C1 Birch/Rhododendron Scrub Forest	44
	15/E1 Dwarf Rhododendron Scrub	2390
Dry Alpine Scrub	16/C1 Dry Alpine Scrub	7
	Water	1227
	Non Forest	498352

### 3.2 Forest Cover

Forest Cover in KSL has 61,672.20 ha under Very Dense Forest (canopy density >70%), 1,19,476.92 ha under Moderately Dense Forest (canopy density 40-70%), 46615.51 ha under Open Forest category (canopy density 10-40%) and 2,790.43 ha under Scrub (canopy density <10%) [FSI, 2013]. Forest cover map of KSL is given in Fig. 3.2.

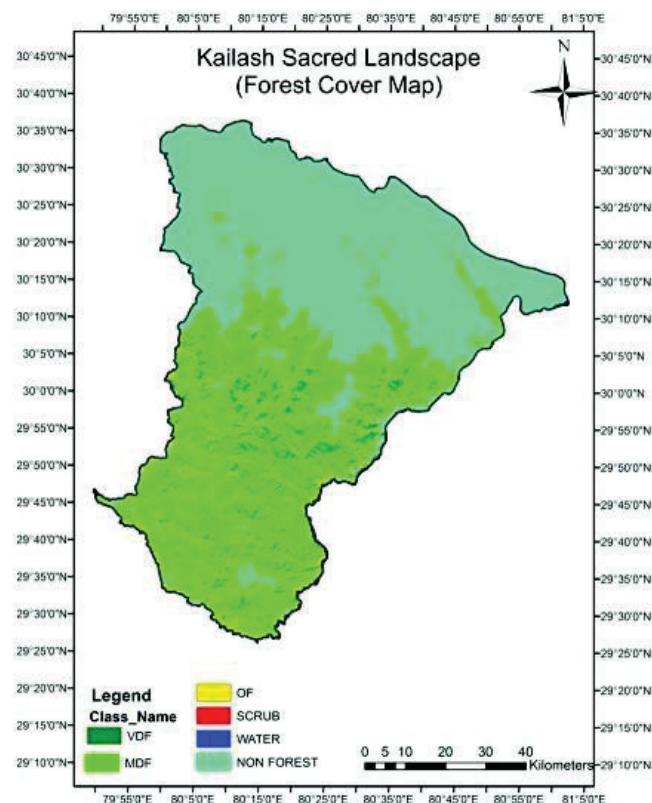


Fig 3.2: Forest cover map of Kailash Sacred Landscape (based on ISFR, 2013)

### 3.3 Status of Forest Covers during Different Assessments

The Forest Survey of India has been assessing the forest cover of the country on a two-year cycle since 1987. Over the years, there have been improvements both in the quality of remote sensing data and the accuracy of interpretation techniques. The 14<sup>th</sup> biennial cycle has been completed from digital interpretation of data from year 2013-14 and published in 2015 with a minimum mapping unit of 1 ha. FSI is following the tier 2 and tier 3 of IPCC Good Practice Guidance (methodology) for carbon estimation in forests of India through a combination of remote sensing and ground-based forest carbon inventory.

**Table 3.2 Forest Cover (Area in km<sup>2</sup>) of Pithoragarh District**

Forest Cover	Year					
	2003	2005	2009	2011	2013	2015
Very Dense Forest	470	470	567 (+97)	567	571 (+04)	509 (-62)
Mod. Dense Forest	1229	1229	1115 (-114)	1115	1113 (-02)	1013 (-100)
Open Forest	378	378	412 (+34)	412	416 (+04)	580 (+164)
Total	2077	2077	2094	2094	2100 (+06)	2102 (+02)
Percent of Geographical Area	29.29	29.29	29.53 (+0.24)	29.53	29.62	29.65 (+0.03)
Scrub	-	69	32	32	28 (-04)	39 (+11)

(Source: FSI, 2003; 2005; 2009; 2011; 2013; 2015)

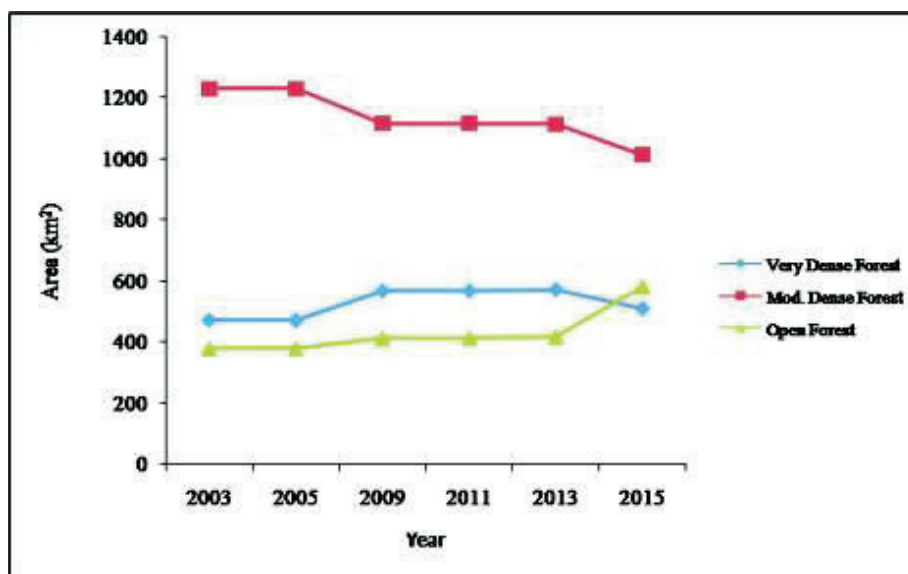


Fig 3.3: Change in area (km<sup>2</sup>) by each forest class wise in Pithoragarh from 2003-2015

The district wise change in forest cover for Pithoragarh and Bageshwar districts of Uttarakhand from 2003 to 2015 has been shown in Table 3.2 and Fig. 3.3. Table 3.2 shows that there is continuous increase in percentage of total geographical area covered by the forest in Pithoragarh. In 2015, there is the increase of 0.03% in geographical area covered by the forest. In between the forest cover class wise the scenario is different, the total area covered by the open forest is increasing (164 km<sup>2</sup>) while the area covered by very dense forest (62 km<sup>2</sup>) and moderately dense forest (100 km<sup>2</sup>) is decreasing (FSI, 2015), which shows that the very dense forest and moderate dense forest is converting to open forest. This conversion of very dense and moderate dense forest to open forest indicates that forest degradation is happening in Pithoragarh district (Fig 3.3).

In Bageshwar district there is degradation of forest occurring in moderately dense forest (Fig 3.4). Table 3.3 represents that the area under the moderately dense forest has decreased to 49 km<sup>2</sup> in 2015 as compared to 2013, while the area under the open forest increased to 24 km<sup>2</sup> in 2015 as compared to area under the open forest in 2011 and 2013 (FSI, 2009; 2013; 2015).

Table 3.3 Forest Cover (Area in km<sup>2</sup>) in Bageshwar District

Forest Cover	Year					
	2003	2005	2009	2011	2013	2015
Very Dense Forest	159	159	194 (+35)	194	197 (+03)	200 (+03)
Mod. Dense Forest	875	875	883 (+08)	883	883	834 (-49)
Open Forest	346	346	304 (-42)	304	305 (+01)	329 (+24)
Total	1380	1380	1381 (+01)	1381	1385 (+04)	1363 (-22)
Percent of Geographical Area	61.44	61.44	61.49 (+0.05)	61.49	61.67 (+0.18)	60.69 (-0.98)
Scrub		4	4	4	4	4

(Source: FSI 2003; 2005; 2009; 2011; 2013; 2015)



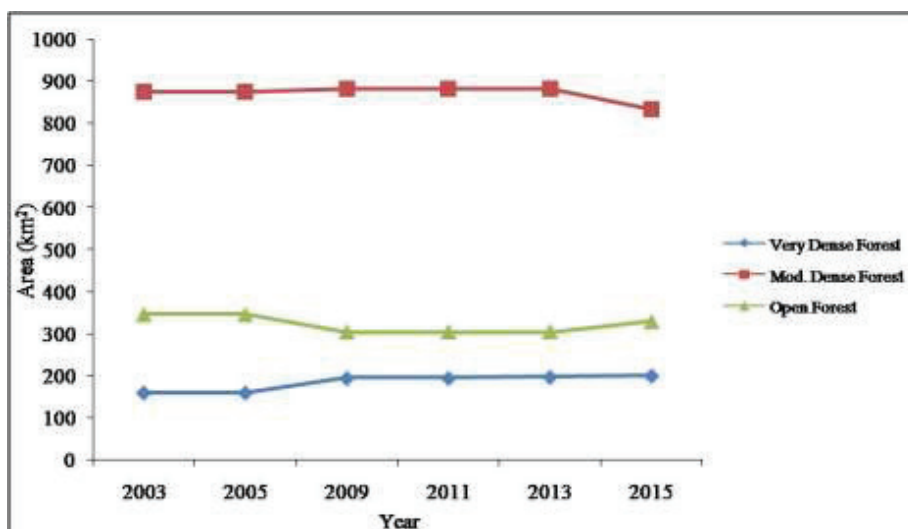


Fig 3.4 Change in area (km<sup>2</sup>) by each forest class wise in Bageshwar District from 2003-2015

### 3.4 Estimation of Carbon Stocks

Forest in Himalayan region plays an important role in mitigation and adaptation of climate change. Natural forests sequester and store more carbon than any other terrestrial ecosystem and are an important natural brake on climate change. Carbon sequestration by forests has attracted much interest as a mitigation approach, as it has been considered a relatively inexpensive means of addressing climate change. The biomass productivity (17.0 -21.0 t/ha/yr) of the pristine forests of the region is comparable to the highly productive forests of the world ranging from 15.0 – 30.0 t/ha/yr among major forests of the region (Singh and Singh, 1992). Singh (2007) has reported that a mature forest in the Himalayan region stores approximately 200 to 300 tonnes of carbon per hectare. Similar studies have been conducted by Jina *et al.*, (2008) and Singh (2009) in this region.

Estimation of forest carbon stocks has been made using existing national and regional data. KSL being rich and diverse in forest ecosystem, have potential to store carbon and act as a landscape for climate change mitigation. For the estimation of carbon stocks FSI has slightly modified the forest type groups for the stratification of activity data. 7 forest type groups have been clubbed to form 06 forest type groups. Himalayan Dry Temperate forest is grouped under Sub-Alpine forests; Moist Alpine Scrub and Dry Alpine Scrub is grouped and termed as Alpine Scrub. FSI has classified the forest cover into following three categories:

- i) Very Dense Forest- Lands with forest cover having canopy density of 70 percent and above.
- ii) Moderately Dense Forest- Lands with forest cover having a canopy density between 40 to 70 percent.
- iii) Open Forest- Lands with forest cover having a canopy density between 10 to 40 percent.

