FOREWORD

In tune with the National Green India Mission (GIM), the State of Jammu and Kashmir has also come up with the perspective Plan (2015-16 to 2020-21) for implementation of the Green India Mission in the Sate with an aim to enhance the forest cover and its quality, to abet mitigation and adaptation in the context of climate change.

The perspective plan is set with a clear understanding of the vulnerability of the hilly States of the Indian Himalayan Region, to climate change. The intricate linkage between the livelihood of the people, availability of natural resources, sustainable development and the overall economy and ecological health of the State is well established and our state is extremely climate-sensitive. The projected change of climate by experts could have a disastrous effect for a State like J&K. The recent floods in Kashmir valley is a sad example.

The plan therefore, is holistic in approach and attempts to achieve the national goals of Green India Mission through proper planning and implementation.

I am sure this multi-faceted strategic plan dealing not only with the forest plantations but also with improvement in an array of ecosystem services, will definitely make the people and the land of Jammu and Kashmir more adapted to the vagaries of the ever changing environment.

(Rakesh Kumar Gupta), IAS
Principal Secretary to Government,
Forest, Environment & Ecology Department,
J&K, Jammu

PREFACE

The perspective plan for implementation of Green India Mission(GIM) for the State of Jammu and Kashmir was required to enable the state to meaningfully participate along with the other states in achieving the National goal of the GIM as a part of the National Action Plan on Climate Change (NAPCC).

Tailor-made interventions specific to target areas have been conceived after employing various modern tools of Remote Sensing and GIS to delineate largely homogenous landscapes. This landscape based approach having inter-sectoral scope, proposes to enhance the cover and productivity of the forests, on which is dependent many direct and indirect benefits being availed by the people.

Huge efforts have been made to create a picture of the present status, possible dangers of climate change and steps to be taken up to equip the state of Jammu and Kashmir to deal with Climate change adaptation and mitigation while ensuring food, water and livelihood security along with biodiversity conservation.

The plan proposes changes in the planning, implementation and monitoring processes by actively involving the grass root level people in decision making as a model of decentralised participatory approach. This I believe will be a guiding force for the action plans that will follow in reducing the impact of climate change in the State.

The committee under the chairmanship of Shri Suresh Chugh IFS APCCF/Director Social Forestry J&K, has come up with the GIM perspective plan and the team has made a commendable contribution in bringing out a well formulated plan in shortest possible time. I congratulate the Committee for producing such a fine document, which is unique in style and approach, nonetheless conforms to the National Guidelines on Green India Mission.

A. K. Singh IFS (HoFF)
Principal Chief Conservator of Forests
Jammu and Kashmir

PREFACE

The State of Jammu and Kashmir has the distinction of having, one of the widest climatic variations in its different regions having maximum temperatures of more than 45^0C in Jammu Region to as low as minimum recorded temperature of -50^0C in Drass Sector of Ladakh Region. The distinct and equal distribution of the year into all four seasons with characteristic climatic and vegetation change is seen in the entire Region. This along with the unique and scenic natural geo-physical settings makes Jammu and Kashmir a preferred tourist destination.

Located on the young fragile Himalayas, the state's Tourism, Agriculture and Forestry sectors are among those having significant influence on the overall economy of the state, yet most vulnerable to climate change.

Jammu and Kashmir Forest department has made continuous effort to conserve the vast forests and other natural resources of the state and the Green India Mission will help the department in meeting these aspirations while providing livelihood security to the Forest dependent communities of the state.

The Committee constituted for preparation of the Perspective Plan of the Green India Mission for the State of Jammu and Kashmir has done a commendable job in shortest possible time. I am thankful to all the members who contributed in its preparation. My special thanks to Mr K Anandh IFS CF Working Plan and Training and his team for his untiring efforts despite various constraints.

I am sure the Plan will set forth the action strategy for a greener Jammu and Kashmir.

Suresh Chugh IFS
APCCF/ Director
Department of Social Forestry
Govt of Jammu and Kashmir

ACKNOWLEDGEMENTS

It gives me immense pleasure to acknowledge the efforts of one and all in preparation of the Perspective Plan of (GIM) Green India Mission for the State Jammu and Kashmir.

I am confident that the Plan has touched upon all possible aspects relevant to the State, as it is unmistakably Result-Focused and is not just an activity plan. With the planned shift in focus and strategy from the conventional forestry interventions, the process of planning has also seen a major transformation and the various institutions at different levels are also proposed to be suitably revamped to elicit wider participation.

The task of formulating the plan was entrusted to the committee comprising the following members;-

1. Shri. Suresh Chugh IFS -Chairman.
2. Shri. N P Singh IFS -Member.
3. Smt. Roop Avtar Kour IFS -Member.
4. Shri. Samuel Changkija IFS -Member.
5. DR. K Anandh IFS -Member Secretary.
6. Smt. Priyanka Sareen SFS -Wildlife Warden, Kuthua. (Special invitee)
7. Sh. Majid Farooq -Scientific Assistant, DEERS (Special invitee)

The efforts of the staff of the Department of Environment and Remote Sensing Department in using the GIS tools to prepare the required maps of different landscapes, was integral for conceptualising the plan. Without their contribution and expertise, the plan would have taken much longer time to prepare. I would like to thank all those in the Department who were involved this exercise and have contributed immensely.

My thanks and appreciation also go to all the members of the committee for their sincere efforts in preparation of the Perspective Plan within the specified period.

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Dr K Anandh IFS

(Conservator of Forests WP&RT)

Contents

Executive Summary

The State of Jammu and Kashmir located in the north India assumes a great importance under the Green India Mission for its profound inter linkages with climate, natural resources and livelihoods. The delicate balance of interconnectivity of these is very likely to get affected due to climate change influencing the sustainability of Himalayan ecosystems, as well as the ecosystems of the plains of northern India. The National Mission for a Green India thus becomes very effective vehicle to call for a concerted intensive approach to be adopted for adjustments in livelihood practices in order to adapt to the climate change. The strategic location of Jammu and Kashmir in the Western Himalayas may help respond to climate change by a combination of adaptation and mitigation measures to enhance carbon sinks in sustainably managed forests and other ecosystems, and facilitating adaptation of vulnerable species/ecosystems as well as forest- dependent communities to the changing climate.

The State of Jammu and Kashmir has been divided into three major biographical zones namely western Himalaya, Eastern Himalaya and Trans-Himalaya. Due to low population of the Trans Himalayan zone and its difficult terrain, the landscape has not been included in the current perspective plan(s). However, conservation of Seabuckthorn- an important shrub of the trans-Himalayas closely linked to the local livelihoods, has been included.

With the geographical area of 222,236 sq. Km. and population of 12.54 million, Jammu and Kashmir accounts for about 6.5% of the national geographical area, including 1, 20,849 square kilometre illegally occupied . by Pakistan and China with about 1.0% of India's population. Jammu and Kashmir has some distinctive characteristics that set it apart from other Indian States because of its climatic conditions and demography. The State currently comprises of three regions; i.e, Jammu, Kashmir and Ladakh and has 22 districts. It is geographically different from most of Indian States located in the plains. It is mountaineous, but exhibits extra ordinary biological diversity of the aggregate geographical area, almost 50% is officially classified as forest, while there is negligible (about 0.06%) forest area in Ladakh region (trans-Himalayan region). The population density in the State Jammu& Kashmir is around 124 persons per square kilometre and is lower than the national figures of 320 persons per square kilometre, largely due to relatively low and scattered population in the hill and forest areas.

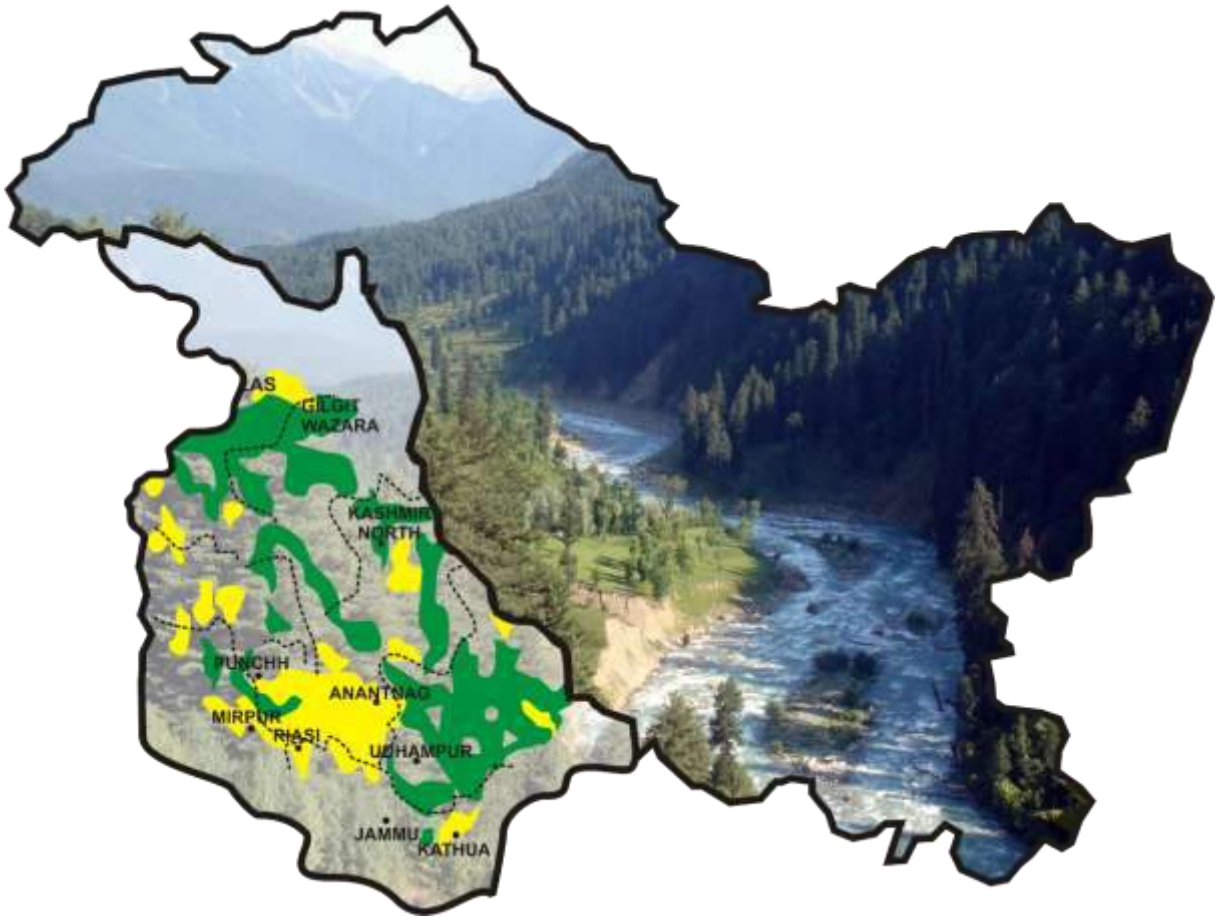
The State of Jammu and Kashmir has not made much economic progress due to the following reasons: lower average literacy rate 68.74% as compared to national average of 75.85%; while female literacy rate is slightly higher i.e 58.01% (national literacy rate is 54%). The sex ration of female per 1000 males is 883 as compared with 933 for India.

The forests of Jammu and Kashmir have been managed for getting sustainable yield under various working plans. Most of the working plans have been revised. The silvicultural fellings were aimed at making the forest uniform and the regeneration achieved through natural means. Till the early seventies, the emphasis was on planting commercially important species such as deodar, kail, chir, fir, spruce etc. However, there is also an ever growing pressure by local communities for resources such as fuel wood, fodder, medicinal plants, minerals stones etc. to this end the mission also aims to take a broader landscape approach to address the drivers of forest degradation, while supporting communities meet their basic necessities of fodder, fuel-wood, livelihood.

This perspective plan has been prepared by the Forest Officers and staff from various line departments of the state. The tremendous efforts put in by the forest department team in preparing a plan of this order is highly appreciable. Entire GIS planning support in preparation of the plan has been provided by the Department of Ecology, Environment and Remote Sensing and GIS cell of working plan circle of the forest department, and Social Forestry Department. The plan has been prepared in a very short period , which is again very commendable. It is true that the earnest efforts put into the preparation of this plan will yield fruits , when it is implemented in the near future.

GREEN INDIA MISSION
JAMMU & KASHMIR STATE

CHAPTER-I



CHAPTER-I

INTRODUCTION

Green India Mission the National perspective:

The National Action Plan on climate change (NAPCC) contains eight missions and Green India Mission (GIM) is one among them. There is an urgent and pressing need to address the possible impacts of climate change phenomena which will seriously affect the livelihood of people living in the vulnerable areas. The forestry sector provides a great opportunity to mitigate the effects of climate change and ensure food security, water availability and conservation of bio-diversity guaranteeing the livelihood security of the forest dependent communities in particular and the larger population in general. The GIM has been formulated in response to climate change by adopting measures to reduce its impact primarily through the forestry sector. It envisages greening and afforestation of degraded forest areas and enrichments of open forest so that the impact of climate change on the people living in the fringes of forest area will be reduced to a large extent.

The mission aims to respond to climate change by a combination of adaptation and mitigation measures which would result in the:-

Conifer Forests in Yusmarg, Kashmir.

- *Enhancement of carbon sinks in sustainably managed forests and eco-systems*

- *Adaptation of vulnerable species/eco-systems to the changing climate and*
- *Adaptation of forest dependent local communities in the face of climatic variability*

One of the major targets of GIM will be to improve the density of forest cover. The focus areas of the project will include degraded forest, open forest, grasslands, wetlands, under-stocked forest and urban landscapes. It will also aim to improving the productivity of dense and very dense forest.

The major paradigm shift in the present GIM is the landscape based approach for treatment of the watersheds. Under the programme both forest and non-forest areas of a catchment, to the tune of about 5000 to 6000 hectares will be treated in a holistic way to achieve desirable results. The major factors of forest degradation such as over exploitation of firewood, timber, grazing and forest fires will be addressed under this programme. Grazing, Forest fires & deforestation main causes of degradation.

Grazing, Forest fires & deforestation main causes of degradation

Some cross-cutting interventions aimed at promoting use of alternative sources of energy for domestic purposes, improvement of livelihood measures, connecting fragmented wildlife habitats, protection of sacred groves and conservation areas for biodiversity or hydrological significance are also proposed in the Mission. Research and

Development, strengthening of institutions for implementation of the mission are the integral part of the mission.