The forest area for each forest type of Uttarakhand was available on the basis of FSI forest type map and area under each forest density class for forests of Uttarakhand was available in Forest Survey Report (FSI, 2013). The proportion of forest area for each forest type was estimated from forest type map and further extrapolated to the available data of 2013 to calculate the forest area for respective forest type of the forests of Uttarakhand for the year 2013. It is assumed that the estimated proportion is uniformly distributed in 2013 also.

Secondly, the data of forest density class for 2013 was used to estimate respective proportion of forest area under different density class i.e. very dense forest, moderately dense forest and open forest. It is assumed that the forest area under different density class for each forest types is distributed similar to the area under different forest density class (overall) in the same year. The estimated proportion based on overall area under different density class is used to extrapolate the area under different density class for respective forests types for the year 2013. Same methodology is used for extrapolating the area under each forest type area and for their various forest density classes for KSL.

A total of 29.90 million tonnes of carbon stock is estimated in KSL using estimates of carbon in different forest types (FSI, nd). Mean carbon stock density of Tropical Moist Deciduous Forest ranged between 55.34 tC/ha to 99.95 tC/ha in Open Forest (OF), Moderately Dense Forest (MDF) and Very Dense Forest (VDF) class. Tropical Dry Deciduous Forests have 167.53 tC/ha carbon stock density in VDF, 152.64 tC/ha carbon stock density in MDF and 66.59 tC/ha carbon stock density in OF. Carbon stock density of Subtropical Pine Forests have 155.76 tC/ha, 120.57 tC/ha and 91.56 tC/ha in VDF, MDF and OF respectively. Alpine Scrub has the maximum carbon stock density (202.34 tC/ha) in VDF due to the presence of high carbon stocks in soil while MDF have 84.37 tC/ha and OF have 65.91 tC/ha (Table 3.4).

Table 3.4 Forest carbon stock in the Indian part of KSL (Derived from FSI nd)

Forest Type Major Group	Density	Carbon Stock (tC/ha)	Total area forest cover wise	Total Carbon (tonnes)
Tropical Moist Deciduous Forest	VDF	99.95	850.49	85006.48
	MDF	82.53	1647.65	135980.55
	OF	55.34	642.85	35575.32
Tropical Dry Deciduous Forest	VDF	167.53	2406.35	403135.82
	MDF	152.64	4661.79	711575.63
	OF	66.59	1818.86	121117.89
Subtropical Pine Forest	VDF	155.76	10809.74	1683725.10
	MDF	120.57	20941.61	2524929.92
	OF	91.56	8170.65	748104.71
Montane Moist Temperate Forest	VDF	172.83	38522.41	6657828.12
	MDF	138.34	74629.07	10324185.54
	OF	94.27	29117.52	2744908.61
Subalpine & Dry Temperate Forest	VDF	181.34	5161.18	935928.38
	MDF	152.69	9998.70	1526701.50
	OF	103.52	3901.12	403843.94
Alpine Scrub	VDF	202.34	1.90	384.45
	MDF	84.37	3.67	309.64
	OF	65.91	1.43	94.25

### 3.5 Carbon Sequestration Potential

KSL has 49,787.07 ha area in Open Forest (OF) and 72,878.03 ha area under Moderately Dense Forest (MDF) cover. Afforestation programmes in OF and enrichment/Assisted Natural Regeneration in MDF class can have pivotal role in carbon sequestration. Local community needs motivation in the form of REDD+ like programmes to play important role in forest conservation, sustainable management of forests and afforestation reforestation programmes. Capacity building in the form of technical knowledge should be provided to the communities and other stakeholders for these programmes. Selection of appropriate species for plantation should be done after the consultation with State Forest Department and members of Van Panchayats considering the local conditions. Pilot projects can be undertaken in Hat Kalika and Chandak-Aunla Ghat Watershed and further upscaled in other watershed. Afforestation/ Reforestation and other forestry programmes can be synergized with the Green India Mission (GIM) under National Action Plan on Climate Change. Natural and manmade causes such as resin tapping, illicit felling, lopping removals in the form of poles and firewood collection account for 19% of carbon loss which is equivalent to 0.861 million tonnes of CO<sub>2</sub> (UFD, 2012, Working Plan for Pithoragarh Forest Division) Region has high Carbon sequestration potential as well. Rawat and Rawat (2012) reported that community forest management can be a viable strategy for reducing permanent emissions by deforestation activities. In two *Van Panchayats* (Anriyakot and Bhatkholi) of Almora district (Adjacent to Pithoragarh District of KSL) of Uttarakhand, the mean carbon sequestration rate in the study in Anriyakot *Van Panchayat* forest was 3.90 tC/ha/yr, while in the Bhatkholi *Van Panchayat* forest was 3.41 tC/ha/yr. The Anriyakot *Van Panchayat* accumulates a total of 140.87 tC and Bhatkholi *Van Panchayat* accumulates 170.5 tC annually (Rawat and Rawat, 2012)









# Drivers of Deforestation and Forest Degradation in Kailash Sacred Landscape

## 4

The dynamics and causes of deforestation and forest degradation in developing countries are multi-faceted, complex and vary from place to place. There are long, complex chains of causation that can bring about deforestation or the degradation of forests. Carefully and systematically analysing and comprehensively addressing all direct and underlying drivers of deforestation and degradation of forests is the priority and key prerequisite to effectively reducing emissions from deforestation and forest degradation and thus enhancing forest carbon stocks in REDD+ programmes.

**4.1 Driver of Deforestation and Forest Degradation:** Local community in the Himalayan region remain heavily dependent on forests for their livelihood and subsistence. Communities living in villages have very small land holdings (<1 ha. per household). Population of the Pithoragarh district was 4, 62,289 at 2001 Census and growing by 4.6 per cent during the decade 2001-2011 it is 4,83,439 at 2011 Census. The urban population in the district is about 14.4 per cent and rural population is about 85.6 percent. The population of the district Bageshwar was 2, 47,163 at 2001 Census and growing by 5.15 per cent during the decade 2001-2011, it is 2, 59,898 at 2011 Census. The decadal growth at 5.15 per cent in the district was recorded (Census of India, 2011). The increase in population has caused immense pressure on natural resources and forests are facing degradation due to increasing demand for fuel wood, fodder and timber etc. Factors causing the degradation are enlisted below:

- (i) **Fuel wood Collection:** There is a huge demand of fuel wood as a source of energy for cooking and keeping the house warm in winters. Most of the pressure of fuel wood collection is on the forest near the villages. From Uttarakhand REDD+ project study, it was found that on an average 28 kg/day of fuel wood is being collected per household during winter season and 24 kg/day is being collected during summer season. The Fuel wood is collected from the month of October to the month of May. Normally females of the household are responsible for the collection of the fuel wood and for that they have to spend around 3-4 hour by travelling 3 to 4 km daily in the forest. There are total 18,458 households in 186 different villages inside the project boundary and the survey revealed that the total annual quantity of fuelwood consumed by the village communities inside the project boundary is 0.1771 million tonnes which in terms of carbon is around 0.0885 million tonnes of carbon. Women especially spent more time for the collection of fuel wood. Sometimes trees are lopped heavily or young trees are chopped off which adversely affects the regeneration of forests. Forests near the habitations are the worst affected and have been considerable degraded. The use of fuel wood has considerable impacts on the health of women and there is a need to ensure the efficient use of fuel wood through improved cook stoves & supply of LPG etc.
- (ii) **Grazing:** Grazing affects the forest resources heavily. Cultivation of green fodder in agricultural fields is not a common practice in this region. Unregulated grazing in the government forests all the year destroys ground flora. Young seedlings are browsed and trampled which affects the natural regeneration. Many local communities migrate to the alpine pastures or higher ranges in summer along with their flock of sheep and goats. The unregulated grazing causes tremendous damage to the alpine pastures as well.

- (iii) **Forest Fires:** Forest fires are common in KSL and biotic and abiotic losses are incurred. Flora and Fauna are adversely affected. During the interactive meeting with the local community, it has come to the notice that human life is also in danger due to fire. Local community members get injured when attempting to extinguish forest fires and even some people lost their lives while dousing the fire. Due to difficult terrain, fire control is difficult. Local community members are not trained in fire controlling. Forest department is putting a lot of efforts to control the fire but more actions are also needed to control the expansion of fire and awareness need to be generated among local community regarding the control the expansion of forest fire and prevention of forest fire incidence. This region experienced unprecedented forest fire events during summer of 2016. Fire incidents in Pithoragarh and Bageshwar Forest Divisions in 2016 are given in table 4.1.

Table 4.1: Fire incidents in Pithoragarh and Bageshwar Forest Divisions in 2016

Forest Division	Number of Fire Incidents			Affected Area (ha) Evaluation			of losses in Rs.
	Reserve Forest	Civil/Soyam/Van Panchayat Forest	Total	Reserve Forest	Civil Soyam / Van Panchayat Area Forest	Total	
Pithoragarh	13	54	97	125.00	163.60	288.60	372,650.00
Bageshwar	32	27	59	106.90	106.45	213.45	318,025.00
<b>Total</b>	<b>45</b>	<b>81</b>	<b>156</b>	<b>231.90</b>	<b>270.05</b>	<b>502.05</b>	<b>690,675.00</b>

Source: <http://www.vigilanceandlegalcell.co.in/fire/Office-Fire.html> accessed on 25 June 2016

- (iv) **Litter Collection:** Women also collect litter and dried leaves from the nearby forests for use in manuring and bedding material for the cattle. The semi decomposed bedding material (dried leaves) are mixed with cow dung and used as manure in the agricultural fields. The unregulated collection of dried leaves affects the organic matter availability in the forests. Study conducted for the Uttarakhand REDD+ project reveals that leaf and litters collection in the villages within the project boundary has many uses and the most important use is to use as dry beds for the livestock and then after use it as manure in the farmland. Some of the high altitude village having horticulture as option of livelihood, uses litters of pine needle as packing material for fruits. A sustainable level of pine needle removals needs to be quantified so that the natural biogeochemical cycling of these forests remains in balance. A rough estimate of quantities of leaf, litter collection during summer and winter per household have been given in the (table 4.2).