Objectives of the National Level Mission:

- Increased forest/tree cover on 5 m ha of forest/non-forest lands and improved quality of forest cover on another 5 m ha (a total of 10 m ha).
- Improved ecosystem services including biodiversity, hydrological services and carbon sequestration as a result of treatment of 10 m ha.
- Increased forest-based livelihood income for 3 million forest dependent households.
- Enhanced annual CO_2 sequestration of 50-60 million tonnes by the year 2020.

Mission Objectives would be achieved through a set of five sub-missions listed below:

Sub-Mission 1: Enhancing the quality of forest cover and improving eco-system services;

Sub-Mission 2 : Eco-system restoration and increasing forest cover;

Sub-Mission 3: Enhancing tree cover in urban and pre-urban areas including institutional lands;

Sub-Mission 4: Agro-forestry and social forestry and

Sub-Mission 5: Restoration of wet lands.

The GIM envisages institutional arrangements for the implementation of the programme along with detailed monitoring and evaluation mechanism. It is proposed that the Village Forest Committees constituted in villages for implementation of National Afforestation Programme will be the implementing agency of the programme in Jammu and Kashmir State.

The mission organisation includes:

(a) The National Level and autonomous society under the chairmanship of Minister of Environment and Forests, Government of India with an inclusive Governing Council.

(b) Revamped State Forest Development Agency (SFDA) at the state level

(c) Revamped Divisional FDA

(d) At the village level traditional village forest committees.

(e) In urban areas the Ward level committees with support from Municipal Organisation and Forest Department.

The monitoring frame work includes:

1. Self monitoring by committee and field staff,
2. Monitoring with the use of Remote Sensing and GIS,
3. Monitoring by third party, `
4. Monitoring key indicators on long term basis.
5. Auditing by CAG/AG,
6. Social audit.

Green India Mission in Jammu and Kashmir:

Green India Mission is based on a holistic view of greening and focuses on carbon sequestration and multiple ecosystem services, especially, biodiversity, water, biomass etc. along with climate adaptation and mitigation as a co-benefit. It has the following broad objectives to be covered over next 5 years. The State of Jammu and Kashmir is one of the twelve hilly States of Indian Himalayan Region which is considered

as highly vulnerable to climate change. The people of this State have a high dependency on sensitive natural resources for their livelihood. The distribution, quality and functionality of the natural resources would be likely affected by the climate change resulting in disturbances to the livelihood capacity and options of the people. To tackle the phenomenon of climate change, it requires mitigation measures by change of policy and strategic actions at Local, National and International levels. In the fragile environment of Himalayas any small change in the climate will adversely affect the availability, magnitude and quality of eco-systems services in that place. The Himalayan region is warming at a rate higher than the Global average. It has resulted in shift of vegetation and destabilisation of mountain eco-system. To tackle the damages and destruction that will be caused by the climate change, the Jammu and Kashmir Forest Department have taken initiative to prepare a perspective plan, known as Green Indian Mission for Jammu and Kashmir with the aim of enhancing the forest cover and its quality to mitigate the adverse affect of climate change.

Keeping in view the overall National Goals, the state mission is aimed at the following:

J&K State Mission Aims:

Conifer forests on way to Gulmarg, Kashmir

✓ Enhancing quality of forest cover and improving ecosystem services from forest lands, including moderately dense forest cover, open forest cover, of degraded grass lands.

✓ Eco-restoration/afforestation to increase forest cover and eco system services from forest/non forest lands, including scrub lands and sea-buckthorn areas.

Avenue Plantation of Social Forestry Department on Boulward Road, Srinagar.

Avenue Plantation of Forest Department in Jammu & Srinagar.

✓ Enhancing tree cover in Urban and Peri-Urban areas (including institutional lands)

✓ Increasing forest cover and eco-system services from Agro-forestry and Social Forestry on non-forest lands.

✓ Restoration of wetlands and the eco system services thereof.

✓ Improving fuel-use efficiency and promoting alternative energy sources in project area households.

✓ Enhancing Community livelihood of households.

Methodology for Selection of Landscapes:

Criteria for identification

Landscapes are identified on the basis of both biophysical and socio economic parameters, with an operation unit (about 4000-6000 ha) often co-terminus with micro/ milli watershed. As contiguous area, the operational units within larger landscapes make sense ecologically as well as socio-economically. The criteria for identification of the landscapes included projected vulnerability of forests to climate change, status of forest cover, significant biodiversity and other ecosystem values, critical habitats, corridors, and potential of area for carbon sink. The Socio economic criteria like poverty were overlaid to help prioritization of project areas within the candidate landscapes.

Landscape Levels

At the first step; broad landscapes of importance (L1) are identified as large contiguous areas of forest and non-forests lands in a given landform / catchment and narrow down to operational units, usually milli-watershed of approximately 4000-6000 ha (L2) and the working units, usually micro watersheds and villages/hamlets within level 2 landscape for actual implementation of the Mission (L3).

While some criterion are suitable to one level for e.g. landform or catchment are useful for identifying landscapes at L1 level, there are certain criterion that relevant for multiple levels, like forest and tree cover mapping are useful at all 3 levels to identify and prioritize the landscapes. Special criteria are added for specific sub-missions / cross-cutting interventions – e.g. sea-buckthorn areas in Ladakh area, areas for agro-forestry and urban landscape

L1 Landscapes

At L1 level broad landscapes of interest are identified using Land forms or catchments as base layer. It will require describing the landscape in terms of total Geographical Area, the forest area in different density classes, the areas of interest, total number of L2 level landscapes within the L1 etc. The forest cover and scrub layer are overlaid on the base map of landforms/ bio geographic units/ catchments to identify areas of interest under different density classes. Identification at L1 level is easily made with State Maps with landforms / catchments shown on it, to which latest available forest and tree cover layer from FSI are overlaid. Agro forestry (tree cover outside forest

layer), urban /periurban layers are added separately. Once the L1 Landscape/landscapes in the State have been selected, State Level landscape plan will also solicit collation of various L2 level Landscape Plans (L2) within a given L1. The State will begin implementation of the Mission with all the L1.

L2 Landscapes

This is the critical level for planning. Once the landscape at L1 is identified, delineation of L2 level is done by putting watershed boundaries (Milli watershed/second hierarchy of stream) on the map, and thereby delineating L2 level landscape or the so called operational units. Thus each L1 landscape have multiple L2 level landscapes with area varying from about 5000 -10,000 ha. Each L2 level landscape brings out a situational analysis for the landscape and keeping in view various Sub Missions to which the L2 relate to. The baselines are set accordingly. The planning for L2 level requires to map the existing institutions and programs/schemes. Prioritisation of the L2 landscape is the most important task. The key criteria for prioritization may include forest and tree cover, vulnerability of forests to climate change, bio-diversity richness, along with the socio economic criteria like % of tribal population and incidence of poverty. To get clear prioritization of L2 landscapes, once data sets have been obtained for different criteria, they will have to be aggregated and combined in a way to provide a composite picture. Each criterion can be assigned relative weight, based on the specific requirement and priority of the state. For each criterion, the range of value should be normalised to cover a range of 0-1. Then the normalized and weighted values are added together to get a total score. In addition, some criteria for representativeness are used to ensure broad coverage, so that specific landscapes of interest or importance which may have small or localized coverage do not get left out – e.g. across forest types, agroecological/ agro-climatic zones, etc. Similarly for Seabuck thorn sub-missions, the area is being identified.

The criteria for different landscape levels include:

- Land forms /catchments /bio-geographic zones etc. (Data source: SOI toposheets)
- Forest and tree cover with density class wise details including moderately dense forests as well as open/scrub forests) Data Source: FSI
- Wastelands (source: Space Application Centre)
- Vulnerability to Climate Change impacts, of forests and communities, (Source : IIS data , provided by FSI)
- Percentage population of STs / SCs, (Census data)
- Poverty levels (BPL %) (Census data)
- Special criteria are added for specific sub-missions / cross-cutting interventions – e.g. sea buckthorn areas in the Ladakh region, areas for agro-forestry, urban landscape and etc. Once the criteria have been listed , various maps and spatial and attribute data sets are collected from different sources like FSI, Space Application Centres, IIRS, State Departments, Census of India, Dept. of Rural Developments, etc.

L3 Areas

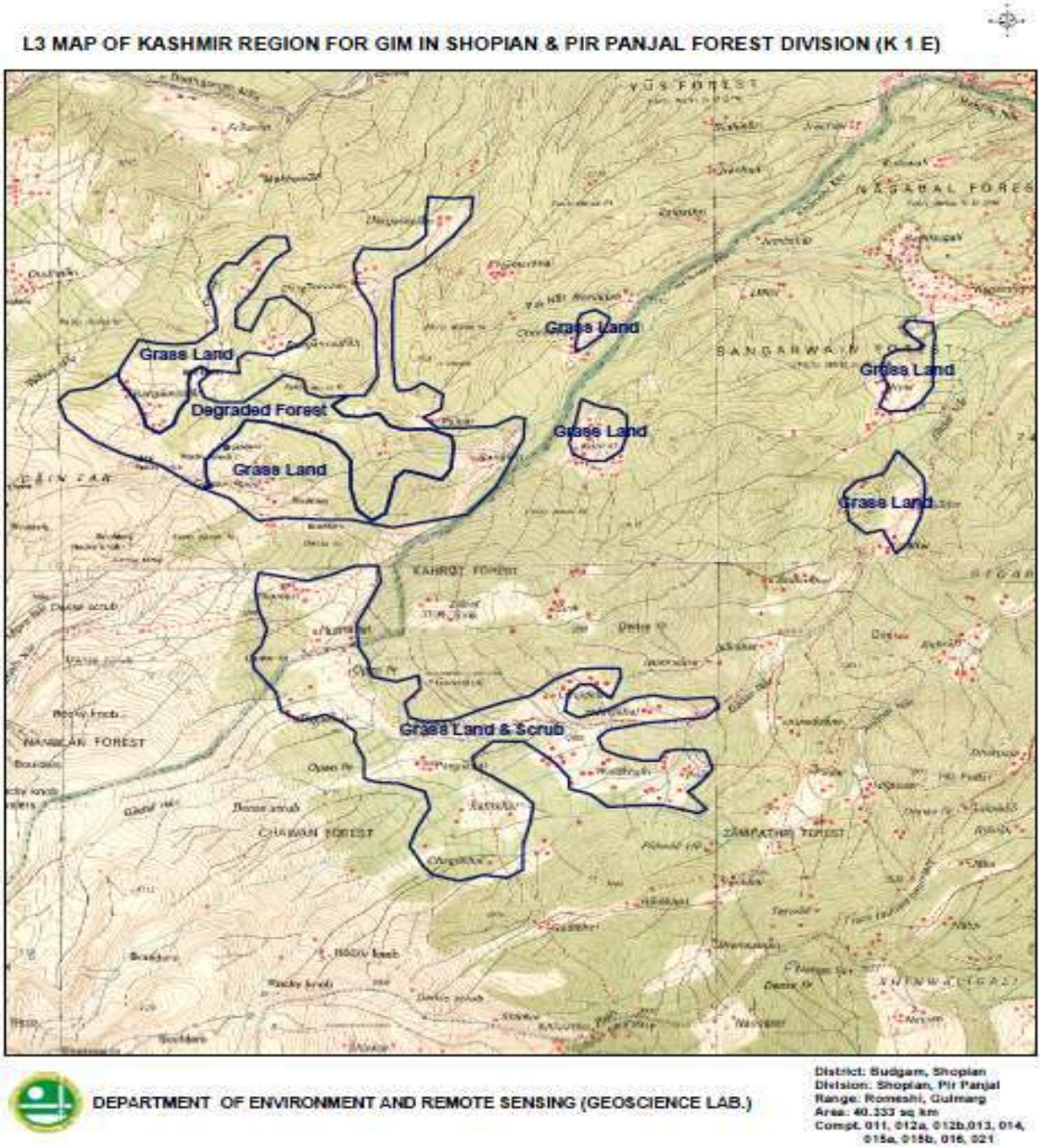
Once the L2 operational units are identified above, then focus shift to identification of the L3- actual Working Units. Based on the Microwatershed/ village

boundaries, all the villages along with forest/non-forest area with a given L2 landscape are being proposed for treatment. For each constituent unit or village of the L2 level landscape, a Micro Plan is developed. The guideline developed by the State for JFM formed the basic principle.

Use of GIS application for selection of landscapes:

GIS based analysis:

In J&K State data sets have been collected and GIS analysis done on the lines indicated above to choose landscapes, sub-landscapes and operational units. Various layers of data as envisaged in the guidelines for GIM have been used to arrive at L1, L2 & L3, landscapes.



Laying over of identified degraded areas over topo sheet

CHAPTER -II
THE STATE PROFILE

CHAPTER -II
THE STATE PROFILE

Location and Physiography:

The State of Jammu and Kashmir is located in the northern part of India on the greater Himalayas and has international boundaries with Pakistan in the West and China in the East. The state is located between 32^{O} 25' N and 37^{O} 07' N latitudes and 72^{O} 35' E and 80^{O} 14' E longitudes. It is surrounded by the Karakoram Mountain on the north, Tibetan Plateau on the east, the Nation, Pakistan on the west and Punjab on the South. The total geographical spread of the state is 2,22,236 sq.km, including an area of 1,20,849 sq km under illegal occupation of Pakistan and China.

The State has varied elevations in different parts of Shivalik, greater Himalayas and plain lands of Kashmir Valley between inner Himalayas and Karakoram Ranges and has three distinct regions comprising Kashmir Valley, Jammu region and the Ladakh which is the only cold desert of India. Each region has a unique resource base and most of the state is mountainous except for Jammu and Kathua districts. The plateau of Ladakh is separated from the rest of the State by high mountain ranges and has lower population density. Ladakh region offers very peculiar problems of development and communication as most of the geographic area is covered by glaciers and steep rocks.

The State has an elaborate natural drainage in the form of three major river systems of Indus, Jhelum and Chenab having drainage from east to west, through Pakistan into Arabian Sea. Most of these rivers originate from the glaciers in higher Himalayas. There are many natural lakes and wetlands in this State.

Climate:

The climate of the State of Jammu and Kashmir broadly falls into the tropical, temperate, and alpine categories depending on the elevation, aspects and rainfall. The cold arid desert areas of Ladakh, temperate Kashmir Valley, and the humid subtropical region of Jammu are the major climatic zones. The temperature in the region varies spatially. Drass is the coldest while Jammu is the hottest. January is the coldest and June and July are the hottest. The different climatic zones of Jammu and Kashmir are as follows:

1. The windward (Jammu region) – having monsoon climate
2. The leeward (Ladakh region) having low snowfall
3. The high altitude Kashmir (Himadri, Pir Panjal),

4. The Kashmir valley.

The climates of the valley of Kashmir and Chenab valley of Jammu Province have its own peculiarities. The seasons are marked with sudden change and the climatic change can be distinctly divided into four seasons of three months each. These areas receive snowfall and faces severe winter. On the other hand, many parts of the Ladakh region are mostly subjected to heavy snowfall and others to severe dry cold and remains cut off by road for about 5-6 months every year. Pooch, Rajouri & Uri in the South-West belts of J&K are moderately hot.