Table 4.2 Leaf Litter/Understory Collection in different Season in the project area

Parameters	Winter Season	Summer Season
	Mean $\pm$ Standard Error	Mean $\pm$ Standard Error
Quantity of Collection (Kg/hh)	22.22 $\pm$ 0.59	21.23 $\pm$ 0.63
Time Spent (hr/d)	2.69 $\pm$ 0.07	2.97 $\pm$ 0.08
Distance Travelled (Km/d)	2.62 $\pm$ 0.09	2.67 $\pm$ 0.10

Source: Dr. Rajiv Pande (Unpublished)



- (v) **Encroachment and Illegal Felling:** Unclear boundaries between *Van Panchayats*, Reserved Forests and *Gram Panchayats* have led to the encroachment of forest area. With the increase in the land prices, encroachment has become a serious problem. The forests are burdened with the rights for timber for house construction, the demand for which is increasing with the increase in population. Sometimes at some places unlawful practices are followed to meet the requirement of timber for house building construction etc.
- (vi) **Collection of Medicinal Plants:** KSL has vast repository of medicinal plants like *Aconitum heterophyllum*, *Dioscorea deltoidea*, *Swertia chirata*, *Picrorhiza kurrooa*, *Dactylorrhiza hatagirea*, *Eulophia campestris*, *Rauwolfia serpentina*. Medicinal plants are used in the traditional medicine by the local community. Over-exploitation of medicinal plants is also cause of concern.

**Box 4.1:**

**Collection of Keera Jari or Yartsa Gumba, caterpillar fungus  
(*Ophiocordyceps sinensis* = *Cordyceps sinensis*) found in the district of Pithoragarh**

Collection of *Keera Jari* or *Yartsa Gumba*, the wonder medicine from Himalayas is a caterpillar fungus (*Ophiocordyceps sinensis* = *Cordyceps sinensis*) found at high altitudes between 3,000 to 4,500 msl in the district of Pithoragarh. Collection of this caterpillar fungus medicine is a major sources of cash income for the local communities of the region in past 2-3 decades owing to its demand in Chinese medicine system. People residing in the nearby villages camp in the high altitude areas just before the onset of snow melt. The emergence of caterpillar coincides with snow melt. Most villagers especially the youth wait eagerly for this time when they go to collect the caterpillar. In international market it costs around Rs 20 Lakh a kilo.

State Government has not yet implemented an effective system to regulate this trade for benefit of locals while middle man and smugglers are thriving with its illegal trade. A regulated mechanism will ensure sustainable harvest along with environmental conservation. A system of regulated trade could generate handsome revenue to the state as well. The Forest Department has facilitated a system of its sale to the Uttarakhand Forest Development Corporation by villagers permitted by the Village Council Head (*Gram Pradhan*) but this system has not proved to be successful. Owing to its high price and demand in grey market, neither the villagers collecting the caterpillar, nor the State Government are able to derive the full potential benefit from this trade.

- (vii) **Invasive Species:** Invasive species like *Lantana camara* and *Eupatorium adenophorum* occupy the ground flora and adversely affect the growth of natural flora. Invasive species cause loss of biodiversity and affects ecosystem structure and function leading to ecological homogenization of the landscape. Field observation and preliminary analysis of the data collected during the project on REDD+ in Uttarakhand revealed that there is heavy influx of invasive species like *Lantana camara* and *Eupatoium adenophorum* in the forests of Uttarakhand. Interaction with the local community and forest official also revealed that invasive species are causing the degradation of biodiversity in the forests and they do not allow the natural to flora to flourish. Further analysis is required to analyze the impact of invasive species on natural flora in the hills.


### Case Study: Uttarakhand REDD+ Pilot Project

Indian Council of Forestry Research and Education in collaboration with the Uttarakhand Forest Department is implementing a REDD+ pilot project in Kalsa Gola Sub watershed of Nainital Forest Division of Uttarakhand. Project area in Nainital district of Uttarakhand is adjacent to the KSL part of India having similar socio economic scenario. Socio economic survey through pre-tested questionnaire was conducted across the area to evaluate the dependency of local communities on the forest ecosystem. Survey results that majority of the local communities are dependent on forest for various forest produce for their subsistence. Approximately, 80-90% village households are using fuel wood for cooking, while during winters, 90-95% households are using fuel wood for heating. The fuel wood collection responsibility lies primarily on women. They travel 3-4 km distance and spent 3 to 4 hours for collection of fuel wood from the nearby forests. Daily fuel wood consumption from forests by a household is approximately 24 to 30 kg. Now-a-days, household



Collection of fodder, fuel wood and leaves from forests






prefer to use LPG as cooking energy, however, availability of LPG in the area is low. Fuelwood is still a favourable option for heating during winters.

Fodder extraction from forests for cattle is also very common in the area. Generally, people cut the fresh leaves and twigs for livestock feed. The members, generally female, collect fodder on daily routine basis to the tune of 22 – 28 kg for their livestock. Grazing in the forests and own field is also common in the area. The uncontrolled grazing leads to trampling of new shoots and seedlings and restrict the regeneration. These two, the fodder collection and grazing are also driver of forest degradation. The other main cause of forest degradation is forest fire, which is also routine phenomenon in the region during the summer. Generally, forest fire is anthropogenic either incidental or intentional. The other causes of forest degradation are uncontrolled lopping, cutting of new recruits, climate change, survey reveals (Source: Personal Communication to Dr. Rajiv Pandey, ICFRE).

#### 4.2 Interventions/ Activities to address the drivers of Deforestation and Forest Degradation:

Interventions, those are locally acceptable, adaptable and easily replicable need to be identified to address deforestation and forest degradation. The interventions within the framework of REDD+ and to ensure more effective involvement of participating communities in the management of forests will make REDD+ a more attractive options to the communities. Rights of the peoples should be respected before implementing a REDD+ project. The following activities could be implemented to address the drivers of deforestation and forest degradation.

- (i) **Improved Cook Stoves and Alternative Sources of Clean Energy:** Fuel wood collection from forests affects the ecosystem and also the health of the women. Efficient use of fuel wood should be ensured through use of efficient and improved cook stoves. Study done elsewhere reveals that major consumption of fuelwood is during winter for heating purpose and most of the household stockpile fuelwood for winter consumption. Alternative sources of energy like Liquefied Petroleum Gas (LPG) and solar photovoltaic should be made available to the community so that the dependence on forest resources is reduced more effectively. However, fuelwood will remain primary source of heating in winters in the region. Pilot programmes could be implemented in KSL to know the effectiveness of the introduction of improved cook stoves which can be further up scaled at landscape level. Afforestation/ reforestation programmes should be implemented under REDD+ to provide fuel wood. A good REDD+ programmes needs to carry out plantation activities involving local communities and State Forest Department after stakeholder consultation process.
- (ii) **Grazing Control:** Rights of the people should be respected before implementing REDD+ project in the KSL. Grazing should be on rotational basis that should be monitored through the members of *Van Panchayat*. Awareness needs to be generated among local community for stall feeding and improved livestock rearing. Regulated grazing should be allowed in a phased manner and under the directions/supervision of State Forest Department and community members. Plantation of fodder trees/ shrubs/ grasses and other forages could be strategically introduced in *Van Panchayats* so that they can be managed by the local community according to their needs. Awareness should be raised among local community and other related department to support the cultivation of fodder species in agricultural fields. Traditional knowledge of forest management for livestock rearing should be integrated with scientific programmes for the sustainable management of natural resources. A village nursery should be developed to provide the good quality planting material including fuelwood and fodder species to the villagers for plantation in *Van Panchayats* Forests with the active




involvement of women folks. Good quality planting materials should be provided at the right time of plantation. A concept of village fodder bank can also be introduced to relieve pressure on forests.

- (iii) **Forest Fire Control:** *Van Panchayats* and local Non Government Organizations would be actively involved to educate the local community. Forest fire fighting equipments would be provided to the local community so that they can play role in dousing the fire at local level. Immediate relief and a mechanism of compensation for the individuals who are injured or lost their lives while during the fire extinguishing process need to be established. Removal of Forest floor fuel load along the road sides can help in checking spread of forest fire. In order to reduce forest floor fuel load, use of pine briquettes for fuel is one of the option. Some briquetting units have been installed in the region. Small Pine briquetting machine and technical knowledge need to be provided to the villagers to make pine needles briquettes, so that they can be used in house as a source of energy and in turn will reduce the dependency on forests for fuel wood as well. Commercial use of Pine needles is facing lot of limitation for the industries to flourish. Bulk collection and transportation of pine needles is uneconomical and the dried pine needles are available for about 3 months. Storage of pine needles is beset with fire problems and storage becomes a problem. But still, efforts are done by a Non Government Organization AVANI for the utilization of pine needles as energy source at local level. A 9 KW pine needle gasifier system has been developed and installed as a pilot, at AVANI campus at Berinag. (See Box 4.2)

Villagers also complain that fire lines are not cleaned well in time that also resulted to spread of small fire to large area. Fire line should be created between forests to control the expansion of forests. Local youths should be educated regarding the control burning. Village forest boundary wall needs to be erected to reduce incidence of forest fires.

- (iv) **Litter Collection:** Dried leaves (Leaf litter) are collected as a bedding material for cattle and subsequent use in manuring. Vermicomposting pits should be promoted in the villages to ensure the effective use of dried leaves and cowdung. Use of vermicompost should be encouraged in the agricultural fields for effective and efficient utilization of leaf litter as organic manure.
- (v) **Agricultural Practices:** Local community would be encouraged to use improved agricultural implements, scientific methods of agricultural practices, crop selection. Mechanism for effective co-ordination between Government Departments like Horticulture, Agriculture, Rural Development and Watershed etc whose activities have a direct bearing on reducing pressure on forests, promoting forest conservation, reducing forest degradation etc. should be strengthened. Such coordination will lead to climate change adaptation as well.
- (vi) **Encroachment and Illegal Felling:** At the stakeholders meeting villagers raised the issue of no clear demarcation between *Van Panchayats* and reserved forests. Clear boundary should be delineated between Reserved Forest and *Van Panchayat* Forests to reduce the conflicts and ensure better management of forest resources. Local community members are encouraged to assist in controlling illegal felling and encroachment. Strict legal actions should be undertaken against the peoples involved in encroachments.
- (vii) **Cultivation of Medicinal Plants:** Assessment and Promotion of medicinal plant resources needs to be done in the region. Village Cluster system should be encouraged for the cultivation of medicinal plants. Highly valued medicinal plants should be encouraged to cultivate. Nursery should be




developed to provide the quality planting material. Market linkages and processing of medicinal plants at local level should be developed. Technical knowledge should be imparted to the farmers for the cultivation of medicinal plants. Medicinal Plant Conservation Areas (MPCA) should be surveyed and conserved through the participation of local community. One such MPCA is established at Khalia Top near Munsyari in Pithoragarh Forest Division within the KSL region.