The annual rainfall of the State ranges between 600 mm to 800 mm and temperature between sub-zeros to 40^{o} C. However, about 59% of the geographic area under our possession is covered with glaciers and therefore not available for tree plantation.

Physiographic including Geological Structure and Soil Erosion:

The territory of the State is divided into **seven** physiographic zones closely associated with the structural components of the western Himalayas. These include:

1. The Plains: The plains of the Jammu region are characterized by interlocking sandy alluvial fans that have been deposited during the Pleistocene age by the streams flowing from the foothills and by a much-dissected pediment (eroded bedrock surface) covered by loams and loess (fine deposits of silt). The Foothills: Rising from 2000 to 7000 feet, the foothills form the outer and inner zones.

2. The Lesser Himalayas: Composed of Permo-Carboniferous volcanic rocks of granite, gneisses, quartz and slates, the Pir Panjal constitutes the first mountain rampart comprising the western-most part of the Lesser Himalayas.

3. The Greater Himalayas: This consist ranges reaching more than 20,000 feet (6100 metres) in altitude. These ranges act as a climatic divide and stop the cold wind coming from Central Asia.

4. Valley of Kashmir: Between the Pir Panjal and the western end of the Great Himalayan ranges lies a deep asymmetrical basin called **the Valley of Kashmir**.

5. The Upper Indus Valley: The valley of the upper Indus River follows the geological strike structural trend westwards from the Tibetan border to the point in the Pakistani sector where it rounds the great mountainous mass of Nanga Parbat to run southwards in deep gorges cut across the strike. In its upper reaches, gravel terraces flank the river; each tributary builds an alluvial fan out into the main valley. The town of Leh stands on such a fan, 11,483 feet (3500 meters) above sea level.

6. The Karakoram Range, Zanskar range, Nun Kun range and the Nanga Parbat are among the important mountain ranges in the region.

7. The other ranges include the Shivaliks, Pir Panjal range and its offshoots including Doda, Poonch and Rajouri districts. Parts of the Western Himalayas also lie in the region.

The Karakoram Range is glaciated and rises from dry plateaus characterized by extreme temperatures. The Karakoram Range has some of the world's highest mountain peaks and huge glaciers such as the Baltoro glacier. The temperatures in these parts are very low and the region is snow covered due to the extremely cold temperature. The second highest peak in the world, mount K2 (28,264 feet or 8,615 meters), lies in the Karakoram Range.

These physiographical and geological characteristics and the high intensity of snowfall and rainfall cause excessive soil erosion, landslides, and loss of nutrients. About 33% of the total area of Jammu and Kashmir is affected by water erosion, which results in terrain deformation. Poor and imperfect drainage are also commonly observed.

Natural Resources

Jammu and Kashmir is endowed with rich natural resources including rich forest, wildlife, agricultural including horticultural, fishery and water resources. It is also very rich in many medicinal plants, found in low- and high-altitude areas. Estimated Hydro power potential of the state is 20,000 MW out of which only around 2000 MW is realized till date. Glacial micro flora and that of aquatic ecosystems, forests, soils, plants, and fungi are yet to be documented well.

Developmental projects have also taken a toll over Forests.

Flora

Due to the wide variations in topography, the region has a large variety of species. Its flora ranges from the thorn bush type of the arid plains to the temperate and alpine flora of the higher altitudes. Prominent among the trees are maple, horse chestnuts, silver fir, Deodar, Kail, Chir, many Broad leaved species, Bamboo etc. At the higher altitudes there are birch, rhododendron, Berberis and a large number of herbal plants.






Conifer Forests, Medicinal plants & Bamboo Species

Chinar – Charming bloom and in autumn.

Undoubtedly the most important of the trees found in Kashmir is the Chinar, called "Booune" in the local language which is seen throughout the length and breadth of the valley. The size of this tree is gigantic and indeed mind-blowing. It is an enthralling sight to view the Chinar changing its colours corresponding to the changing season. During the autumn, the appearance of the tree becomes very spectacular. Mountainous region in the state are covered with dense deodar, fir and pine. Almond, walnut, willow and cider are some of the trees which are the part of the rich flora.

Badam tree orchard in Kashmir

Fauna (Wildlife):

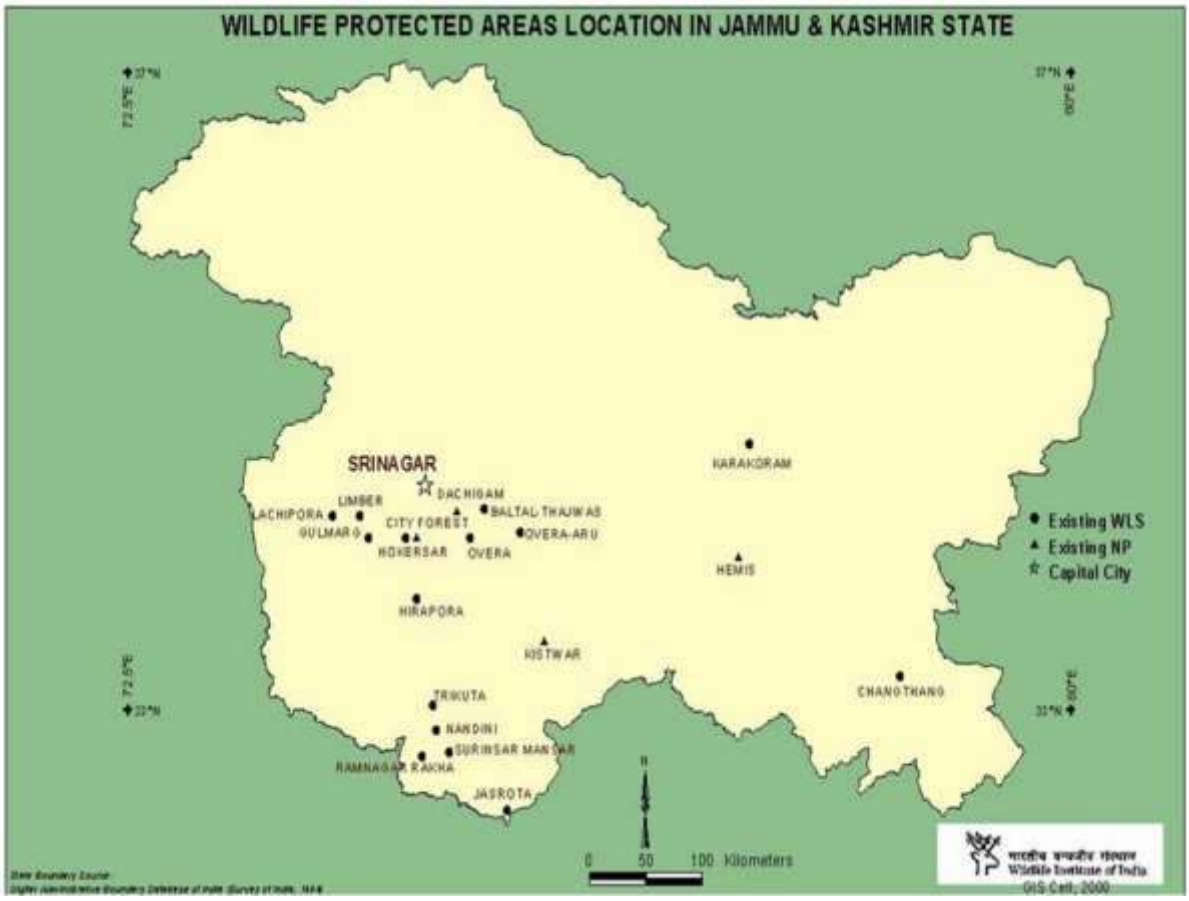
Jammu and Kashmir has fascinating wildlife. The Himalayas and the sub Himalayan mountain ranges are a unique and pristine ecosystem where many rare animals and birds can be found like snow leopard, the burly Himalayan Black Bear, the majestic Hangul or Kashmir stag, the Chiru or Tibetan antelope, the Bharal or blue sheep, many species of mountain goats, the yak - a wild animal that has been domesticated for centuries and many varieties of rare birds, including the splendid Monal pheasant and Himalayan Dragoman. Other animals you can see include Musk Deer, Ibex, Leopards, markhor, monkeys and langurs. The faunal composition of the state is also rich with large no of species of mammals, birds, and butterflies and moths, including many species of reptiles and amphibians.

Wildlife of Jammu & Kashmir – A glimps






Wildlife of Jammu & Kashmir – A glimpse.



Wildlife Area of Jammu & Kashmir.

Conservation Initiatives of the Government

In order to conserve the fauna the State Government constituted 5 National Parks, 14 Wildlife Sanctuaries and 37 Conservation Reserves which are as follows :

#	Name of the Protected Area	District	Area in Sq. Kms
I.	**JAMMU REGION**		
1.	Kishtwar High Altitude National Park	Kishtwar	425.00
2.	Ramnagar Wildlife Sanctuary	Jammu	31.50
3.	Nandni Wildlife Sanctuary	Jammu	3.34
4.	Jasrota Wildlife Sanctuary	Kathua	10.04
5.	Surinsar Mansar Sanctuary	Udhampur & Samba	97.82
6.	Trikuta Wildlife Sanctuary	Reasi	31.77
7.	Sudhmahadev Conservation Reserve	Udhampur	142.25
8.	Jawahar Tunnel Conservation Reserve	Kulgam & Ramban	18.00
9.	Thein Conservation Reserve	Kathua	19.00
10.	Baho Conservation Reserve	Jammu	19.75
11.	Gharana Wetland Reserve	Jammu	0.75

#	Name of the Protected Area	District	Area in Sq. Kms
12.	Pargwal Wetland Reserve	Jammu	49.25
13.	Kukarian Wetland Reserve	Jammu	24.23
14.	Nanga Wetland Reserve	Jammu	15.25
15.	Sangral-Asa Chak Wetland Reserve	Jammu	7.00
II.	**KASHMIR REGION**		
1.	Dachigam National Park	Srinagar & Pulwama	141.00
2.	City Forest (Salim Ali) National Park	Srinagar	9.07
3.	Kazinag National Park	Baramulla	89.00
4.	Rajparian (Daksum) Wildlife Sanctuary	Anantnag	20.00
5.	Overa-Aru Wildlife Sanctuary	Anantnag	425.00
6.	Hirpora Wildlife Sanctuary	Shopian	341.25
7.	Baltal (Thajwas) Wildlife Sanctuary	Ganderbal	203.00
8.	Gulmarg Wildlife Sanctuary	Baramulla	180.00
9.	Limber Wildlife Sanctuary	Baramulla	26.00
10.	Lachipora Wildlife Sanctuary (Uri)	Baramulla	80.00
11.	Khiram Conservation Reserve	Anantnag	15.75
12.	Panyar Conservation Reserve	Pulwama	10.00
13.	Khanagund Conservation Reserve	Pulwama	15.00
14.	Shikargah Conservation Reserve	Pulwama	15.50
15.	Khrew Conservation Reserve	Pulwama	50.25
16.	Khonmoh Conservation Reserve	Pulwama	67.00
17.	Brain Nishat Conservation Reserve	Srinagar	15.75
18.	Khimber/ Dara/ Sharazbal Conservation Reserve	Srinagar	34.00
19.	Wangat/Chatergul Conservation Reserve	Ganderbal	12.00
20.	Ajas Conservation Reserve	Bandipora	48.00
21.	Naganari Conservation Reserve	Baramulla	22.25
22.	Zaloora, Harwan Conservation Reserve	Srinagar	25.25
23.	Achabal Conservation Reserve	Anantnag	20.00
24.	Hokera (RAmsar Site) Wetland Reserve	Srinagar	13.75
25.	Malgam Wetland Reserve	Bandipora	4.50
26.	Chatlam/Manibugh, Kranchoo/ Chandhara Wetland Reserve	Pulwama	0.50
27.	Mirgund Wetland Reserve	Baramulla	4.00
28.	Shallabugh Wetland Reserve	Ganderbal	16.00
29.	Hygam Wetland Reserve	Baramulla	7.25

#	Name of the Protected Area	District	Area in Sq. Kms
III.	**LADAKH REGION**		
1.	Hemis National Park	Leh	3350.00
2.	Changthang Wildlife Sanctuary	Leh	4000.00
3.	Karakoram Wildlife Sanctuary	Leh	5000.00
4.	Sabu Conservation Reserve	Kargil	15.00
5.	Budhkharbo Conservation Reserve	Kargil	12.00
6.	Kanji Conservation Reserve	Kargil	100.00
7.	Tsomoriri (Ramsar Site Wetland Reserve	Leh	Part of Changthang WLS.
8.	Norrichain Wetland Reserve	Leh	Part of Changthang WLS.
9.	Pangong Tso Wetland Reserve	Leh	Part of Changthang WLS.
10.	Hanley Marshes Wetland Reserve	Leh	Part of Changthang WLS.

In Jammu & Kashmir State, 15,806.75 sq.km of area has been brought under the Protected Area Network. It constitutes 15.58% of the total geographical area. In all 12.73% of total forest area of the State is under Protected Area Network.

Land use pattern

The land use pattern in Jammu and Kashmir is shown in the following table. More than 56% areas are under Glacier/permanent snow and not available for use for Agriculture and tree planting. Out of the remaining area more than 74% is either under forest or not available for use. Approximately 3 % area is available for pasture and grazing and this indicates that there is a natural limitation on expansion of area for agriculture. However, there is scope for intensification of agriculture in cultivated and fallow lands. The biodiversity resources in forests and wild life areas have the potential for non-consumptive utilization. These measures have the potential to substantially increase household incomes in rural areas.

Land use pattern in J& K

S.No.	Land use type	Area (in ,000 ha)	% of total area
1.	Total Geographical Area	22,224	
2.	Reporting Area for land utilization(*)	3,781	100.00
3.	Forest(K)	2,023	53.50
4.	Not available for cultivation	573	15.17
5.	Permanent pastures and other	114	3.02

	grazing land		
6.	Land under misc. trees crops and groves	65	1.74
7.	Culturable wasteland	134	3.55
8.	Fallow lands other than current fallows.	13	0.34
9.	Current fallows	113	2.98
9.	Net area sown	745	19.70
(*) excludes area under the illegal occupation of Pakistan and China			

Demography

Jammu and Kashmir is one of the least populated States of India, with density of 123.70 persons per sq km, lesser than the National average of 372 per sq.km. Approximately 72.62% of State's population resides in rural areas. The population is mainly concentrated in the Kashmir valley (**68,88,475)** and Jammu division (**53,78,538).** However, the population is very sparse in Ladakh region having only **2,74,289** persons. The population distribution follows the climatic and physical characteristics of different regions/divisions.

The population grew by 33.1% between 1991 and 2001 and 23.64% between 2001 and 2011. The largest increase was observed between 1971 and 1981 when the population grew by 50.8%. The average household size of the state is 5.2 persons per household, with no significant inter-district disparities.

Demographic characteristics of Jammu and Kashmir State

District	**Total Population**	**Growth Rate**	**Sex ratio**	**Literacy %age**	**Area (km^2)**	**Density ($/km^2$)**
Doda	4,09,936	28.00%	919	64.68	11691	79
Jammu	15,29,958	12.74%	880	83.45	3097	596
Kathua	6,16,435	20.53%	890	73.09	2651	232
Kishtwar	2,30,696	20.88%	920	56.2	1848	125
Poonch	4,76,835	27.97%	893	66.74	1674	285
Rajouri	6,42,415	32.93%	860	68.17	2630	235
Ramban	2,83,713	31.99%	902	54.27	1330	213
Reasi	3,14,667	27.04%	890	58.15	1710	184
Samba	3,18,898	17.01%	886	81.41	913	318
Udhampur	5,54,985	20.78%	870	68.49	4550	211
Jammu Province	**53,78,538**				**32,094**	**168**
Anantnag	10,78,692	38.58%	927	62.69	2853	375
Badgam	7,53,745	24.14%	894	56.08	1406	537
Bandipora	3,92,232	28.65%	889	56.28	3010	1117
Baramulla	10,08,039	19.45%	885	64.63	3329	305
Ganderbal	2,97,446	36.50%	874	58.04	258	1151
Kulgam	4,24,483	7.73%	951	59.23	457	925

District	Total Population	Growth Rate	Sex ratio	Literacy %age	Area (km^2)	Density (/km^2)
Kupwara	8,70,354	33.82%	835	64.51	2379	368
Pulwama	5,60,440	27.00%	912	63.48	1398	598
Shopian	2,66,215	25.97%	951	60.76	312	852
Srinagar	12,36,829	20.35%	900	69.41	2228	703
Kashmir Province	**68,88,475**				**17,630**	**391**
Kargil	1,40,802	18.02%	810	71.34	14036	10
Leh	1,33,487	13.87%	690	77.2	45110	3
Ladakh Province	**2,74,289**				**59,146**	**5**
STATE TOTAL	**125,41,302**				**1,08,870**	**115**

Statement of SC/ST Population

Status of Population	Schedule Tribe	Schedule Caste
Total Population	14,93,299	9,24,991
Total Males	7,76,257	4,86,232
Total Females	7,17,042	4,38,759
Child (0-6 yrs)	20.30%	13.70%
Literacy	50.56%	70.16%
Sex ratio	924	902

Profile of Tribal Population

The major tribes of the State are Gujjar, Bakerwals, Gadies, Changpas and most of them are nomadic. These tribes are distributed all over the State and livestock rearing is their primary occupation. Among them the Gujjars and Bakerwals constitute a sizable chunk. Whereas Gujjars are primarily associated with buffalo rearing, Bakerwals are dependent on rearing of sheep and goats. From November to March the pastoral nomads stay in the sub-tropical areas of the State in Jammu region. During summer months, these nomads move towards the high altitude pastures located in the upper reaches of Kashmir and Jammu regions.

Social Characteristics

With regards to health, infant mortality rates, availability of health and dispensaries and life expectancy suggest that the health status of Jammu and Kashmir's population is about at par with the national average. The natural growth rate is also lower than the national average.

Human Development Indicator for health (2011 census)

Indicator	Jammu & Kashmir	India
Decadal Growth (%) (Census 2011)	31.42	21.54
Crude Birth Rate (SRS 2013)	17.50	21.40
Crude Death Rate (SRS 2013)	5.30	70.00
Natural Growth Rate (SRS 2013)	12.10	14.40
Infant Mortality Rate (SRS 2013)	37	40
Maternal Mortality Rate (SRS 2010-12)	NA	178
Total Fertility Rate (SRS 2012)	1.90	2.40

Livestock

Livestock plays very vital role in the economic development of the State and forms an integral part of State Agriculture. About 73% population of J & K State are dependent on Agriculture as their main occupation. Livestock rearing is their subsidiary occupation as these two sectors are interdependent. Livestock sector engages sizeable number of working force not only in rearing of animals but also in processing, transportation and sale of the animal products.

Cattle population increasing and putting pressure on forests.

It is estimated that livestock and its derived foods and other products contribute about 6.13% to this GSDP. The Integrated Sample Survey (2010-11) revealed that total livestock population of Jammu region had demonstrated an increase of 3.80% over the year 2009-10 and reached to 75.56 lakhs from 72.79 lakhs. Kashmir region also witnessed an increase of 3.11% as livestock population had reached to 73.90 lakhs from 71.67 lakhs. However, in Ladakh region livestock population slipped by 3.03% from 6.60 lakhs to 6.40 lakhs during the same period. Average livestock per household, works out to six animals per household for Jammu and Kashmir State as compared to about three animals per household at All India level. This is mainly attributed to the highest presence of live stock in the districts of Poonch, Rajouri and kargil of J& K State.

Trout farm, Dachigam, Srinagar

Common fish farm in Jammu.

Fishery

The total fishermen population in the State is around 31000. The state has a length of 27781 km of rivers/streams which facilitates the farming of more than 40 million tonnes of fish. Out of total 27781 km of area under fisheries, the State has only 7000 hectares under reservoir area.

Total fish caught during 2014-15 stands at 20.03 thousand tonnes as against 20.00 thousand tonnes in 2013-14. The production of famous Kashmiri Trout has been shown an increasing trend every year.

To increase Fish seed production of commercially important fish species the Fishery department intends to upgrade the existing 18 fish farms including the 2 National

Fish Seed Farms at Kathua and Mansbal by way of increasing their rearing and hatching capacities. The department also established a Mother Unit for Trout culture at Kokernag.

Forestry and biodiversity conservation

The State is landlocked having hilly terrain and beautiful landscape with abundant flora and fauna. Due to natural limitations in the terms of terrain, limited potential for agriculture and industry, the State considers its natural beauty in the form of thick forests, greenish meadows, large lakes, and permanent glaciers as its important assets. This also provides sustenance to a large section of population. Though the contribution of forestry sector to GSDP has decreased over few decades, it remains the major resource for sustaining hydro power, high valued tourism, medicinal plants and livelihood of local people. Though the state covers only 3.20% of India's total land area, it has lot of biodiversity of all kind. In fact, it provides the lifeline for hilly people particularly nomadic tribes of Gujjar and Bakerwals.

In spite of long spells of disturbances, the Forest Department along with its sister Departments had done their best to conserve the forest and its flora and fauna in its natural setting. The plan outlay has increased from 0.17 Cr in first plan to 589.34 Cr in tenth plan which helped in preserving the forest and its flora and fauna.

CHAPTER-III
FOREST WEALTH OF THE STATE

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The forest area of the State is administered by the Forest Department. The Forest Survey of India had identified the presence and spread of various types of forests in Jammu and Kashmir State in the following table:

(Area in Km^2)

Forest Type	Area	Percent
5B/C2 Northern Dry Mixed Deciduous Forest	1383.24	5.74
5/DS1 Dry Deciduous Scrub	366.58	1.52
5/DS3 Euphorbia Scrub	1.78	0.01
5/E9 Dry Bamboo Brakes	24.52	0.10
5/1S2 Khair-Sissu Forest	1.61	0.01
9/C1a Lower or Siwalik Chir Pine Forest	2484.19	10.31
9/C1b Upper or Himalayan Chir Pine Forest	882.41	3.66
9/DS1 Himalayan Subtropical Scrub	244.77	1.02
10/C1a Olea cuspidate Scrub Forest	196.06	0.81
12/C1a Ban Oak Forest (*Q.incana*)	582.21	2.41
12/C1b Moru Oak Forest (*Q.dilatata*)	27.99	0.12
12/C1c Moist Deodar Forest	2100.58	8.72
12/C1d Western Mixed Coniferous Forest	3288.24	13.65
12/C1f (Low-Level Blue Pine Forest (*P.wallichiana*)	1545.33	6.41
12/C1/DS1 Oak Scrub	168.33	0.70
12/C1/DS2 Himalayan Temperate Secondary Scrub	326.70	1.36
12/C2a Kharsu Oak Forest (*Q.semicarpifolia*)	0.72	0.00
12/C2b West Himalayan Upper Oak/Fir Forest	2.14	0.01
12/1S1 Alder Forest	3.55	0.01
12/1S2 Riverain Blue Pine Forest	109.18	0.45
12/2S1 Low-Level Blue Pine Forest	83.40	0.35
13(i)/C1 Dry Broad Leaved and Coniferous Forest	795.55	3.30
13(i)/C2b Dry Deodar Forest	799.46	3.32
13/DS1 Pohu Scrub	76.32	0.32
13/DS2 Dry Temperate Scrub	133.58	0.55
13/C3 West Himalayan Dry Temperate Deciduous Forest	262.88	1.09
13(i)/C4 West Himalayan High Level Dry Blue Pine	1344.82	5.58
13/1S2 Populus/Salix Forest	131.47	0.55
14/C1a West Himalayan Alpine Fir Forest	1570.61	6.52
14/C1b West Himalayan Sub-Alpine Birch/Fir Forest	1529.95	6.35
14/2S1 Sub-Alpine Blue Pine Forest	519.53	2.16
15/C1 Birch/Rhododendron Scrub Forest	163.66	0.68
15/C2 Deciduous Alpine Scrub	226.84	0.94
15/E1 Dwarf Rhododendron Scrub	35.82	0.15
15/E2 (Dwarf Juniper Scrub)	15.95	0.07

Forest Type	Area	Percent
16/C1 Alpine Scrub Forest	1584.37	6.57
16/E1 Dwarf Juniper Scrub	758.17	3.15
Plantation/TOF	282.74	1.17
TOTAL	**24094.00**	**100.00**

Statement of classification of forest by types in Jammu & Kashmir State

Different types of Forests in Jammu and Kashmir.

S.No.	Types of forest	% of total forest area
1.	Subtropical Deciduous	4
2.	Subtropical pine	14
3.	Subtropical Evergreen	3
4.	Himalayan dry temperate	7
5.	Himalayan moist temperate	44
6.	Dry Alpine /Moist Alpine	28

The above statement shows that there is dominance of the temperate moist forest and dry and moist alpine in the State's forests.

The State Government does not confer the people with any right over forests. However, the people enjoy liberal concessions since the aegis of Maharaja of the State, under Kashmir Forest Notice, Jammu Forest Notice and other notifications. Concessionists are categorized into “A” and “B” depending on the distance of their habitation from the forest for the purpose of the extent of Timber Grants. Trees of Kail and Fir are granted at concessional rate to the local people residing within 5 kms of the demarcated forests for their bonafide requirement. In case of fire and natural calamities, the trees required for rebuilding their houses are granted at free of cost. The residents of the other areas are entitled to the supply of timber at concessional rate from Timber Sale Depot of the Forest Department. Other Concessions include:

- Collection of dead, fallen material for domestic use.
- Collection lops and tops from worked out forest area.
- Lopping of trees for fodder or other domestic purpose, however, special class trees like Ash, Walnut etc is prohibited.
- Collection of all Minor Forest Produce for domestic purpose is allowed.

Grazing is allowed in forest areas to concessionists except in areas where it has been specifically closed. Thus the State may, however, close any part of the State Forests at its discretion.

In sum, the population of Jammu and Kashmir enjoy liberal concessions in terms of timber, firewood, collection of MFP, grazing etc for bonafide use. Commercial activities are however completely prohibited for private individuals or organisations in the forests. There is a limited scope for generating direct income through the utilisation of forest resources because all the benefits are permitted only for bonafide domestic purposes. The current policies on state-owned forests are now aimed at creation of livelihood to local population as well as conservation. The concept of sustainable forest management with help of local communities has been strengthened after the State implemented National Afforestation Programmes.

Rights over private trees

The plantations raised outside the demarcated forests by the farmers under the schemes like Social Forestry, Farm Forestry and Agroforestry etc. constitute a huge source of timber of species like poplar, willow, eucalyptus and Dalbergia sissoo etc. A detailed survey to assess the availability of timber from the trees growing outside the

demarcated forests has been conducted in collaboration with the Forest Survey of India (FSI), Dehradun. Annual availability of wood from Trees Outside of Forests (TOF) has been calculated separately for both the regions as well as for rural and urban areas. For calculation of annual availability of wood, timber species have been clubbed into three categories:

1. Short and medium rotation species; These group include species having rotation of less than 50 years
2. Long rotation species; This category includes species having a rotation of 50 or more years.
3. Species to be harvested after death/ dryage/ snow fall/ uprooting. This category consists of species like Deodar, Kail, Waknut, Ash etc for which green felling is not allowed as per extant J&K laws and practices even if growing on private lands. The outturn of these species have been worked out on the basis of average mortality involving death due to natural, un-natural causes as well as uprooting/ falling due to snow in the temperate areas of J&K.

The annual volume available from rural TOF of the State is 23,13,056 cum, and from urban TOF is 1,22,800 cum. The source of raw material for saw mills, veneer and plywood mills is mainly the timber available from trees grown outside the demarcated forests by the people on their private lands. In case of most of these species felling and transportation does not require permission. In case of willow there is separate law and rule.

The state encourages the public to plant trees. The Social Forestry Department and Forest Department provide seedlings free of charge to be planted on their private land under different schemes of the State Government. The prevailing rules for private trees show a significant level of trust by the government towards the public in their dealing with trees and forests. The current policies for private trees strongly encourage the planting of trees and their use. The policies have successfully promoted forestry on private land and the pressure of commercial demand on the Forests has been considerably reduced.

Forest Cover

Forest Change Assessment since 2005 has shown that there is no perceptible change in forest cover in very dense forest, moderately dense forest, open forest and scrub categories. However, there is 9 % increase in the tree cover over non forest area. There are inconsistencies in the available information on land use and vegetation cover of J&K as the relevant data are not collected regularly. Nevertheless, the available figures suggest that there is a need of silvicultural treatments in a majority of the area under forest. Some of the forest areas which had been clear-felled prior to the ban on green felling by the Hon'ble Supreme Court of India and those under consistent use for resin extraction have not seen sufficient regeneration. Despite consistent reforestation efforts, some of the clear-felled upper slopes and hilltops have not regained sufficient forest

cover due to the heavy loss of top soil and the harsh climatic conditions prevalent in those areas.