- (viii) **Eradication of Invasive Species:** Local community should be involved in the eradication of invasive species like *Lantana camara* and *Eupatorium adenophorum* etc. Alternative and creative uses of invasive species could be discovered. Eradication programmes should be conducted to reduce the menace of invasive species. Study should be conducted to assess the spread of invasive species and impact of climate change on invasive species.
- (ix) **Strengthening of Van Panchayats:** Excessive powers and responsibilities have been concentrated in the village *Pradhan* or *Sarpanch*. At times this has not only weakened the strong tradition of collective decision-making but also reduced transparency and accountability of *Van Panchayats* (VPs). Excessive responsibilities thrust on the village *Sarpanch* as an individual is also a major disincentive for taking up the leadership of a *Van Panchayat*. Heads of *Van Panchayat* are devoid of financial powers to invest within their *Van Panchayat*. Lack of administrative support has resulted in a large number of unattended boundary and penalty disputes and unauthorized occupation in the absence of effective and accessible dispute resolution mechanisms. The problem of inter-village inequity in the availability of village forest areas remains unresolved. VP should be given more autonomy and flexibility to manage forests and necessary support should be provided by Forest Department. Some legal rights should be provided to Head of the *Van Panchayat* Forests to have more control on the *Van Panchayat* Forests. Head of *Van Panchayat* also complain that Mahatma Gandhi National Rural Employment Guarantee scheme does not have any provision for work within the *Van Panchayat*. They were also of the opinion that Provisions should be made to provide the funds in Mahatma Gandhi National Rural Employment Guarantee Act (MNREGA) schemes to *Van Panchayat*. *Van Panchayat* and *Gram Panchayat* both are local institutions. While people actively participate in the proceedings of the *Gram Panchayat*, only a few have any direct involvement in the proceedings of the *Van Panchayat*. It has also been observed that the *Sarpanch* and *Panchs* of *Van Panchayat* are sometime selected by the *Gram Sabha*, and no elections are held for many years whereas as per the rules, election needs to be held every five years (Negi *et al.*, 2012).

#### 4.3 Analysis of Institutional Capacity to Address the Drivers of Deforestation and Forest Degradation

Institutional capacity building/ training programs regarding effective implementation of REDD+ are needed at all level of forest staff. Capacity building of the forest staff is of utmost importance to address the drivers of deforestation and forest degradation. Regular monitoring of activities addressing the drivers of deforestation and forest degradation would be useful and forest staff should be regularly trained to assess the various aspects of implementation of REDD+ programmes. Involvement of local youth in various REDD+ actions like measurement, field data collection, promoting livelihood activities need to be encouraged. These actions will also help the forest staff in effectively implementing REDD+ with involvement of local communities. Continuity of trained forest staff in REDD+ need to be ensured till the benefits of the projects are starts flowing to the participating communities.





The involvement of *Van Panchayat* is very important to address the drivers of deforestation and forest degradation. Viable alternatives need to be worked out and provided to them to reduce the dependency on forests. Exposure visit to operational REDD+ project would be useful for the *Van Panchayat* members to develop their capacity in handling drivers of forest degradation. Awareness programme should be conducted for the women. Women Groups (*Mahila Managal Dal*) should be created to raise the awareness about REDD+ programmes. Involvement of women in implementing REDD+ project will assist in reducing the drivers of forest degradation.

Different departments of Government are pursuing their own policies and programmes with their own mandate and priorities. Co-ordination among different departments is required for controlling the drivers of deforestation and forest degradation. Department officials should be sensitized about REDD+ programmes and different schemes should be covered under REDD+ programmes to reduce the dependency on forests and provide good opportunity to raise their livelihood standards.

**Box 4.2:**

**AVANI: Utilisation of pine needle for energy production**

AVANI is a voluntary organization working in the Kumaon region of Uttarakhand, located in Berinag a small town in district Pithoragarh in KSL

In order to provide clean and green energy Avani initiated a dialogue with the people about solar technology as a viable option to meet their energy needs in the project area in Berinag. After having demonstrated effectiveness of solar energy in providing micro solutions, they have gone on to develop processes for using waste and destructive biomass for meeting energy needs, both electrical and thermal. These renewable energy technologies have been disseminated through community systems.

AVANI has developed and disseminated renewable energy technologies (solar photo voltaic for home lighting and cottage industry needs, solar water heaters, solar driers, pine needle gasifier and biogas).

A 9 KW pine needle gasifier system has been developed and installed as a pilot, at AVANI campus at Berinag. This system is fully operational and generates 9 KW of electricity. Pine needle gasification, apart from meeting the rural energy needs, should be able to generate rural employment while protecting the forests from fires. The conversion of pine needles into fuel gases or electricity immediately gives it an economic value, thus a motivation for the people to collect these from forest floor. Once cleared of the Pine needles, the forests have minimum risk of fires, protecting the precious biodiversity, thus affecting the fragile mountain ecosystem positively. This conversion of pine needles into usable fuel, apart from saving the forests from fires, would also save the forest from fuelwood pressure. (Source: <http://www.avani-kumaon.org/>)

# Scope of REDD+ in Kailash Sacred Landscape

## 5.1 Kailash Sacred Landscape

Within the designated area of >31,000 km<sup>2</sup> of KSL, India constitutes approximately 7,120 km<sup>2</sup> area in north-eastern part of Uttarakhand state. This area covers nearly entire Pithoragarh and part of Bageshwar districts, with major watersheds of Kali, Dhauli, Gori, Ramganga and Saryu rivers. It is bordered by Nepal and Tibet Autonomous Region of China on eastern and northern sides respectively. The KSL is extremely rich in biodiversity, socio-cultural and trans-boundary historical linkages. The natural beauty along with spiritual and sacred values of this landscape attracts tens of thousands of pilgrims and tourists every year. However, at the same time the landscape is also known for its extreme vulnerability to both anthropogenic and natural changes. As a result, the rich biological diversity, the ecosystem goods and services, and the value based cultural heritage of this landscape are under severe pressure.

## 5.2 Objectives of the Project and REDD+ Scoping Study

The overall goal of “**REDD+ Himalayas: Developing and using experience in implementing REDD+ in the Himalayas**” project is to improve the condition for implementing REDD+ measures to mitigate climate change that are socially and environmentally sound. Project aims to implement National REDD+ Strategy through conservation and sustainable use of natural sinks. Conservation and sustainable use of forests through REDD+ programs is an effective mitigation & adaptation measure. The project also aims at building regional REDD+ learning platform to foster south-south learning. This regional scale REDD+ project meets the goal that “Trans-boundary landscapes are better conserved and managed for sustaining ecosystem goods and services to improve livelihoods and enhance ecological integrity, economic development, and socio-cultural resilience to environmental changes”. The project aims at:

- (i) Development of methods for calculating, modelling and projecting carbon storage.
- (ii) Developing instruments in preparation for regional REDD+ readiness.
- (iii) A Regional learning platform; In working towards harmonization in the region, an exchange of experience and mutual learning on good REDD+ implementation practices is established as South–South cooperation. The platform especially deals with standards for calculating reference levels (RLs) and reference emission levels (REL) and the design of systems for measuring, reporting and verification (MRV), including social and environmental aspects (regional).

The Objective of the present scoping study is to find out the feasibility of implementing REDD+ project in Kailash Sacred Landscape and recommend a road map for future action. A REDD+ project in KSL region of India, can be developed with an overall objective of developing an ideal pilot projects for demonstration of REDD+ actions in the selected cluster of *Van Panchayats* and JFM areas of the KSL region with active involvement of local communities.

In order to achieve the overall objective following short term objectives could be:

- Empowering forest dependent communities for forest carbon conservation and developing an MRV system for REDD+ actions. Estimation of carbon status in different carbon pools in the selected *Van Panchayats* forest of Uttarakhand
- Capacity building of various stake holders such as forest staff, staff of other related departments such as rural development and participating communities for REDD+ and also for developing a

transparent MRV system at small project level

- Estimation of enhancement in forest carbon stocks as a result of conservation efforts in *Van Panchayat* forests
- Developing a system of respecting and reporting of safeguards in accordance with the international agreements
- Feasibility study for getting the project registered for carbon credits and developing a model system of payment to the participating communities

The project participants/ developers will develop the project in accordance with the modalities and procedures adopted for registration of project in under GCF of voluntary carbon market so that payment of carbon can be devolved to the participating communities. The study can also lead to developing a REDD+ State Action Plan for the state of Uttarakhand

**5.3 REDD+ proposed Pilot Project Sites:** GBPNIHESD, Almora and other national partners have conducted preliminary surveys during preparatory and start-up phase of KSLCDI. Two representative transects (i) Horizontal transect: along the east-west heritage route linking west Nepal with mainland India (*i.e.*, Jhulaghat in the east to Talla Seraghat in the west) and (ii) Vertical transect: along Kali-Dhauri river catchments in eastern part of KSL India, have been broadly identified as intensive sites. These transects have been identified as major sites for long-term monitoring and conservation development interventions in the landscape. In the region, a potential REDD+ project can be implemented in two representative sub-watersheds (*i.e.*, Hat-Kalika and Chandak-Aunla Ghat) along the horizontal transect. These two sub-watersheds have been extensively explored for establishing the baseline by GBPNIHESD.

Hat Kalika sub-watershed covers approx. 36.6 sq km area with 14 Gram Panchayats while Chandak-Aunla sub-watershed has 23.2 sq km area with 12 Gram Panchayats. The number of identified villages in Chandak-Aunla Ghat and Hat-Kalika watersheds is given (Table 5.1).

**Table 5.1 Villages in Chandak-Aunla Ghat and Hat-Kalika watersheds**

S. No.	Sub-watersheds	Gram Panchayat	Revenue Village
1	Hat-Kalika	14	45+5*
2	Chandak-Aunla Ghat	11+1 (Partly) = 12	28

\* Included in Nagar Panchayat

A lot of works like resources utilization pattern and people's needs, impacts of invasive species on forest and agricultural resources, protocol for landscape vegetation analysis and invasive species assessment have been done by GBPNIHESD. A total of 15 sacred groves were assessed for their ecological status and biodiversity values by GBPNIHESD. Various activities for livelihood improvement like honey collection; off-season vegetable cultivation, heritage tourism and kidney bean cultivation, eco-restoration of degraded sites carried out by youth groups are being implemented in these sub-watersheds (KSLCDI Newsletter, 2014)<sup>4</sup>. Several consultations, training programmes, awareness programmes, were conducted by GBPNIHESD in KSLCDI. These activities have already sensitized the community regarding environment, role of forest in climate change mitigation, livelihood generation and biodiversity explorations. Potential candidates can be selected from already trained community member for further training regarding effective implementation of REDD+ project in two sub watershed (Chandak-Aunla Ghat and Hat-Kalika). *Van Panchayats* in these two sub-watersheds can be selected for their participatory role in enhancement of carbon stock, reducing emissions from forest degradation, conservation of carbon stocks and sustainable management of forest.