Surveys conducted for revision of working plan have indicated that natural regeneration in temperate forests and sub-alpine conifer forests is not satisfactory and could lead to degradation of forests if suitable intervention is not devised. Another matter of concern is the regeneration in oak forests found in the altitudinal range of 1,700 to 2,400 metres MSL. Regeneration of silver fir is also a great challenge. Thus, afforestation activities should be promoted by the Project, together with a component to improve afforestation techniques in challenging environments like high altitude alpine, Oak, fir and spruce forests etc.

Wasteland estimation

The term wasteland is a misnomer. They are not wasteland in real sense but comprises of parts of land that were put into inappropriate usages therefore making them less productive. The land use pattern in J&K clearly shows that a significant proportion of land in the following land use categories are available for afforestation.

S.No.	Land use type	Area (in ha)
1.	Not available for cultivation	5,82,000
2.	Permanent pastures and other grazing land	1,26,000
3.	Land under misc. trees crops and groves	72,000
4.	Cultural wasteland	1,40,000
5.	Fallow land	89,000
	Total	**10,09,000**

Source: Land Use Statistics, Ministry of Agriculture, Government of India (2005)

Growing stocks

The growing stocks of forests are estimated consistently during the revision of working plans. The working plan exercises were continuously carried out and revised till 1989. However after 1989 the revision of working plan came to a halt due to the turmoil prevailing in the State. With the improvement of the situation in last five years many of the working plans were revised and approved by the State Government. The field exercise as well as the Satellite Imagery Analysis clearly shows that 50% of the forests are adequately stocked. The remaining areas are facing varying degrees of degradation due to various reasons including the population pressure of people living in the fringe areas.

Analysis of the working plan data reveals that the average density of growing stocks, has come down from 212.80 cum/ha in 1966 to 206.60 cum/ha in 2005. Accordingly, the prescribed yield has also declined from 1.96 cum/ha to 1.65 cum/ha.

Harvesting and output

The Supreme Court of India had banned the green felling of trees from the forests. Currently, most of the divisions have approved working plans. Only dead, diseased, snow fallen trees are allowed to be harvested. The Qualitative & Quantitative committee constituted as per the direction of the Supreme Court of India, had stipulated the removal of 80 lakh cft of dead/ dry and fallen trees annually from the commercial area of the forests.

The following statement shows that the revenue realized from forest increases consistently, but quantity of timber extracted shows the declining trend

S. No.	Year	Total quantity extracted (cum)	Total value (Rs. in lakhs)
1.	1960-61	451.79	841.66
2.	1970-71	423.83	1204.18
3.	1980-81	609.21	7049.56
4.	1990-91	154.00	8402.18
5.	2000-01	102.48	8419.09
6.	2010-11	86.59	10557.45
7.	2011-12	45514.29	
8.	2012-13	52685.71	10574.43
9.	2013-14	68400.00	13299.85
10.	2014-15	67514.29	13989.18

However, the share of Timber in revenue generation has declined over the years due to ban on green felling and ban on export beyond a ceiling and increasing sale of other produce. It is worth analyzing that the main services provided by forest do not contribute to increasing revenue by the Department. In spite of the fact that sectors like the hydro-power generation potential and tourism sector which are highly dependent upon the health of the surrounding forests, the revenue generated is credited to the other departments.

Forest based industries

The major part of the State of Jammu and Kashmir comprises of hilly areas, and therefore, the lifestyle of the people is one that is highly dependent on forests for timber

Timber & small wood being used in plywood industry, cricket bats & fruit packing boxes

and firewood for construction and energy fuel purposes. Also, the famous horticulture industry of the State, inter-alia, utilizes a large number of packing boxes made from wood obtained from the trees grown traditionally by the farmers on their proprietary lands outside the demarcated forests.

Timber Supply

Timber from demarcated forests of State at present is being extracted from dry and fallen trees only as the Hon'ble Supreme court has imposed ban on felling of green trees. The qualitative Committee framed under the dirte4ctios of Hon'ble Supreme court has imposed restriction on quantity of timber to be extracted and restricted the marking to 80.00 Lakh Cfts (standing volume) per annum which can yield at the most 40.00 Lakh Cfts. Part of this timber is being extracted by State Forrest Corporation for sale through completive mode of auctions and the other part for direct sale to consumers in A, B & C

Sawn logs & planks being sold at TSD (Depot).

zones through Forest Department. The timber supplied through TSDs and Jammu/Kashmir forest Notice during the last five years us given as under:-

Distribution timber from 2011-12 to 2015-16 (in lakh cum)

	Timber supplied		
Year	**Kashmir Region**	**Jammu Region**	**Total**
2011-12	0.38766	0.32910	0.71676
2012-13	0.46298	0.31522	0.77820
2013-14	0.49130	0.27665	0.76795
2014-15	0.44288	0.31205	0.75493
2015-16 (Upto 11/2015)	0.18321	0.11950	0.30271

Similarly, cricket bats are made from willow wood of trees grown by the farmers in the lands outside demarcated forests.

Therefore, operation of 2500 odd saw mills are an inevitable necessity, which besides meeting the typical needs of wood sawing of the local people, horticulture and other allied industries (cricket bats, joinery and furniture etc.) also contribute significantly in the economy of the State. The saw mills provide livelihood to one lakh people

including educated youth and sustenance to a sizable predominantly rural population, either directly or indirectly.

Similarly, annual installed capacity in respect of veneer, plywood and other industries using large quantity of timber/wood as reported by the Directors, Industries Department is as under:-

Name of industry	Number	Annual Crushing (Installed capacity)
Sawmills	2496	10.73 Lakh Cum
Veneer & Plywood & Particle board	105	3.66 Lakh Cum
Others	4	0.01 lakh Cum

Apart from the timber extracted by J & K State Forest Corporation and J & K Forest Department from dry/ fallen trees, the private timber traders import the timber from outside the State without any restrictions, and sell the same through their registered timber sale depots. The average annual volume of imported timber comes to be 1.24 lakh cum. The source of raw material for saw mills, veneer and plywood mills is mainly the timber available from trees grown outside the demarcated forests by the people on their private lands. The plantations being raised outside the demarcated forests by the farmers under the schemes like Social Forestry, Farm Forestry and Agroforestry etc. constitute huge source of timber, like poplar, willow, eucalyptus Dalbergia sissoo etc are being used for this purpose.

Resin production details

The oleo-resin extracted from chir pine trees is processed in the industry to get a variety of products like rousin, turpentine etc. The chir forests of this State were tapped by Cup & Lip method and since last few decades the rill method is used for extraction.

The statement showing the resin production in this State since 1990.

Year	Resin production in Tonnes	Year	Resin production in Tonnes
1990-91	7854	2003-04	10284
1991-92	7824	2004-05	3941
1992-93	9057	2005-06	6748
1993-94	9500	2006-07	4934
1994-95	9180	2007-08	6116
1995-96	10470	2008-09	2482
1996-97	10803	2009-10	1693
1996-98	8466	2010-11	1422
1998-99	11020	2011-12	1193
1999-00	10798	2012-13	849

2000-01	10958	2013-14	1028
2001-02	10694	2014-15	1805
2002-03	10783	2015-16	1587

Description of forests in proposed GIM area

Demarcated Forests

The State Forest Department administers 20,230 sq. km area of demarcated forests. The forests of the State were demarcated during the first decade of the last century using available techniques of the time and created demarcation records and maps. Crude boundary pillars were erected at that time for the purpose of physical demarcation on the ground and recorded in the registers. About 2000 forests of the State were demarcated with the total length of about 48000 km of mainline using 280000 boundary pillars.

Significance of forest wealth of the State for carbon sequestration

The forest types such as subtropical deciduous forests, subtropical pine forests, subtropical ever-green forests, Himalayan dry temperate forests, Himalayan moist temperate forests and dry alpine/ moist alpine dry alpine scrub forests are adequately represented in this State.

As per the State of Forest Report, published by the Forest Survey of India, the forest cover change matrix as per the satellite data interpretation is as follows.

Forest Cover Change Matrix						**(Area in sq.km)**
Class	**2015 Assessment**					
	VDF	**MDF**	**OF**	**Scrub**	**NF**	**Total ISFR 2015**
Very Dense	3758	209	58	1	114	4140
Moderately Dense	152	7334	608	42	624	8760
Open Forest	69	593	7235	63	1678	9638
Scrub	4	116	291	307	1387	2105
Non-forest	78	563	1920	212	194820	197593
Total ISFR 2015	4061	8815	10112	625	198623	222236
Net Change	-79	55	474	1480	1030	

13,29,24,660 cum of wood in the form of conifer and broadleaved trees are available in the forest of J&K. Also, the degraded forests areas are a potential source of carbon sequestration by adequate plantation in the future.

Factors adversely affecting forests in the State with special reference to the area selected for GIM

The population living in the fringe areas of forests heavily depend upon the forests for fuel wood, timber, fodder and other NTFP's for their bonafide use. Both the settled local people and nomadic graziers own a few million livestock between them which directly depend on the forests for fodder. As the winter is severe and prolonged in Kashmir valley and most part of Jammu province, demand for fire wood is comparatively higher than the national average. Due to the remoteness of these places, alternate form of energy such as LPG and CNG cannot reach the people. Significant number of people are living above 1000 m MSL, where they experience subzero temperatures for more than three months. In rural areas, people need at least two quintal of fire wood in each household of about six persons in a day during peak winter. People resort to removal of young trees for the purpose of fire wood collection.

The local people living in villages share the grass growing in the open and degraded forest land, state land and other common lands among themselves. During the months of October & November, people especially the women are very active in grass collection from these lands. They used to cut the grass completely in large stretch of lands. During the process, all the natural current recruits of the tree species are also being cut and carried away by the people. Hence, the open and degraded forests remain in the same way it existed; never allowed to regenerate naturally. Thus, the forests of J&K are degraded mainly due to fire wood extraction and grass collection.

Apart from these man-made factors, natural factors such as fire, wind storms and flood also cause severe damage to the forests. In 2012-13, there was a wind storms in the entire Kashmir valley which uprooted green standing trees of volume more than 60 lakh cft in the forest areas. An equal number of trees were also uprooted in the private lands.

Vulnerability to climate change in Jammu & Kashmir State

The J&K is a highly vulnerable State from the climatic change angle primarily due to its location on the young fragile Himalayas. The Himalayas stops the cold wave of Siberian origin from entering into the fertile Gangetic plains of India, thereby preventing the desertification of the plains. The high altitude terrains are being deeply serrated by the glacial rivers for millions of years, so the entire mountainous regions are found to be steep and slopy in nature. A small part of the State i.e, Kathua, Samba, Jammu and parts of Udhampur, Reasi and Rajouri districts receive monsoon rains. The entire Chenab and Kashmir Valleys receive rain during winter in the form of snow.

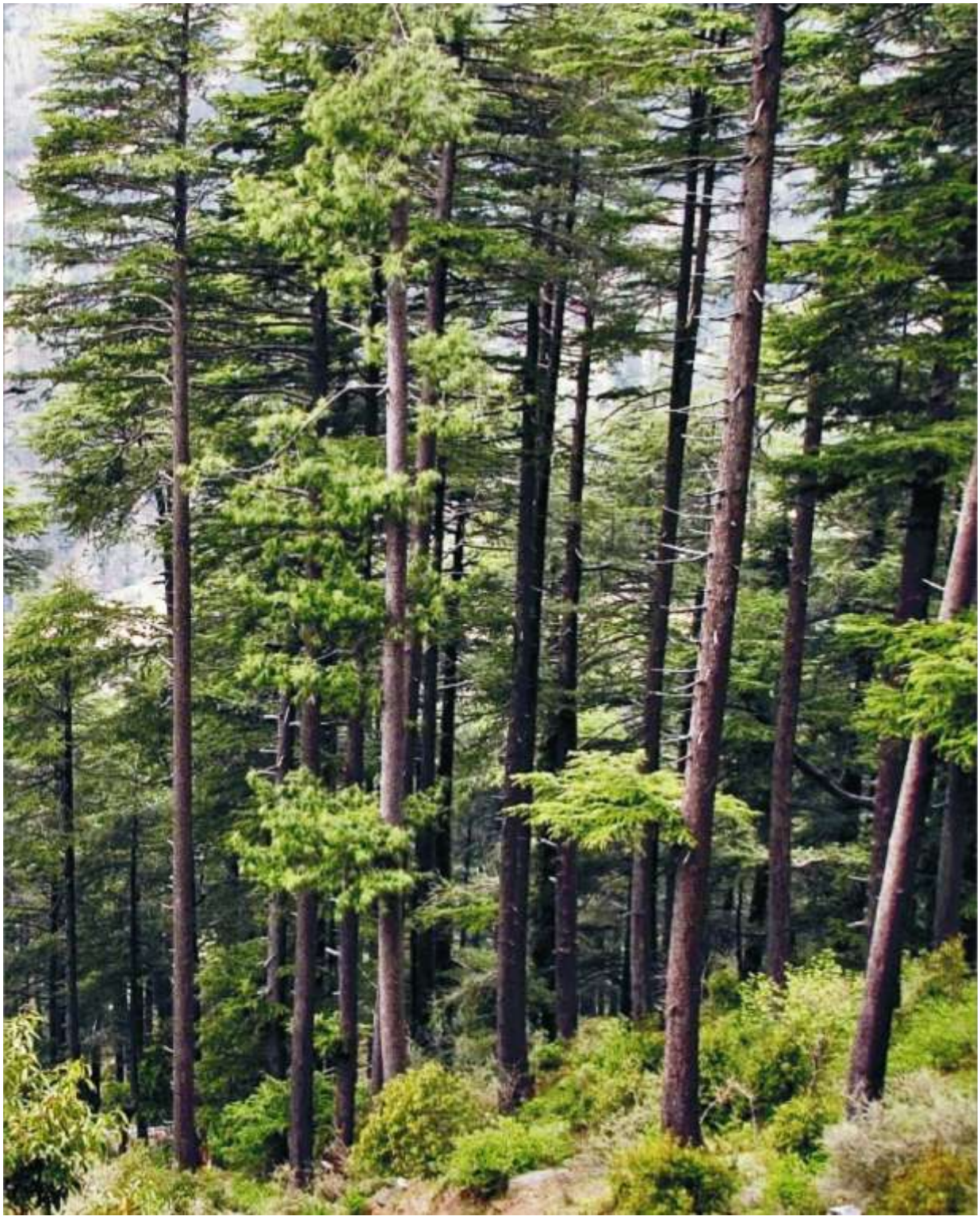
Due to climate change, the Kashmir Valley received unprecedented rainfall in first week of September, 2014, created floods in the Kashmir Valley. During 2011, Leh experienced cloud burst and received huge rainfall which caused loss of life and property.