<sup>4</sup> KSLCDI-Newsletter, SANGJU Sacred Attempt for Natural Growth and Joyful Union, Vol. 1(1), July 2014.

**5.4 REDD+ Incentives for Community Based Forest Management:** A Case for KSL REDD+ implementation is an iterative process, requiring regular appraisals and improvements at local (i.e., REDD+ projects) (sub-national), national and through international (i.e., UNFCCC) levels. Involving and passing financial incentives to local communities can make the REDD+ a success at local (sub-national) and National level. Forest dwelling communities in the Himalayan region have been successful in transforming the deteriorating state of their natural forests to sustainable management, thereby avoiding deforestation and the subsequent release of CO<sub>2</sub> emissions into the atmosphere.

Uttarakhand has a tradition of Community controlled forest management like Civil and Soyam Forests, *Van Panchayats*, JFM Committees (under forest department). All these forests are managed by elected representatives from the local communities. *Van Panchayat* and community based forest management in Uttarakhand have been successful in conserving the forest resources. In Uttarakhand *Van Panchayats* cover about 15 % of forest cover another 13% is under Civil and *Soyam* Forest (Table 5.2). All these activities and measures of forest governance/management in the KSL have the potential can fit into REDD+ oriented mitigation measures, with sizable potential for increasing the sequestration of carbon.

There is ample scope and opportunities for integrating the REDD+ initiative within the community controlled/managed forest and JFM activities. For this purpose, methodologies, modalities and procedural framework will need to be worked out to ensure people's participation and sharing of the benefits accruing from REDD+ incentives. There is a great potential of initiating a pilot REDD+ project in the *Van Panchayats* of Uttarakhand who have been traditionally protecting and conserving forests.

**Table 5.2 Forest Statistics in Uttarakhand**

Forest	Area controlled (Sq km)
Under Van Panchayat	7,350.85
Under Revenue Department	4,768 .70
Under Private Control (Municipalities and Cantonment etc.)	156.40
Under Forest Department	25,863.18


(Source: Uttarakhand Forest Statistics 2014-2015 published by Uttarakhand Forest Department)

**Need for the Project**

In accordance with UNFCCC decisions, REDD+ countries aiming to undertake REDD+ activities will have to develop following elements at national (as an interim measure at sub-national level)

- (a) A national strategy or action plan.
- (b) A national forest reference emission level and/or forest reference level or, if appropriate, as an interim measure, subnational forest reference emission levels and/or forest reference levels, in accordance with national circumstances.
- (c) A robust and transparent national forest monitoring system for the monitoring and reporting of REDD+ activities in accordance with national circumstances,
- (d) A system for providing information on how the safeguards are being addressed and respected throughout the implementation of the activities.

The COP decision (1/CP. 16) further requests developing country Parties, when developing and implementing their national strategies or action plans, to address, *inter alia*, the drivers of deforestation and forest degradation, land tenure issues, forest governance issues, gender considerations and the safeguards ensuring the full and effective participation of relevant stakeholders, inter alia indigenous peoples and local communities;



As mentioned elsewhere in the text, India's draft REDD+ strategy and action plan yet to be approved by the government. Same is the situation with developing National Forest Reference/ Reference Emission Level (RL/REL). RL/REL are yet to be developed. In so far as forest monitoring is concerned there should not be any problem, at national level Forest Survey of India (FSI) has been conducting this exercise at regular intervals.

India has not yet formally developed the Safeguard Information System (SIS) for REDD+ implementation. However, the process has been started by way of pilot studies, which provide an ideal opportunity to develop the same. Various acts and legislations mentioned earlier are strong testimony to Government of India's commitment to implement REDD+ safeguards involving participating communities and conservation of its natural forests. India is in a commanding position to have a strong policy, legal and regulatory framework for environmental safeguards, and also an elaborate institutional arrangement of JFMCs at the grassroots level for ensuring social safeguards. However, the process needs to be formalized by way of an SIS. Among the various options available, the 'Cancun Principles' are the most elaborate option to follow, but are not very objective and focused. India has recently joined UN-REDD programme and needs probably to relook at the safeguards followed by FCPF and UN-REDD Programme. The biggest challenge, however is to build capacity for development and implementation of such a system. The potential REDD+ programmes in the KSL will provide an excellent opportunity to integrate the existing knowledge with the tools and techniques developed by different agencies to develop country specific essential REDD+ elements like RL/REL and SIS.

**5.5 Carbon Rights:** Local participating communities have the primary right on carbon as they are at the forefront on managing their forests (*Van Panchayats* and JFM model). Incentives generated through the carbon credits must be passed to the local community in an equitable manner with a share to be utilized for management of forest.

**5.6 Access and Benefit Sharing Mechanism:** Access and Benefit Sharing Mechanism (ABSM) needs to be developed which will allow the fair and equitable sharing of benefits arising from the implementation of REDD+ project in KSL. Local community will be involved in designing the ABSM depending on their requirements.

**5.7 Livelihood Enhancement Programmes:** REDD+ project will provide the better livelihood options for the local community. Local community should be involved in various livelihood generation programmes that contribute in reducing pressure on forests like cultivation of medicinal plants, fodder production, organic farming, Bee Keeping, dairy production etc.

**5.8 Government/Departmental Schemes/Programmes for Forest Conservation:** Various departments are running lot of schemes and developmental programmes in KSL. REDD+ Cell should be developed at sub-national level or project level to enhance the co-ordination between different Departments and work in synergy to uplift the livelihood of the community and reduce the dependence on forest resources.

**5.9 Expected Project Outcomes:** Implementation of pilot project in two sub watersheds will built the capacity of the local community to manage forests for climate change mitigation with an added incentive in the form of REDD+ payments. The project will improve the livelihood of the forest dependent community and provide better options for their subsistence. As an inclusive approach, local youth will be trained in the forest management and data collection at local level. Forest dependent community will become adapted to the changing climatic conditions through training and awareness programmes. Drivers of deforestation and forest degradation will be addressed and forest quality will be improved.



# Carbon Standards and Methodological Issues

REDD+ is still not functioning as a established market mechanism under UNFCCC. Besides the UNFCCC and the other regulated markets, there are several transactions of carbon certificates in the “voluntary market”. The voluntary market is not a market place itself, but the sum of transactions “over the counter”. There are several standards active in the voluntary market, including the Verified Carbon Standard, The American Carbon Registry, The Gold Standards and Plan Vivo. There are also standards looking at certifying the co-benefits from forestry activities participating in the global carbon market: The Climate, Community and Biodiversity Standards (CCBS) or the REDD+ Social and Environmental Standards (REDD+ SES). This chapter describes the different standards and their requirements for REDD+ projects. Methodologies set out detailed procedures for quantifying the real greenhouse gas (GHG) emissions and provide guidance to help project developers determine project boundaries, set baselines, assess additionality and ultimately quantify the GHG emissions (VCS, 2016)<sup>5</sup>

## 6.1 Existing Voluntary Carbon Standards for the Development of REDD+ Project for Kailash Landscape

**Verified Carbon Standard:** The VCS is the most comprehensive standard, covering all relevant AFOLU activities, and is based on IPCC guidelines. VCS is commonly combined with CCB Standards to address other environmental and socioeconomic impacts, and a combined certification currently provides the best option for addressing carbon accounting and social and environmental concerns. VCS credits have been particularly sought-after by buyers and investors preparing themselves for forthcoming compliance schemes beyond the UNFCCC.

**Plan Vivo Standard:** Plan Vivo accepts a range of land-use projects, including afforestation/ reforestation (AR), agroforestry, restoration, and REDD. These are developed with small-scale farmers based on a broader “Plan Vivo” livelihood strategy. Unlike other standards, Plan Vivo does not generally provide methodologies, and each project must instead devise its own technical specification adapted to the specific realities of the project, which is reviewed by external experts. Projects are issued Plan Vivo Certificates on an *ex-ante* basis in order to ensure sufficient start-up funds for farmers.

**ISO 14064:** ISO 14064 is a greenhouse gas project accounting standard developed by the ISO. The standard does not lead to the issuance of carbon credits but might be used provide some additional assurance of integrity of climate benefits for projects that do not aim to sell carbon credits. It does not apply restrictions on project types, size, location or other aspects. Unlike standards approving scientific methodologies, ISO 14064 offers only general guidance, with tools defined by the greenhouse gas program or standard under which the standard is used.

**SOCIAL CARBON:** SOCIAL CARBON is a standard designed to demonstrate social and environmental co-benefits of carbon offset projects, as well as to increase active participation of local stakeholders, and is in some ways comparable to CCB. This standard is always used in conjunction with another approved carbon-

<sup>5</sup> <http://database.v-c-s.org/methodologies/what-methodology>

accounting standard like VCS and therefore does not define its own project type or methodologies. Similar to the CCB Standards, it does not issue carbon credits.

**Climate, Community and Biodiversity Standards:** The CCB Standard evaluates land management projects from the early stages of development through implementation. The CCB Standards identify land management projects that deliver net positive benefits for climate change mitigation, for local communities and for biodiversity. The CCB Standards can be applied to any land management project, including projects that reduce greenhouse gas emissions from deforestation and forest degradation or from avoided degradation of other ecosystems, and projects that remove carbon dioxide by sequestering carbon (e.g., reforestation, afforestation, revegetation, forest restoration, agroforestry and sustainable agriculture) or other land management, from design through implementation and monitoring.

**The American Carbon Registry:** ACR verify the CER of the various project of different sectors i.e. forest carbon, carbon capture and storage (CCS), rural solar power, landfill gas, fuel switching, methane capture, fuel switching and truck idling. It has developed a number of standards and methodology by each sector wise to validate and verify the projects. In sectoral scope 14, Agriculture, Forestry, Land Use ACR has Nested REDD+ Standard (V.1) for the accounting of greenhouse gas and net emission reductions from the project activities. ACR makes no quality distinction between voluntary and pre-compliance offsets.