The untimely rain and snowfall cause huge loss to the economy of the people. There was an untimely snowfall in the last week of May, 2011 leading to the death of more than 30000 sheep and goats of nomadic graziers in Warwan valley. The grass availability in the upper reaches is directly linked with the summer rainfall. If the availability of grass is lesser due to poor rainfall, the nomadic graziers shall return to the plain during the month of August along with their few millions of livestock, after a brief stay in the alpine meadows. These livestock would graze the grasslands of the plain and then enter the forest and deplete the natural resources.

The local people living in the villages are depending upon the natural springs to meet their potable water needs. The recharge of natural springs located in high altitude directly linked with the snowfall; but not on rainfall. In adequate or untimely snowfall create potable water crisis in the State. The quantum of snowfall received during November to January is more beneficial than snowfall received after February.

CHAPTER-IV

SNAPSHOT OF PROPOSED GIM LANDSCAPES



CHAPTER-IV
SNAPSHOT OF PROPOSED GIM LANDSCAPES

Socio-economic conditions prevailing in proposed area for GIM: An overview

Jammu and Kashmir is one of the least populated States of India, and approximately 72.62% of State's population resides in rural areas. The population is mainly concentrated in the Kashmir valley and Jammu division. However, the population is highly sparse in Ladakh region. The population distribution follows the climatic and physical characteristics of different regions/divisions.

In general, the people of the State depend on the State Government for employment. The major occupations of the people are agriculture and animal rearing. J&K is the pioneer in land reforms; hence most of the families own at least a small piece of land and practise subsistence agriculture. Most of the people in rural areas are living below poverty line. No large scale private investment in the State is possible in light of Article-370 and due to the prevailing legal environment.

Agriculture Scenario

In Jammu region, most the people are practising subsistence agriculture, the higher valued inputs like fertilizers and pesticides are not being used due to lack of

sour Agriculture is main profession of large section of population.

knowledge as well as remoteness. Hence, the produce can be graded as “organic”. Some progressive farmers in R.S. Pura area of Jammu region are cultivating scented long grained basmati rice. A small patch of ‘*Kesar land*’ is the most suitable for saffron cultivation in Kishtwar town of Jammu region. In majority of plain area with irrigated facility is used for cultivation of rice during the summer season and wheat in winter season. In hilly areas people are cultivating the steep slopes by converting into bench terraces. In the rainfed areas Maize is the major crop. Use of mechanical power is restricted in the plains only

World famous Saffron being grown at pampore

Apple orchard in North Kashmir.

In Kashmir region, people are cultivating mainly rice and vegetables. A good proportion of land is under Apple orchards and temperate fruit crops. Trees such as Poplar, Willow are also cultivated by progressive farmers. A vast stretch of land in Pampore is under saffron cultivation. Also, people are cultivating walnut, and other dry fruits in Kashmir valley.

Traditional irrigation system is being followed in most part of the State. People made irrigation channels with gentle slopes to connect the agricultural fields with perennial water sources. The irrigation water flow is maintained by gravity. Ranbir Irrigation Channel that connects the agriculture field of R.S.Pura with Chenab River is a famous example in Jammu.

Infrastructure

Historically Jammu and Kashmir State is located in the silk route that connected the Central Asia with China. Now, the State is in need of huge investment for meeting its infrastructure needs such as roads, railway and electronic connectivity such as cell phones and internet connectivity. The National Highway 1A is the lifeline of the State which links the Kashmir Valley with the rest of the Nation. Works are under progress between Udhampur to Srinagar for conversion it into four lanes. The Kashmir Valley is connected to Jammu Province by Mughal Road and NH-1B that passes through Kishtwar. In every district a significant proportion of villages are connected by PMGSY roads. However, still many areas remain unconnected.

The Indian Railways are operating trains upto Katra. Also, trains are under operation from Banihal to Baramulla in the Kashmir Valley. The track construction is going on between Katra and Banihal and likely to be completed by 2020. The State is need of e-connectivity. Jammu, Srinagar, Kargil and Leh are the Towns connected by air.

Sources of livelihood

Apart from employment in State Government, agriculture is the major source of livelihood of majority of people. The tourism sector also engages significant proportion of locals. In a year about one crore people visits the religious place of Katra. Similarly Amarnathji temple located in Kashmir Valley receive about five lakh people in a year. In addition, lakhs of people visits Kashmir to enjoy the natural beauty. The State had created large infrastructure for the tourists as locals are depends on the tourism .

Forests attract Tourists, A major source of livelihood in Kashmir valley

Animal husbandry practices

The State is the home of about 150 lakh of livestock. Local people as well as nomadic graziers rear livestock such as sheep, goat, horse, ponies, buffalos etc for their livelihood. The nomadic graziers live in temporary houses in plains as well as in high altitude meadows. During winter they are staying in the plains of State and migrate to the respective meadows in the pre-designated routes traditionally during summer. It is the unique feature of the State. The Government made extraordinary arrangements to for schooling, distribution of ration and other facilities in both plains and in the foot-hills.

Natural Springs and water sources

The State is bestowed with ample number of natural springs which meets the drinking water demand of large section of population. The Royal Spring (*Chashma shahi*),


Natural springs & streams are source of fresh water & tourist attraction.

located in Srinagar, is the best known example. In the rural areas, the spring water is diverted through net work of pipes to the village, thereby people are getting potable water. The recharge of the natural aquifers directly linked with the snowfall in the higher reaches. The natural springs are one of the important sources of water for the wildlife also. In the Chenab and Kashmir valleys, many glacial origin rivulets serve as source of drinking water for local population and wildlife.

As described earlier the L1, L2 and L3 areas are identified using GIS tools on the maps are prepared. The division-wise area available for the treatment and area proposed to be taken for treatment under GIM is presented in the table below:

Province	Name of the Division	Total Area identified for treatment (in Ha)	Area proposed to be taken up under GIM (in ha)
Jammu	Bhaderwah	778.38	300
	Billawar	8112.91	3500
	Doda	12162.84	5000
	Kathua	1035.07	500
	Mahore	4995.04	2000
	Kishtwar	724.38	300
	Nowshera	686.4	300
	Poonch	2281.99	1000
	Rajouri	1965.78	1000
	Ramnagar	1512.03	850
	Jammu/ Urban forestry		3000
	Sub total	**33530.44**	**14750**
Kashmir	Bandipora & Kupwara	1429.32	700
	Jehlum Valley	6984.72	2500

Province	Name of the Division	Total Area identified for treatment (in Ha)	Area proposed to be taken up under GIM (in ha)
	Kamraj	1417.24	650
	Kehmil	2580.24	1000
	Pirpanjal	17477.37	6000
	PP & Shopian	2020.46	700
	Shopian	7562.02	2700
	Sindh	1354.51	500
	Urban forestry		3000
	Sub total	**40825.88**	**14750**
Ladakh	Kargil	2724.71	875
	Leh	11365.13	875
	Sub total	**14089.84**	**1750**
Total		**88446.16**	**29500**
Wetlands areas proposed			1000
Grand Total of area proposed for treatment			**34250**

It is proposed to take up 34,250 ha in the next five years under the programme with a financial outlay of 256.50 crores.

CHAPTER-V

DEPENDENCE OF VILLAGE COMMUNITIES ON FORESTS AND OTHER NATURAL RESOURCES

Forests – A boon for local people fulfilling their essentials.

CHAPTER-V
DEPENDENCE OF VILLAGE COMMUNITIES ON FORESTS AND OTHER NATURAL RESOURCES

The forest cover of Jammu and Kashmir province is more than 50%. The vast forest area serves as the livelihood for the local population both directly and indirectly. From the satellite imagery one can recognise that the villages are dotted amid the forests in the State of J&K. By recognising the proximity and dependency of the people with forests, the people are given with concessions since aegis of His Highness Maharaja. It is the major reason that the Maharaja did not reserve the forests, but only demarcated the forests. People are still getting the forest resources under concession rates announced by the popular Governments.

The concessions given by erstwhile rulers of the State

The Maharaja had given concessions to the people living in the vicinity of the forests under Jammu Forest Notice and Kashmir Forest Notice. The local people living in the rural areas can get trees sanctioned for construction of their residences. It is followed even during the regimes of popular Government. The people are given other concessions namely right of way, collection of firewood and fodder, timber for making agricultural implements, collection of broken deodar trees less than 6 feet girth for construction etc.roximity of villages from forests

The villages are located very close to the forests. Only few patches in the State are away by 8 km from the forest boundary. It shows the proximity of villages to the forests. Due to the proximal nature of villages, the forests face the degradation. The Forest Department cannot control the people from entering into the forest.

Firewood as principal source of domestic energy

Due to poor development of road network, most of the places in the State are


Fire wood for domestic need

inaccessible to market. The modern household fuels such as LPG and LNG cannot reach the villages. Most of the people are poor and are not afford to use electricity for domestic cooking purpose. Due the undulating nature of terrain, solar energy cannot be tapped due to shade effect. All these factors push the local people to bring the firewood from forest for domestic energy. In people perception, brief summer is the blessed time for stocking of essential commodities to face the long winter. Each household lives in high altitudes require atleast one quintal of firewood in a day during winter for warming of their house. The firewood extraction is the major factor of forest degradation.

Dependence on forest land for fodder

People collecting grains/fodder from Social Forestry clousers.

As already mentioned, the people are depending upon the forests for fodder also. The people are given concession to take their livestock for grazing any open area otherwise that is not closed by the order of the Government. The grazing is practised in summer throughout the high altitude meadows. The local people in snow bound areas stall feed their animals during winter. Hence, they accumulate grass during October and November. They cut the grass from all land which deprives the current recruits from the forest floor too. Hence, the open and degraded forests remain in the same way.

Forestry for creation of employment opportunities

The forest sector is the major source of employment to the local people living in the fringe areas. Every year the State Forest Department and the Corporation extract approximately 10 lakh cft of timber in sawn form and another 50 lakh cft in log form. There by it creates an employment of about 10 lakh mandays in the timber operation in a year. The afforestation works of forest and sister department create a large number of mandays of work. The collection of NTFP's such as guchhies and other works of forest department also create employment.


Tourism a very important sector to improve financially health.

The natural beauties of the State lies in the forest cover which attracts the tourists across the globe and create ample employment opportunity to the local people.

Ecological services

The conserved forests of J&K, is the major sink of carbon in the fragile Himalayas. Moreover, the survival of these forests directly linked to the survival and life of hydro-electric projects constructed/ to be planned. An earlier estimate by the State Government projected the hydroelectric potential of 20000 MW, but till now only 2000 MW is being installed. If the untapped potential is harvested with huge investment, it will boost the economy of the State as well as the people. By improving the infrastructure, unknown hydro-electric potential areas like Warwan valley can also be tamed to improve the revenue.

Occurrence of trees in private holdings

As already mentioned the trees in the private holdings are the major source to meet the timber requirement of packaging and bat industry. The main sp. being grown under farm forestry are Salix, Poplars etc.

Bat industry of South Kashmir is World famous.

CHAPTER-VI
MAJOR PROGRAMMES AND SCHEMES OF FORESTRY SECTOR

High altitude forests in Kashmir Valley

CHAPTER-VI
MAJOR PROGRAMMES AND SCHEMES OF FORESTRY SECTOR

State sponsored programmes of the forestry sector are Rehabilitation of degraded forests and Forest protection. These programmes are the components of the State and District Plans. The Centrally Sponsored Schemes such as National Afforestation Scheme, Finance Commission Awards, River Valley Projects, Backward Region Grant Fund and Rashtriya Krishi Vikas Yojana are the major schemes implemented in the State in forestry sector. Recently, Compensatory Afforestation Fund Management and Planning Authority (CAMPA) scheme is also implemented in the State.

Forestry practises in identified GIM areas:

In the plains of Jammu province, such as plains of Katua, Samba, Jammu, Udhampur, Reasi and Rajouri districts, the plantation works are carried out during the monsoon season. The plants are raised in the nursery during the months of January and February and planted in July and August. The major species planted are Khair, Dalbergia, Almus, Emblica, Chir, and fodder grasses. The resin extraction is carried out as per working plan prescriptions. No timber extraction is carried out in these areas since the major forest species Chir, does enjoy good market in Jammu.

In the higher reaches of Rajouri and Poonch districts, Chenab valley and Kashmir valley, the plantation is carried out during winter months coinciding with snowfall. The major conifer species such as deodar and Kail are planted with nurse crops such as Robinia, Ulmus, etc. Recently fir seedlings are also raised in nurseries. The seeds of Horse chest Nut are sown near streams. As the growth rate of conifer species is very slow, the conifers are raised in nurseries for atleast three years. Timber extraction is one of the major activities of the forest department in this tract as it is rich in high value conifer trees.

MAJOR PROGRAMMES AND SCHEMES OF FORESTRY SECTOR:

State Forest Department is responsible for managing the most important renewable natural resource base, the forest wealth, which due to its physiographic characters is ecologically very sensitive and play a vital role important in the growth process of our State. Forestry Sector holds tremendous employment potential for rural

masses. Apart from providing requisite raw material for industries, timber for constructions and agriculture based requirements for tools and implements etc. Forests are major source of energy in rural areas and provide fodder to huge cattle population in the State. Forests provides various indirect benefits by acting as means of facilitating the soil and moisture conservation, prevention of floods, recharging of ground water, wildlife conservation and preservation of gene-pool of most of the species which are important from medicinal point of view. The existence of the state tourism industry depends to the forests.

Rapid industrialization, agriculture modernization, burgeoning population coupled with faulty management practices have damaged the forest eco-system so severely that its carrying capacity has deteriorated drastically. The total forest area in our State is 2.02 million hectares and about of 48 % is badly degraded with very poor regeneration status due to intense biotic interference. This trend, if it is not corrected, could seriously affect the future economic growth of state.

The depletion of forest resources is being manifested in the ever-increasing hardships of rural masses due to scarcity of firewood and fodder. It is also leading to the reduction in the life spans of our hydroelectric projects because of increasing silt loads from degraded catchments. Deterioration in the quality of forests due to continuous degradation is affecting the glow of various environment related services which is being now felt in the form of increasing pollution, climate change and decreasing discharge of water in rivers in the state.