Table 6.1 shows the various existing methodologies by various voluntary carbon standards in context to REDD+ along with their applicability. For a potential REDD+ project in Kailash Sacred Landscape, the applicability conditions attached with the approved methodology under a standard need to be matched with the project conditions in the KSL.

## 6.2 Methodology under Development

GIZ India along with IORA Ecological Solutions Private Limited is developing a “Methodology for Implementation of REDD Activities in Landscapes Affected by Mosaic Deforestation and Degradation”<sup>6</sup> under Verified Carbon Standard. The methodology has gone through the first assessment and in due course of time, the methodology is likely to be approved by VCS. This proposed methodology has the potential to be adopted for REDD+ project in KSL. Following are the proposed project activities under the aforesaid proposed methodology:

Project category	Eligible to apply the methodology?	Activity
Reduced Emissions from Deforestation and Degradation (REDD)	The project activity can apply the methodology	Avoiding Unplanned Deforestation and / or Degradation
Afforestation, Reforestation and Revegetation along with REDD (REDD+ ARR)	The project activity can apply the methodology	AUDD +Afforestation, Reforestation and Revegetation
Afforestation, Reforestation and Revegetation	The project activity is not eligible to apply the methodology.	Not eligible

<sup>6</sup> <http://database.v-c-s.org/methodologies/methodology-implementation-redd-activities-landscapes-affected-mosaic-deforestation>

# Way Forward

# 7

Kailash Sacred Landscape in India is endowed with diverse forest types ranging from tropical wet evergreen forests in the North East and the South West, to tropical dry thorn forests in the central and western part, and temperate and alpine forests in the High Himalayas. The region represents 7 major type groups and 19 subgroup types of forest as per Forest Types of India classification of Champion & Seth (1968). Forests in the region are already subjected to multiple stresses, including over-extraction, livestock grazing, forest fires, and other anthropogenic pressures. Effective implementation of REDD+ project in KSL will lead to mitigation along with livelihood benefits. Involvement of local community and providing technical support to the community will assist in better management of forests. There is ample scope and opportunities for integrating the REDD+ initiative within the community controlled/managed forest and JFM activities. Strengthening of *Van Panchayats* system will empower the local community to address their demand of forest resources sustainably.

Enhancement of carbon stocks could be done in KSL by afforestation, reforestation and ANR activities. KSL has a large area in open forests category (canopy density 10-40%) which can be further analysed to find out the exact preferable locations for plantation. Afforestation/ reforestation/ ANR programmes can be implemented in consultation with local community and forest department with perfect matching of species and site. Such species should be promoted which have the vital role in local community subsistence. Invasive species are causing a great threat to the native flora. REDD+ projects with the involvement of local community can contribute in promoting indigenous species.

REDD+ project in KSL India can learn from Nepal part of KSL REDD+. Learning from Nepal and China REDD+ will help in effective implementation of REDD+ projects. Objectives of Green India Mission to increase the forest/tree cover could be integrated with REDD+. Local community will be financially incentivised through their involvement in REDD+ programmes. KSL is culturally rich area and social safeguards should be respected while implementing REDD+ project in KSL. Key biodiversity areas should be surveyed and mapped so that the management plan could be prepared and proper care should be taken not to disturb the areas due to plantation or other activities. Survey and consultation should be done to identify the culturally important areas like Sacred Grooves, medicinal plants conservation reserves so that the policies could be designed in such a way that the preferences of local community are respected. Developing safeguards (environmental and social) for REDD+ projects are essentially required. Concentrated efforts are needed to develop an effective Safeguard Information System (SIS) in accordance with international requirement. Learning from the project will assist in the preparation of protocols for MRV and SIS.

A few isolated REDD+ pilot projects have already been initiated in India. Subject to availability of finance from national, international (bilateral or multilateral) or alternative sources, India needs to launch the following pilot projects to understand the intricacies of maintaining baseline forest carbon stocks, forest carbon stocks changes, and forest carbon accounting:

- Based on the Concept of Reducing Emissions from Deforestation (RED)
- Reducing Emissions from Forest Degradation (REFD)
- Conservation of Forest Carbon Stocks(CFCS)

- Sustainable Management of Forests (SMF) and Enhancement of Forest Carbon Stocks (EFCS)

Experiences from KSL REDD+ projects and Uttarakhand REDD+ project will assist in designing the REDD+ framework at sub national level. Active involvement of communities in the form of traditional institutions like *Van Panchayats* in the KSL further makes the region potentially favourable candidate for a REDD+ programme. Non-Government Organizations working with communities on issue like livelihood, forest conservation, people's participation are also very active in this part of the country. These can help in the motivating, capacity building, planning and decision making for a REDD+ in the KSL. Uttarakhand State Forest Department also needs to play a proactive role in implementing REDD+ project in KSL. Forest department needs to develop new and innovative programmes to address drivers of deforestation and forest degradation in the region. Women can play an important role in the planning and decision making of forests management as they are the most affected when it comes to managing resources for their subsistence. Pilot programme should be developed to distribute the improved cookstoves to the local community to reduce the forest dependency. Activities like plantation of fodder species, fuelwood species should be done in consultation with the forest department and local community. Awareness should be created among the local youth to control the forest fire. Cross-sectoral integration would help to achieve the objectives of the REDD+ programmes in KSL.

### **Capacity building and Stakeholder Participation:**

Forest dwelling communities in the KSL need REDD+ capacity building programmes to cope with the challenges of climate change mitigation. Capacity building programmes on REDD+ for enhancing the capabilities of forestry professionals and other stakeholders at national, state and local levels are also needed. Strengthening local community institutions through 'Gram Sabhas' (Village councils) and building a cadre of rural youth, strengthening forest departments and other partner agencies are required for an inclusive approach.

Indian Council of Forestry Research and Education being an apex body in national forestry research, education and extension system and instrumental in developing REDD+ concept in India can implement the REDD+ project in KSL. ICFRE can take up initial capacity building activities of various stakeholders.


Uttarakhand State Forest Department further needs to develop its State REDD+ Action Plan (SRAP). The objectives of the SRAP should be to reduce Greenhouse Gas (GHG) emissions from deforestation and forest degradation, enhance carbon stocks, and improve the health of forest ecosystems; minimize potential social and environmental risks of REDD+ implementation; ensure implementation and effective monitoring of the REDD+ intervention packages. SRAP are to be aligned with National REDD+ Strategy to contribute to achieve the targets of REDD+. SRAP must define role of local community in REDD+ and a well-structured mechanism for benefit sharing out of REDD+ project while addressing carbon and non-carbon benefits of REDD+. Objectives of the Green India Mission can be aligned with the SRAP as both the programme will assist in climate change mitigation and support the local community for forest management. Local NGOs and civil society may be involved as they have their visibility of actions in the local community and they have experience of implementing livelihood programmes at local level. ICFRE may collaborate with research organizations like GBPNIHESD in implementation of REDD+ project in KSL as they are implementing KSLCDI and have the field level outreach and experience of working with communities.

Financial needs for the project can be fulfilled by bilateral or multilateral funding organizations for the successful implementation of REDD+ project in KSL. Funding organization may share their international experiences in implementing REDD+ project in KSL.



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# Annexure I

## Stakeholders Consultations on REDD+ Scoping Study in Kailash Sacred Landscape of India

### Background

REDD+ (Reducing Emissions from Deforestation and Forest Degradation) in Developing Countries and Role of Conservation, Sustainable Management of Forests and Enhancement of Forest Carbon Stocks (Collectively known as REDD-plus) is one such programme agreed under UNFCCC to reward financial incentives for forestry activities like (i) Reducing Emissions from Deforestation, (ii) Reducing Emissions Forest Degradation, (iii) Conservation of Forest Carbon Stocks, (iv) Sustainable Management of Forests and (v) Enhancement of Forest Carbon Stocks. With adoption of Warsaw Framework for REDD+ by the UNFCCC, Himalayan countries are taking serious steps to engage in REDD+ at national and sub national level.

Indian Council of Forestry Research and Education (ICFRE) in collaboration with ICIMOD is implementing a programme 'REDD+ Himalaya: Developing and using experience in implementing REDD+ in Himalayas'. Under the project one of the activities identified is to conduct a scoping study for REDD+ in KSLCD region. The overall objective of the project is to build the capacity of the REDD+ focal points in partner countries to develop & implement National REDD+ Strategy through conservation and sustainable use of natural sinks. Conservation and sustainable use of forests through REDD+ programs is an effective mitigation & adaptation measure. In India, it is a REDD+ capacity building programme with focus on North East Region of the country.

In the aforesaid context a stakeholder consultation meeting on REDD+ scoping study in Kailash Sacred Landscape Region was organized on 4 May, 2016 at Govind Ballabh Pant National Institute of Himalayan Environment and Sustainable Development (GBPNIHESD), Kosi-Katarmal, Almora and on 5 May, 2016 with the villagers of Naukina Village under Chandak Aounla Sub-watershed. GBPNIHESD have conducted preliminary surveys during preparatory and start-up phase of Kailash Sacred Landscape Conservation and Development Initiative (KSLCDI) for establishing the baseline at sub-watershed level. Stakeholder meeting at the Chandak-Aounla sub-watershed has been organized after the interactive meeting and the guidance given by the GBPNIHESD in context of REDD+ scoping study in Kailash Sacred Landscape, India. List of participants in the meeting and stakeholder consultation is attached at Annex I and II, respectively.

### *Stakeholders Consultation at GBPNIHESD*

The consultation meeting at GBPNIHESD was started with the warm welcome by Er. Kireet Kumar, Scientist-'G', GBPNIHESD. He gave brief introduction about the activities and programmes carried out by the GBPNIHESD in Kailash Sacred Landscape Region. He apprised that the REDD+ programme is beneficial for the Himalayan region which has the history of community participation in the management of forest for their livelihood requirements. Implementation of REDD+ programme in Kailash Sacred Landscape Region can lead to further association between ICFRE and GBPNIHESD with a common goal of community participation and development in the Himalayan region. He was of the opinion that mutual cooperation between these two organizations can strengthen various aspects of REDD+ implementation in Himalayan region and emphasized that the capacity building and awareness is required about the mitigation of climate change through REDD+ and the involvement of local community as they have and can play a vital role in the

climate change mitigation due to their traditional knowledge and practices of forest management.

Dr. T.P. Singh, Assistant Director General, (Biodiversity and Climate Change), ICFRE thanked Director, GBPNIHESD and Er. Kireet Kumar for accepting ICFRE request for organizing this meeting and providing necessary support to make this meeting successful. He reaffirmed that the REDD+ is a great opportunity for collaboration between ICFRE and GBPNIHESD. He briefed about the main objective of the scoping study on REDD+ in Kailash Sacred Landscape Region. Highlighting the importance of REDD+ under Paris Agreement, he also elaborated on the importance of REDD+ programme in climate change mitigation through forestry sector.