The majority of masses living in the vicinity of forests fall in the category of below poverty line. Land holdings of the farmers are mostly small and/or marginal, and with single crop production in a year. The literacy rate in quite low and village level collage industries are almost non-existent. For the life-support, these people exploit the forest resources unabatedly.

The Forest Department has initiated many development programmes with the aim to restore the productive capacity of forests and to generate maximum employment opportunities to provide life-support to these masses. These programmes are now being carried out with the active participation of locals who are involved in the planning execution and distribution of usufructs. Forest Department plays the key role of a facilitator and technical know-how provider. This has enhanced the confidence of the people in the department and the sense of belongingness is now prominent.

As already mentioned that more than 10 lakh hectare of state forest area is degraded. The efforts are afoot to carry out rehabilitation of the degraded and denuded forest land on scientific lines by way of afforestation, enhancing the production of fodder and regulating the grazing on scientific lines, promoting natural regeneration and adopting soil and moisture conservation measures. However, the quantum and pace of

our rehabilitation activities vis-a-vis the dimension of problem is far less mainly because of budgetary constraints and inadequate absorption capacity of department. Less than 0.5 % of annual state plan budget becomes available to forestry sector as a whole which includes territorial forest department and seven sister wings.

Forest Maintenance and Development:-

Under this component, the following types of activities will be taken-up as briefly stated below:-

Maintenance of Natural Forests:-

As mentioned earlier, about ten lakh hectares of forest suffers from degradation mainly because of excessive biotic interference. The past experience reveals that most of the forest areas have potential to naturally regeneration. Therefore, if these forests are fence to reduce the biotic interference, process of natural regeneration starts. It would be aided by artificial sowing /planting and subsidiary silvicultural operations.

Some of the regenerated areas require forestry operations like thinning, pest and disease control, soil and moisture conservation measures to induce better growth of crop. The activities would be taken under this component in a phased manner.

Forestry is a long gestation operation. Artificial plantations raised, require continuous maintenance and upkeep at least for limited few years till these get established and full restocked. There remains a regular need of repair and renovation of fencing lines of plantation closures, watch and ward, beating up of mortalities of plants caused due to weather vagaries, attacks of pest and disease and forest fires. Similarly certain plantations, raised require additional stocking to improve the density which would be carried out under enrichment planting.

Under Forest Maintenance and Development, thrust would lay on improving the health of high forests which mostly comprised of coniferous species like Fir, Spruce, Deodar and Kail. The forests badly suffer due to poor regeneration status and scants young crop necessitating immediate treatment measures.

Protection Forestry:

The commercial plantations will be raised in the vicinity of population near to villages and city areas for economic purposes. In these plantation s, the fast growing

Poplar plantation in Kashmir

species like Robinia, Poplar, Salix, Eucalyptus, Plownia etc. will be raised. These plantations will be catering the needs to the local peoples like fuelwood, small timber as well as fulfilled the needs of the small scale and medium scale wood based industries on sustainable basis.

Protection and Development of Vulnerable Forests:

Plantation of the fast growing species will be raised on evicted forest areas and those areas which are prone to the encroachments. These areas will be taken up on priority basis and closed with mess crate fencing, brick walls, RCC structures / walls etc. so these areas could be saved from further encroachments.

Establishment of Modern Nurseries:

Hi-Tech Conifer nurseries in Kashmir.

To support the efforts for regeneration of forests it is proposed to have central nurseries developed on modern line to provide good planting material especially conifers such as Chir, Deodar, Kail, Fir etc. These modern nurseries have been proposed at Jammu and at Srinagar to provide planting material for respective provinces.

Fire Protection:

Similarly there exists no provision for transportation of manpower in case of emergency field requirements like forest fires. To improve the functional preparedness, vehicle of different types will be purchased out of the earmarked funds. The fire protection tools, equipments, gears / kits will be provided to the local field staff. Other fire protection works will be carried out also in the fields.

Research and Development:

The objectives of the research and development are to generate information required to develop strategies, technologies and methodologies for better forest

management. It also aims at attempting solutions to the practical problems of resource management, conservation of natural resource and eco-regeneration of degraded areas. Further, it also aims at strengthening of infrastructure to facilitate research and scientific man power development. For this purpose forest department will take help from State Forest Research Institute, Jammu and Kashmir and ICFRE, Dehra Dun.

Infrastructure Development:

As already mentioned Forests department manages large extent of area, with inhospitable terrain. The field staff works under trying conditions and have to stay inside the forest while discharging their day to day duties. Presently forest department has following functional field units at different level:

S. No.	Name of Unit	Total Nos.
1.	Divisional Offices	29
2.	Ranges	190
3.	Blocks	432
4.	Beats	1007
5.	Forest Cheek Posts	239
6.	Timber Sale Depots	663
7.	Control Rooms	28

Information and Technology:

The magnitude and extend of Forest and Wildlife management is large and complex and it involves multi stake holders. Forest department has multiple-mandate, a large establishment and huge workforce. The silvicultural management involves large number of work sites in geographically disadvantageous locations. The development and management came in conflict with our management practices and therefore department policies of various other line departments needs to maintain a good and continuous horizontal liaison in administration. Nature and diversity of works executed by the Forest Department also speaks out the magnitude and complexities involved in the functioning and thus monitoring and decision making becomes very critical. The existing age old infrastructure and communication facilities are not in sufficient and hampering in the decision making and ultimately quality and quantity of work output is adversely affected.

Department intends to execute its information and communication technology initiative in an integrated manner wherein all its functions shall be carried out through Web-based work flows which facilities each role player to get connected with other users and with headquarter as well.

In order to execute the proposed road map, following components will be taken up:

- ✓ Forest Resource Management Centre at Jammu and Srinagar.
- ✓ Procurement of Software.
- ✓ Enhancement of communication network and Digital Connectivity of Forest Department.
- ✓ Outsourcing of ICT Services.

Settlement and Demarcation of Forest Areas:

Settlement, demarcation and consolidation of forest areas are an important component in the scientific management of forest. There is immense pressure on forest lands due to increasing population and development activities. The forest areas have always been prone to encroachments and illegal occupations due to perforated boundary lines and poor maintenance of land records. State forests have a total boundary line of about 43134 Km comprising of 282437 boundary pillars. The ground position revels that boundary lines have become non-existent at many places and boundary pillars have either been damaged/removed or non-existing.

The land records have not been updated and old records are in dilapidated condition and in certain cases are not traceable. Similarly forests maps are very old and have not been updated. There are many such forest areas which are yet to be demarcated and delineated by proper boundary lines. The land records and maps maintained by forest department in many cases do not reconcile with the records of revenue department and therefore, forest department faces problems in establishing its ownership claims when ever disputes arise.

Though department has been taking up the work of settlement and demarcation on micro level with in the limited budgetary provisions, but keeping in view the seriousness and dimension of the problem, it becomes imperative to take up the of survey, settlement demarcation, boundary erection and updating of land records on holistic basic in a time bound manner, using latest technology. It would go a long way in proper protection and scientific management of forest resources.

Pastures and Fodder Development:

Excessive grazing is one of the main causes of degradation of forest ecosystem. Live stock population of the state is almost equal to human population. Out of which about 55 % are sheep and goats, majority belonging to nomadic graziers who practice pastoral life style frequently moving up and down the forests. Nomadic graziers stay in alpine/sub-alpine Forest areas called “Margs” or Dhoks” during summer months and migrate to plain of Shivalik forests during winters where they stay up to April before

again taking up their upward journey with the onset of summers. They follow their specific migratory routes during seasonal/annual migration.

The heavy grazing pressures on “Dhoks”, at “winter halting stations” and along their migratory routes, lead to the degradation of grazing land and pastures. These grazing land pastures get infested with weeds and growth of unpalatable grasses, face soil erosion problems and resultantly overall productivity.

Degradation due to heavy grazing pressure.

The annual fodder requirement of state is about 200 lakh tons, whereas availability from different sources viz alpine pastures, forest grazing lands, fallow agricultural lands, private lands etc is about 100 lakh tons per year thereby leaving a steep gap between supply and demand. The scarcity of fodder, induces over-grazing (grazing beyond the carrying capacity) of forest areas which produces adverse affects in the form of damage to young regeneration, poor/natural regeneration due to compaction of soil, soil erosion growth of weed infestation and ultimately further degradation of forest ecosystem.

The following activities shall be carried out under this component:

Promotion of Rotational Grazing:

Pasture and grazing areas shall be closed temporarily on rotation basis using fencing preferably of local brush wood material. It would be done in consultation with

Closures being created under afforestation programmes.

stakeholders. The closed areas shall be treated for weed eradication, soil-erosion related problems, soil fertility and for enrichment through seeding/planting of fodder species.

Development of High Pasturelands:

Against 20 lakh hectare forest area, about 15 lakh hectares is used as grazing/pasture lands, therefore, improvement of highland pastures and grazing lands is essential for enhanced fodder production which ultimately will protect our forests against further degradation.

Maintenance of older Fodder units:

Units raised over previous years need regular maintenance in terms of repair/renovation of fencing, enrichment planting of grasses/fodder plants, removal of weeds to maintain their productivity and flow of benefits to community. These units shall be identified and taken for maintenance in a phased manner.

Research and Development Activities and Survey:

The detailed survey will be carried out of the pastures including highland pastures and grazing forest areas for preparation of the future developmental plan/works of the grazing forest areas. After survey there will be formulation of the research work in the forest grazing areas to find out the pre and post harvesting technology, for example, soil fertility, micro and macro nutrients management, introduction of new high yielding species of various type of fodder yielding species fodder and grasses, fast growing palatable species of trees, shrubs, herbs and grasses, legumes etc. For this purposes forest department will take up help and technical knowhow from Fodder and Grass Research Institute, Jhansi.

Working Plans and Research:

Forest Management Plan/Revision of Working Plan:

The working plan is a document which prescribes the management practices to be adopted for managing the forests on scientific lines Working plan is prepared by a senior

officer of the rank of Deputy Conservator of Forests, designated as DFO Working Plan. Working plans are prepared territorial division wise and the period of operation of a particular working plan is for 10 years.

The preparation of working plan is a very important exercise which last few years. It involves the preparation of preliminary report, in which DFO working plan assesses the results of past management and examine the justification for revision of working plan. It is followed by an extensive field survey and huge data collection. The data collection includes: pilot survey, socio-economic survey, stock mapping, forest resource survey, meteorological data analysis, updating compartment histories. The objective is to study the health of forest crop effects of past management practices followed, and to link the impact of forestry prescriptions to people's requirements and policy priorities. The field work is followed by processing and analysis of collected data and proposing prescriptions for future management.

Human Resource Development:

Strengthening of Infrastructure in Existing Training Schools:

Following three Forest Training Schools are functioning in the state.

- Kashmir Forestry Training School, Chittarnar, Bandipora, Kashmir.
- Soil Conservation Training School Miran Sahib Jammu.
- Forest Guard Training School, Doomi, Jammu.
- Newly Proposed Forest Training Centre, Kishtwar.
- Setting up of Forest Officers Training Centre Kashmir, Srinagar.
- Setting up of Forest Officers Training Centre Jammu.

The Training School have been imparting training to recruited Foresters, Forest Guard and Class-IV officials of territorial as well as other sister wings of forest Department. In service short duration orientation courses different categories of field staff are also conducted in these schools/Centres. There are proposed of setting up of Forest Officer Training Centres Jammu and Srinagar and a newly proposed at Kishtwar.

These centres will be conducted various short term training and refresher courses within the state and outside of the state.

The infrastructure in these schools/centres needs up-gradation to cater to the emerging needs of the department especially in view of the expanded mandate of forest department buildings, housing the class-rooms, hostels, mess, office-chamber of teaching staff, sports facilities for trainees, improved teaching and training equipments need up-gradation. The field equipments and gears and uniform will be provided to the forest field staff.

Development of Minor Forest Produce:

It has been felt that timber production has received much attention and development of other Minor Forest produce virtually been neglected so far. Depletion of Minor Forest Produce continued at an alarming rate and the conservation efforts are not apace with it, resulting loss of important species. The forest resources in J&K have a tremendous potential of Minor Forest Produce for becoming an independent industry provided adequate funding is made available. The cultivation of medicinal plants and its conservation is another area that needs focussed attention. In order to give necessary impetus to the development of Minor Forest Produce including medicinal plants a full-fledged industry can be encouraged with ensured market.

Eco Task Force:

The Eco Task Force Project (E.T.F) is a joint venture of J&K Forest Department and Territorial Army. Initially, it was launched in the year 1988 to rehabilitate the Ruie Catchments in Samba Town of Jammu province. The Territorial Army provides the man power by utilizing the services of ex-Army personnel and the funds for the purpose are provided by Ministry of Environment & Forests. The Forest Department provides the expert guidance's and the planting materials. The project awarded Indira Priyadarshani Vriksha Mitra Award by Government of India in the year 1994 for afforestation programme launched by it. The project was approved for implementation up to 10th plan period viz; 03/2007. However on the insistence of the Army and the locals the extension of the project has been approved till end of 11th Five Year Plan.

Urban Forestry:

The rapid urbanization has witnessed exploitation of natural resources especially the trees and green belts have met on slaught of various developmental activities, consequently causing environmental Hazards in the cities and towns. Need is being felt to

Plantation by Social Forestry on National Highway Near Kathua.

green the urban areas by mass plantation of vacant lands, along Road sides, Highways, residential and commercial establishments and Parks. The plantation of ornamental plants on the private lands, and around residential areas is utmost important. The funds under urban Forestry schemes are therefore, being provided for achieving the desired results especially in two cites of Jammu & Srinagar. For the current financial year 2015-16 an amount of Rs. 40.00 lakh has been provided and the same amount has been projected for the next financial year 206-17.

Stabilization of Slip Areas on National Highway (1A):

Srinagar Jammu National Highway 1-A passes through an unstable mountain range and river Chenab flows alongside the Highway This peculiar situation of the Highway makes it prone to landslides and natural disintegration. The problem of landslides has become acute in the recent past due to degradation of forest cover.

It is a fact that the work undertaken by the Forest Department in stabilization of slips on the National Highway yielded outstanding dividends and some of the major slips have been stabilized. However there are certain SORE points on National Highway which still need to be treated, so that these may not develop into major slips, if left unattended to.

CM's Participatory Afforestation / Afforestation of Denuded Forests:

The scheme Chief Minister's Participatory Afforestation Programme "has been launched from the year 2004-05 on pilot basis with the objectives to make tree plantation on blank / scrubs, open forests, vacant lands etc and full benefits giving to the local people involved the programme. The Forest Department provide the infrastructural support viz. planting materials, fencing materials and expert guidance to the beneficiaries. The scheme is being implemented in all 42 forest divisions including 12 divisions of Social Forestry Department. In the meeting Chaired by Hon'ble Chief Minister on 22.09.2015 it was decided that Forest Department will launch pilot project related to afforestation of denuded forests in the general Holy Amarnath Cave areas including the area around Frislan village on the Phalgam side.