Subsequently, following two presentations were made during the meeting:

1. Presentation on “Kailash Sacred Landscape Conservation and Development Initiative (KSLCDI) - India” by Dr. R.S. Rawal, Scientist-'F', GBPNIHESD, Almora.
2. Presentation on “Scoping Study for REDD+ Kailash Sacred Landscape Region” by Mr. V.R.S. Rawat, Scientist-'F', ICFRE, Dehradun

Dr. Rawal, Scientist-F, presented the activities carried by GBPNIHESD in Kailash Sacred Landscape Region of India. He stated that preparatory phase of KSLCDI started in 2009 and during the preparatory phase, feasibility document, conservation strategy, comprehensive environmental monitoring plan and regional cooperation framework were designed. Start-up Phase of KSLCDI was started in 2011-12 with the development of National Implementation Plan and endorsement of Regional Cooperation Framework by partner countries. Implementation of National Implementation Plan was carried in Implementation Phase which started in the year 2012. He briefly explained the importance of Kailash Sacred Landscape by highlighting the various aspects of spirituality and sacredness of the region, complex and diversified bio-physical and life support values, diversity in socio-cultural systems, dynamic people-nature linkages. He said that the people of the region are extremely vulnerable due to rapid transformation in rich and unique biodiversity, ecosystem goods and services, value based cultural heritage.

He further explained the components of KSLCDI which includes innovative livelihood approaches; access and benefit sharing; regional cooperation, enabling policies and knowledge management; long-term conservation and monitoring; ecosystem management for sustaining ecosystem services. He also briefed about the various partners involved in the implementation of this programme. Kailash Sacred Landscape



consists of 31,175 sq km covering China, India and Nepal of which 7,250 sq km area is in India. Kailash Sacred Landscape Region of India has been stratified into five units comprising of Bhot, Askot, Seera, Sor and Gangoli based on site of cultural assimilation, centre of activities for ethnic, lingual & cultural groups and biodiversity richness & representativeness. In Kailash Sacred Landscape, two watersheds (Hat Kalika and Chandak-Aunla Ghat) were selected for the implementation of this programme. Hat Kalika covers approx. 36.6 sq km area with 14 Gram Panchayats while Chandak-Aunla Watershed has 23.2 sq. km area with 12 Gram Panchayats. He explained about the various activities for livelihood improvement like honey collection, off-season vegetable cultivation, heritage tourism and kidney bean cultivation, eco-restoration of degraded sites carried out by youth groups. He also apprised about the Landscape *Yatra* as a process tool for wider communication, understanding on ground realities, bringing in experiences and values and feel of short and long term impacts. He summed up his presentation by emphasizing that the learning from the KSLCDI, can play vital role in other landscapes like Khanchendzonga Landscape and Landscape Initiative for Far Eastern Himalaya (Hi-LIFE).



Mr. V.R.S. Rawat, Scientist 'F', Biodiversity and Climate Change Division, ICFRE, delivered a presentation on “Scoping Study for REDD+ Kailash Sacred Landscape Region”. He briefed about the role of forestry sector in climate change and forestry sector provide large and relatively low cost mitigation opportunities with significant co-benefits. He further explained that forests provide other ecosystem goods and services to the communities to adapt to climate change. He further elaborated on the evolution of REDD+ starting from COP 11, Montreal, 2005 to Paris Agreement, 2015. He highlighted that REDD+ activities could be implemented in three phases:

1. Beginning with the development of national strategies or action plans, policies and measures, and capacity-building,
2. Followed by the implementation of national policies and measures and national strategies or action plans, technology development and transfer and results-based demonstration activities,
3. Evolving into results-based actions that should be fully measured reported and verified (MRVable).

He also explained about the concept of safeguards under Cancun forestry decisions while implementing REDD+. He further emphasized that the knowledge and rights of indigenous peoples and members of local communities should be respected. Effective implementation of REDD+ requires the participation of relevant stakeholders, in particular indigenous peoples and local communities. He explained the four key



components of REDD+: (i) National Strategy or Action Plan; (ii) National Forest Monitoring System (MRV); (iii) Safeguards Information System and (iv) Forest Reference level/Forest Reference Emission Level. He also focussed on the role of non-carbon benefits associated with the effective implementation of REDD+ programmes. He further gave an overview of various REDD+ pilot projects in India. He explained about the Reference document for REDD+ in India. He further briefed about the India's draft national REDD+ policy and strategy. He further highlighted the ICIMOD-ICFRE REDD+ programme which is a part of Trans-boundary REDD+ Himalaya Capacity Building Programme of ICIMOD in 4 countries. The project will improve capacity on REDD+ understanding in Indian Himalayas. The project focuses specifically on the North-Eastern States of India, and Kailash Sacred Landscape Region is selected for the Scoping Study on REDD+. Following broad outlines of the proposed scoping study were also presented:

- REDD+ introduction
- India's National REDD+ Strategy
- Project Area Description/Study Site
- Forest institutions, policies and laws enabling REDD+
- Project implementation and project activities
- Current forest carbon assessment and trajectory in Kailash Region
- Carbon standards and methodological issues
- Recommendations on future project implementation

He also outlined on the area of cooperation with GBPNIHESD and Uttarakhand Forest Department on the proposed study. He summed up the way forward that REDD+ is an innovative way to mitigate climate change through sustainable development. REDD+ strategy development and piloting has been initiated in India. Pilot projects shall provide good learning platform for this mechanism. There is the need to learn from within and outside the country, synergizing with other projects, and capacity building for further dissemination.

At last, he stressed that following information was solicited from GBPNIHESD and Uttarakhand Forest Department in order to conduct a scoping study for REDD+ in KSL region.

- Details of GBPNIHESD programmes on KSL Region
- Published research papers, reports, manuals etc. on KSL Region

- Detail about activities done in KSL Region
- Boundary/extent (shape file) of KSL Region
- Land use land cover maps of KSL Region
- Village (Shape file) of KSL Region
- Carbon Stock Assessment Reports if available
- Biodiversity – reports/publications etc.
- Socio-economic information of KSL Region

Following information solicited from Uttarakhand State Forest Department:

- Latest Working Plan/Status of forest resources
- Detail on Activities/forestry programmes being undertaken by Forest Department in KSL region.
- Forestry Programmes/activities in *Van Panchayat*
- Drivers of Forest Degradation and their extent
- Pithoragarh Forest Division Shape Files
- National Park, Sanctuary Shape Files
- Possible Suitable site for future REDD+ project implementation

Following points also emerged during the meeting:

- Sh. Prem Kumar, CCF/CF North Kumaon Forest Circle, Almora assured to provide the necessary support for the effective implementation of REDD+ programmes in KSL region.
- Research activities can be published as a joint publication of ICFRE and GBPNIHESD after the implementation of REDD+ in KSL region.
- GBPNIHESD agreed to facilitate with the necessary documents like reports, manuals, land use land cover maps, shape file, research papers, details on the activities carried in KSL region for the study.
- Er. Kireet Kumar, Scientist 'G', GBPNIHESD, also emphasized the need to review the existing policies related to KSL region.
- Dr. G.C.S. Negi, Scientist 'F', GBPNIHESD stressed to do intensive ground work for existing policies, laws, regulations and *Van Panchayat* Acts. He also briefed about the Sacred Natural Sites (SNS) that management of SNS is done by the locals and benefit sharing mechanism can be developed to share the incentive with the local stakeholders. He further emphasized the need for the technical capacity building for avoiding forest degradation by the locals. The mechanism should be developed to address the drivers of forest degradation. He was of the opinion that there is scope in improvement for carbon stock assessment by the participation of local community. He stressed to conduct plantation drive in degraded forests of KSL region. Nursery should be developed to provide the quality planting stock. Plantation in degraded forests can be achieved with the collaboration of *Van Panchayats* in KSL region
- Dr. Subrat Sharma, Head, Climate Change, GBPNIHESD, recommended that Safeguard Information System chapters should be included in the scoping study. Dr. Sharma further emphasized the need to conduct the climate vulnerability studies in KSL region to analyze the impacts of climate change on the livelihood of the local community.



- Scope for the inclusion of Access and Benefit sharing mechanism prepared for State Biodiversity Board can be highlighted in the study.
- Sensitization programmes can be conducted for conservation, demonstration and herbal gardens.
- Dr. Rajesh Joshi informed about the spring-shed management in KSL Region and emphasized the need to take action on the spring-shed as they are the primary source of water in the hills and they are drying at a very fast rate.
- Dr. K. Chandra Sekar, Scientist 'D', GBPNIHESD, briefed about the Long Term Monitoring Plots being monitored following ICIMOD protocols can have mention in the scoping study. He explained that density of grasslands is decreasing in the hills and measures should be adopted to conserve the grasslands as they are the source of fodder for cattles.
- Landscape *Yatras* conducted by GBPNIHESD can be mentioned in the scoping study.
- Dr. R.S. Rawal highlighted the importance of plantation activities carried by Eco Task Force in Kailash Sacred Landscape region and also explained about the technical advice provided to Eco Task Force by GBPNIHESD.
- Er. Kireet Kumar and other scientists also proposed that a meeting can be organized in the third/fourth week of June at Dehradun to design the framework for the scoping study and other partners in KSLCDI are also proposed to be invited to participate in the meeting. Officials from ICIMOD should be invited to attend the meeting.
- Er. Kireet Kumar in his concluding remarks said that the KSL Region is of common interest area for GBPNIHESD and ICFRE and the experiences will help in the capacity building of each other. Mechanism of benefit sharing with the local stakeholders will be developed through the effective implementation of REDD+ programme in KSL Region.

Mr. V.R.S. Rawat on behalf of ICFRE thanked Director, GBPNIHESD for providing this opportunity and all the participants for their valuable inputs.





## Annexure II

### Stakeholders Consultation for Scoping Study of REDD+ in Kailash Sacred Landscape

Venue: GBPNIHESD, Kosi, Almora, Date: 04 May 2016

#### List of Participants

S. No.	Name, Designation and Address	S. No	Name, Designation and Address
1	Er. Kireet Kumar Scientist-G GBPNIHESD, Kosi, Almora Email: kireet@gbpnihesd.nic.in	2	Mr. Prem Kumar Conservator of Forests North Kumaon Forest Circle Almora
3	Dr. T.P. Singh ADG (BCC) ICFRE, Dehradun Email: tpsingh@icfre.org	4	Mr. V.R.S. Rawat Scientist-F ICFRE, Dehradun. Email: rawatvrs@icfre.org
5	Dr. G.C.S Negi Scientist-F GBPNIHESD, Kosi, Almora Email: negigcs@yahoo.co.in	6	Dr. R.S. Rawal Scientist-F GBPNIHESD, Kosi, Almora Email: ranbeerrawal4@gmail.com
7	Dr. Subrat Sharma Head, Climate Change GBPNIHESD, Kosi , Almora Email: subrats@rediffmail.com	8	Dr. K Chandra Sekar Scientist-D GBPNIHESD, Kosi, Almora Email: kcsekar1312@rediffmail.com
9	Mr. Rajesh Joshi Scientist-D GBPNIHESD, Kosi, Almora Email: dr.rajeshjoshi@gmail.com	10	Dr. I.D. Bhatt Scientist-D GBPNIHESD, Kosi, Almora Email: bhatt_id@rediffmail.com
11	Mr. G.P. Pande GBPNIHESD, Kosi, Almora Email: pande.gp@gmail.com	12	Mr. Ravinder Joshi FC- KSLCDI GBPNIHESD, Kosi, Almora
13	Ms.Harshita Bisht OSEM-KSLCDI Project GBPNIHESD, Kosi, Almora	14	Dr. Mohommad Shahid Consultant, ICFRE, Dehradun Email: mdshahid07@yahoo.com
15	Mr. Nemit Verma Junior Consultant ICFRE, Dehradun Email: nemit.verma@gmail.com		

## Stakeholders Consultation at Naukina Village

Under the recommendations given by GBPNIHESD during the consultation meeting, the stakeholder's consultation was organized with the village community and *Van Panchayat* members of village Naukina in Chandak-Aunla Watershed, approximately 10 km from Pithoragarh town. In Chandak-Aunla watershed a lot of work like resources utilization pattern and people's needs, impacts of invasive species on forest and agricultural resources, protocol for landscape vegetation analysis and invasive species assessment have been done by GBPNIHESD. Several consultations, training programmes, awareness programmes, were conducted by GBPNIHESD in that area under KSLCDI.

The ICFRE team along with the Dr. G.C.S. Negi Scientist-'F', GBPNIHESD, visited Himlayan Sewa Samiti (HSS), a prominent Non-Government Organization working for the livelihood improvement of the local community. Mr. Dheerendra Joshi, the chief functionary of HSS, briefed about the various livelihood programmes being operated by HSS. One of the activity of the organization is to collect milk from door to door of villagers, pasteurizing and selling it in Pithoragarh market. He opined that the milk production is not profitable to the villagers. Through their efforts remunerate price is given to local milk producers. He stressed for fodder development programmes within the forest/*Van panchayat* land to boost up the milk production and income of local communities.

Dr. G.C.S. Negi welcomed all the participants and briefed about the objective of the meeting with the local community. He introduced the team to the community participants. During the meeting, he also explained about the activities carried by GBPNIHESD in the Chandak-Aunla Watershed under KSLCD initiatives.

Mr. Jagdamba Prasad Joshi, Head (*Sarpanch*) *Van Panchayat* Naukina welcomed and thanked all the team members for selecting village Naukina for holding this stakeholders consultation. He informed that this village is of 94 families but only 52 families are residing rest migrated to nearby towns. He expressed his views that forest fire has become menace in the area and lots of efforts are done by the locals to control the fire. He stressed to provide the equipment to control the expansion of fire. He was of the view to provide the legal rights to *sarpanch* so that the necessary action can be taken to control the fire.

Mr. Anil Kumar, Sub Division Officer, Pithoragarh Forest Division, explained about the various activities done by the Forest Department. He emphasized that the women can play good role in afforestation programme. He also appraised the water conservation activities initiated under Japan International Cooperation Agency (JICA) project by the State Forest Department.

Dr. T.P. Singh, ADG (BCC), ICFRE, thanked all the participants from the village to participate in this stakeholder consultation. He highlighted the objectives of the scoping study to the community and stressed that the participation of community is essential for the successful implementation and to improve the livelihood of the community.

Mr. V.R.S. Rawat, Scientist 'F', Biodiversity and Climate Change Division, ICFRE, briefed about the participatory role played by the community in forest management and importance of the *Van Panchayat* in conserving the forests which contributes towards climate change mitigation. These actions now have the potential to get incentivized through globally accepted REDD+ programmes. He explained the concept of REDD+ and informed that a possibility of developing a REDD+ programme is being explored in the KSL Region through a scoping study.

Following points emerged were discussed during the stakeholders meeting with the village community and members of *Van Panchayat*:

- (i) Forest fire remains a big menace in the area and some basic equipment to control the fire should be provided to the villagers so that they can act on time and prevent the fire expansion.
- (ii) There should be a mechanism of compensation for the individuals who lost their lives while controlling fire or injured during the fire extinguishing process.





- (iii) Owing to ban on green felling, pine regeneration has been very vigorous. Roadside Pine trees should be culled down to control the spread of forest fire.
- (iv) In order to reduce fire hazard on forest floor, pine briquetting machine and technical knowledge need to be provided to the villagers to make pine needles briquettes, so that they can be used in house as a source of energy and in turn will reduce the dependency on forests for fuel wood as well.
- (v) Drastic reduction in water availability in springs (*Naula*) is observed by the villagers.
- (vi) Villagers are of the view that after ban on the tree felling, pine trees has increased in number and dominated the forests. Villagers also proposed that mechanism should be developed to reduce the pine in the *Van Panchayat* forests and supplement it with broad leaved species like oak.
- (vii) Villagers are interested for the participation in the afforestation programmes with species that provide fuel wood and fodder. Fodder trees need to be planted in the *Van Panchayats* forests.
- (viii) Village forest boundary wall needs to be erected to reduce the forest fires.
- (ix) Fire line should be demarcated and regularly cleaned between villages forests so as to control the forest fires.
- (x) Boundary should be delineated between Reserved Forest and *Van Panchayats* Forests so that unauthorized persons are not allowed to enter the forests.
- (xi) A village nursery to provide the good quality planting material to villagers for plantation in *Van Panchayats* Forests. Good quality planting materials should be provided at the right time of plantation.
- (xii) Some Legal Rights should be provided to Head of the *Van Panchayat* Forests to have more control on the *Van Panchayat* Forests.
- (xiii) Provisions should be developed to provide the funds in Mahatma Gandhi National Rural Employment Guarantee Act (MNREGA) schemes to *Van Panchayats*.
- (xiv) Water pond can be constructed to provide water for the villages.
- (xv) Traditional knowledge of forest management should be integrated with scientific programmes for the sustainable management of natural resources.
- (xvi) Vermi-composting pits should be constructed in the villages that will help in fast decomposition of litter into organic manure.
- (xvii) Synergy among various government run programmes is required to improve the livelihood of the community.
- (xviii) Check dams need be constructed to control the flow of water and soil erosion and recharge of water springs
- (xix) Regular training programmes should be conducted for the capacity building of the members of *Van Panchayats*.
- (xx) Improved Cook Stove and LPG can be provided to the community to enhance the efficiency which will reduce the usage of fuel wood.
- (xxi) Women folks from the village participated actively and expressed their views on the management of their forests as they are directly affected from the good and services provided by these forests at local level. Name of the women participants in the meeting are underlined in the list of participants at Annex III.

After the interactive meeting with the community of village Naukina, the team visited village Digtoli to see the plantation of Walnut done by the Uttarakhand Forest Department, also had a look on the spring (*Naula*) and visited Nursery maintained by Uttarakhand Forest Department.





## Annexure III

**Stakeholders consultation for Scoping Study of REDD+ in Kailash Sacred Landscape  
Venue: Naukina Van Panchayat (Pithoragarh District) Date: 05 May 2016**

### List of Participants

S. No.	Name of Participants	S. No.	Name of Participants
1	Sh. Omkar Singh Sarpanch, Van Panchayat, Bhurmuni	23	Sh. Anil Kumar Forest Division, Pithoragarh
2	Sh. Madam Mohan Patli Sarpanch, Van Panchayat, Digtoli	24	Smt. Ganga Joshi Naukina
3	Sh. Jagdamba Prasad Joshi Sarpanch, Van Panchayat, Naukina	25	Smt. Nirmala Joshi Naukina
4	Sh. Vijender Singh, Naukina	26	Smt. Gita Joshi, Naukina
5	Sh. Manohar Joshi, Naukina	27	Smt. Nirmala Joshi, Naukina
6	Sh. Parmod Kumar, Naukina	28	Smt. Janki Joshi, Naukina
7	Sh. Govind Joshi, Naukina	29	Smt. Tara Joshi, Naukina
8	Sh. Jivan Singh, Naukina	30	Smt. Priya Joshi, Naukina
9	Sh. Suresh Chand Joshi, Naukina	31	Smt. Shanti Devi, Naukina
10	Sh. Khim Singh, Naukina	32	Smt. Basanti, Naukina
11	Sh. Mohit Bisht, Naukina	33	Smt. Urmila Joshi, Naukina
12	Sh. Deepak Kumar Forest Division, Pithoragarh	34	Sh. Dinesh Chand Joshi Forest Division, Pithoragarh
13	Sh. Sher Singh Forest Division, Pithoragarh	35	Sh. Rajender Prasad Forest Division, Pithoragarh
14	Sh. Kuldeep Forest Division, Pithoragarh	36	Sh. Hem Chand Joshi Forest Division, Pithoragarh
15	Sh. Dhirender Joshi Himalayan Seva Samiti, Chandak	37	Dr. G.C.S. Negi GBPNIHESD, Kosi, Almora
16	Sh. Suraj Dhapola, Naukina	38	Sh. Amit Joshi, Naukina
17	Sh. Kamal Joshi, Naukina	39	Sh. Neeraj Chand Joshi, Naukina
18	Sh. Anuj Singh, Naukina	40	Sh. Basant Singh, Naukina
19	Sh. Chanchal Singh, Naukina	41	Sh. Manoj Singh, Naukina
20	Sh. Lakshman Singh, Naukina	42	Dr. T.P. Singh, ICFRE, Dehradun
21	Sh. Ramesh Singh, Naukina	43	Sh. V.R.S. Rawat, ICFRE, Dehradun
22	Smt. Nirmala, Naukina	44	Dr. Md. Shahid, ICFRE, Dehradun
23	Smt. Urmila Joshi, Naukina	45	Sh. Nemit Verma, ICFRE, Dehradun
22	Smt. Nirmala, Naukina		





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