Centrally Sponsored Schemes:

Intensification of Forest Management Scheme:

The Integrated Forest Protection Scheme was launched for implementation during 10th FYP on funding pattern of 90: 10 between the Centre and the State respectively as per revised guidelines.

The three main components of Intensification of Forest Management Scheme are as under:-

- Forest fire control and management.
- Strengthening of Infrastructure.

- Survey demarcation and working plan preparation.

The objectives of the scheme are to:

- Maintain environmental stability through preservation and where ever necessary, restoration of ecological balance
- To preserve the natural heritage of the country by protecting and conserving the remaining natural forests
- To improve productivity of forests to meet essential needs,
- To ensure management of forests by preparing and implementing good quality Working Plans
- To protect forests against forest fires by adopting improved and modern management practices.

During the 12th five year plan, the Integrated Forest Protection Scheme (IFPS) has been revised and re-named as Intensification of Forest Management (IFM). Four new components have been added to make it broader based:-Protection & Management of Sacred Groves.

- Conservation of Restoration of unique vegetation and eco-system.
- Control and eradication of Forest invasive species.
- Preparedness for meeting challenges of Bamboo flowering and improving management of Bamboo Forests.

The funding pattern of the scheme is 90% Central Share and 10% State Share. The scheme of Intensification of Forest Management intends to address both the general problems of forest protection and the area specific requirements for management intervention. The scheme aims at modernizing the forest sector and improving the working conditions at the cutting edge level

National Afforestation Programme Scheme:

National Afforestation Programme is a 100% Centrally Sponsored Scheme. The main objectives of the scheme as envisaged in the Revised Operational Guidelines 2009 are:-

- Sustainable Development and Management of Forest Resources.
- Increase and/or improve Forest and Tree cover.
- Rehabilitation of degraded forests and other areas by institutionalizing decentralized / participatory forest management and supplementing livelihoods improvement processes.
- Development of Eco-Tourism Facilities:

To generate environmental awareness in the tourists during their visit at the various tourist spots which are being visited. It also envisages improving living conditions cum living standards of local communities which will ultimately encourage their meaningful participation in the Eco-Tourism activities as providers and managers of services.

CHAPTER- VII
SOCIAL FORESTRY IN J&K

Urban plantation & farm forestry by Social Forestry Department.

CHAPTER- VII
SOCIAL FORESTRY IN J&K

Social Forestry Project was started in Jammu & Kashmir as a World Bank aided Project in 1981-82, initially for a period of five years. The Project was extended up-to 1990-91. Since then the Project works have continued as an activity under the State funding, to provide fuel-wood in the shortest possible time and to provide poles, small timber, fodder fruits and other minor forest products for basic requirements of the rural poor.

In the year 2001, vide Government Order No : 640-GAD of 2001 dated : 14-06-2001, the organization created under the World Bank assistance, was decided to be closed down and remained in the process of winding up till 10/2004 with a very low capital component. The Project Director/CCF was the head of the Organization till then.

Objectives of the Department

The objectives of the Department are briefly summarised as follows

1. Extending tree cover outside forests on available waste lands/avenue plantations on railway tracks/ road sides/canal banks & in institutions etc. to reduce pressure on natural forests for supply of forest produce.

2. Rehabilitation of degraded forests so as to optimize their productivity and restore their potential to provide ecosystem goods and services on sustainable basis.

3. To encourage farmer community to plant trees on farm bunds/agro forestry.

4. To mobilize community participation through Joint Forest Management in creating, maintaining, protecting and managing the Social Forestry plantations.

5. To help in poverty alleviation by providing livelihood/employment to the rural poor particularly the land less and other weaker sections of society.

6. To conserve and improve ecology and environment in the region.

7. To increase the productivity of wastelands.

Categories of Plantation

The Government vide order No: 481-FST of 2004 dated: 28-10-2004 converted the Social Forestry Project into a full-fledged Department, headed by a Director of the rank of

Addl. Pr. Chief Conservator of Forests, realizing fully well the need for reviving the Department enabling it to take up plantations into the degraded forest lands and wastelands on a massive scale in the following categories of plantations.

- **Raising of Village Wood Lots**
- **Rehabilitation of Degraded Forests.**
- **Raising of Strip Plantation.**
- **Farm Forestry.**
- **Institutional Plantations.**

The main function of Department of Social Forestry is to create nurseries to produce planting stocks, raise plantations, distribution of plant material to the people (rural/urban), farmers, Govt. agencies for planting in their premises/ fields with an ultimate goal of Greening the State, improving the environment, generating the employment and conserving the natural forests.

Activities of the Department

The Department of Social Forestry is entrusted with the assignment of giving thrust to Agro Forestry in the State besides the development of Medicinal Plants on commercial line, under the Joint Forest Management Programme as per the Guidelines of SRO-61 of 1992 and SRO-17 of 1999. The Department is to maintain all the assets created under the Social Forestry Project and to create nurseries to produce planting stocks, raise plantations, distribution of plant material to the locals, farmers, Govt. agencies for planting in their fields/premises with an ultimate goal of greening the state, improving the environment, generating the employment and conserving the natural forests.

Hi-Tech Conifer Nursery

Schemes of the Department

Establishment of Nurseries

The Department has established nurseries in all the Tehsil/ Districts of the State excepting Kargil & Leh. In Nurseries improved and better quality planting material is raised in abundance to meet the requirement. From these nurseries apart from meeting the requirement of various plantation schemes undertaken by the Department, the plants are also supplied to the farmers, Govt. agencies on nominal rates.

Technical know how is also imparted to the desirous farmers/public about raising, planting and maintenance.

Rehabilitation of Degraded Forests

Closure being created under afforestation programmes.

Degraded forest areas are closed with fencing and natural regeneration is supplemented by artificial planting. Some times nurse crops are first to provide shade, before the main crop is planted. Thrust remains on natural and indigenous species.

Village Wood Lots

Village Woodlots are planted over unproductive State/ revenue/ the village common lands. Village Woodlots are raised to make villages self sufficient to fuel-wood, fodder and small timber besides earning money for their involvement in forestry in respect of works. Mainly fodder yielding species, plants of medicinal value and grasses are planted in Village Wood Lots. Soil & Water conservation works wherever necessary are also executed in the Village Wood Lots.

Strip Plantations

Strip plantations are raised along side roads, railway line and canals to provide aesthetic beauty, shade to travellers, pollution control etc.

Strip Plantation by S.F. on National Highway Near.

Silvi-Pasture Development

Forest lands/revenue lands/other Government lands in the fodder scarce regions are brought under this scheme. Fodder trees and high yielding grasses like Legumes of Napier, Red clover etc. are given priority under this scheme to improve the grazing capacity of the pasture lands.

Institutional Plantation


Plantation being done in Schools in collaboration with Social Forestry Department.

Tree planting is done on marginal/ Institutional lands of Government offices, Institutional premises, Schools, Colleges etc. to add to the beauty of the institutions.
This way the Department of Social Forestry is creating the desired level of awareness among the people about the significance and importance of planting trees.

Department of Social Forestry helps to induce community for creating, maintaining and protecting the plantations in the contemplated Joint Management Programme. The community participation under JFM had been the central theme for the Social Forestry.

Services (direct/indirect) provided by Department

1. Department provides plants to people at subsidized rates.
2. Providing specialized technical know-how in the field of the agro forestry and tree planting.
3. Providing employment to locals by engaging them in plantation initiatives taken up under various Schemes/Components, feeding & meeting the requirement of fruit industry, plywood/Board industry and sports industry.
4. Providing of fire wood, small timber, fodder, grasses and other NTF Produce to locals. As per provisions of SRO – 61 of 1992 / SRO – 17 of 1999 (modified), the interim and final harvest is being shared with the locals through Village Forest Committees in cash or kind.
5. Upliftment of socio-economic conditions of farmers.

6. Environmental improvement.
7. Adding to the aesthetic scenario.
8. Soil and water conservation.
9. Reducing the thrust on natural forests for wood/timber/grazing etc.
10. Awareness about importance of trees/plantations.

ACHIEVEMENTS OF SOCIAL FORESTRY DEPARTMENT, J&K

Since inception of the Project in 1982, **12.94 Crore** plants have been planted covering an area of about 1.66 Lac hectares up-to date. The plantations have been undertaken both within and outside the natural forests in available waste lands, village common lands, wetlands, roadsides, canal sides, railway line sides and institutional lands etc. Besides this **15.96 crore** plants have been distributed to the farmers for planting in their own proprietary lands since the inception of the Project. The important data pertains to this Department for the last 10 years is presented below:-

S. No.	Period	Area Covered (in Ha.)	Plants Planted (in lacs)	Plants Distribution (in lacs)	Expenditure (Rs. in Lacs)		
					Revenue	Capital	Total
1	05-06	2403.20	30.096	5.011	2274.984	397.415	2672.399
2	06-07	1580.50	20.402	5.667	2464.177	416.188	2880.365
3	07-08	1428.25	21.031	4.729	3037.364	365.857	3403.480
4	08-09	1715.47	22.662	6.042	3452.613	477.544	3930.157
5	09-10	1714.96	22.511	4.880	4069.079	539.664	4608.743
6	10-11	1708.28	22.864	5.134	4510.879	545.380	5056.259
7	11-12	1611.92	24.542	7.798	5525.066	549.855	6074.921
8	12-13	1790.64	23.616	5.591	5999.350	689.821	6689.171
9	13-14	1171.75	19.005	8.311	6400.880	577.402	6978.282
10	14-15	1015.03	14.114	4.935	6516.810	483.737	7000.547
11	15-16	991.40	9.855	6.123	7939.786	522.70	7462.486
	Total	**17131.4**	**230.698**	**64.221**	**52190.988**	**5565.563**	**56756.81**

Social Forestry Department helps to induce community and individual participation in creating, maintaining and protecting the plantation programme to be launched for such purpose, so as to share benefits in the contemplated Joint Management Programme. It also helps to provide employment to unemployed and under employed people, particularly the landless agricultural labourers and other traditionally weaker sections of rural community.

The Department has already defined its terms of meeting the timber requirement of nearly 7.00 Lacs fruit boxes annually in Kashmir region from the farm forestry raised since 1982. Eucalyptus plantations in Jammu region have played a similar role where the

entire requirement of Veneer and Ply board industry is being met from the plantations raised in farm forestry sector.

The lucid impact of the activities of the Social Forestry Department is the creation of 8.65 crore plants outside the Forests which bears a volume of 3.02 crore cubic meter with an annual cut of 8-9% on a rotation of 12 years generates about Rs 1200 crores annually in the private sector.

The Social Forestry Department has created the desired level of awareness among the people about the significance of planting trees. At the national level the Social Forestry, J&K Govt. was awarded the highest "INDIRA PRIYADARSHANI VRIKSHA MITRA AWARD" twice during 1993 and 1998.

Management of Plantations:

In order to make the Social Forestry Department self-sustaining it has been envisaged to transform it from a hundred percent spending department to a revenue yielding department as well. The revenue thus generated shall be increasingly sustaining and boost the rural economy by way of benefit sharing under SRO-61 dated: 19-03-1992, modified vide SRO-17 dated: 12-03-1999. It shall also contribute substantially to the Govt. exchequer. The year-wise details of revenue generated till date is as under:

Year	Revenue Generated (Lacs)	Year	Revenue Generated (Lacs)
2000-01	09.480	2009-10	19.403
2001-02	09.240	2010-11	24.164
2002-03	05.610	2011-12	80.381
2003-04	32.517	2012-13	341.515
2004-05	38.989	2013-14	289.887
2005-06	10.280	2014-15	115.714
2006-07	22.130		
2007-08	97.272		
2008-09	28.100	2015-16	116.107

During 2015-16, against an Annual Plan allocation under State Sector of Rs. 326.450 Lacs for covering an area of 427.19 hectares of land and planting of 5.495 Lac trees, the targets stand achieved in full with 6.123 lac plants distributed under Farm Forestry.

CHAPTER-VIII
SEABUCKTHORN CULTIVATION IN J&K

Different speices of Seabukthoran in Ladakh

CHAPTER-VIII
SEABUCKTHORN CULTIVATION IN J&K

All the species of the genus *Hippophae* are called seabuckthorn. Seabuckthorn belongs to the family Elaegnaceae. Genera in Elaegnaceae include *Elaegnue,*

Hippophae Lepargyrea and *Shepherdia.* According to the latest systematic classification of the genus Hippophae L., the genus comprises of seven species, and the species *H. rhamnoides* circumscribes eight subspecies viz. *sinensis* Rousi, *yunnanensis* Rousi, *turkestanica* Rousi, *mongolica* Rousi, *caucasia* Rousi, *carpatica* Rousi, *rhamnodies* Rousi and *fiuviatilis* van Soest. All species are diploid (2n = 24), wind pollinated, dioecious and are restricted to the Oinghai Plateau and adjacent areas, with the exception of the species *H. rhamnoides* that occurs widely but sporadically in Asia and Europe. The seabuckthorn plant (*Hippophae rhamnoides* L., family: Elaegnaceae) is dioecious and wind pollinated. The female plant bears red, orange or yellow berries on two-year-old thorny twigs.

Seabuckthorn berries are among the most nutritious of all fruits and have immense medicinal properties. Concentration of vitamins B_2, B_3, B_5, B_6, B_{12}, C and E is much higher than other conventional fruits.

Seabuckthorn is mentioned in the writings of ancient Greek scholars such as Theophrastus and Dioscorides. Seabuckthorn fruit has been used in traditional Tibetan system of medicine for centuries. The medicinal value of seabuckthorn was recorded as early as the 8^{th} century in the Tibetan medicinal classic *Gyud Bai* (Four Text of Fundamental Tibetan Medicine). The plant is known as a remedy for horses. Leaves and

branches were added to fodder to induce rapid weight gain and shiny coat, and in fact, the generic name *Hippophae* is classical Latin for shinning horse. Inspired by the ancient literatures, scientists in the former Soviet Union carried out research on seabuckthorn since 1930. In 1940s especially after the Second World War, nutritionists and pharmacologists analyzed the vitamin components and found that seabuckthorn could be used not only as a food but also as a medicine. Several countries including the Russia, Mongolia, Poland, Germany, Finland, Italy, Norway, Hungary, Canada and USA have been studying this amazing plant. The shrub serves as a storehouse for researchers in the field of biotechnology neutraceutical, pharmaceutical, cosmetic and environmental sciences.

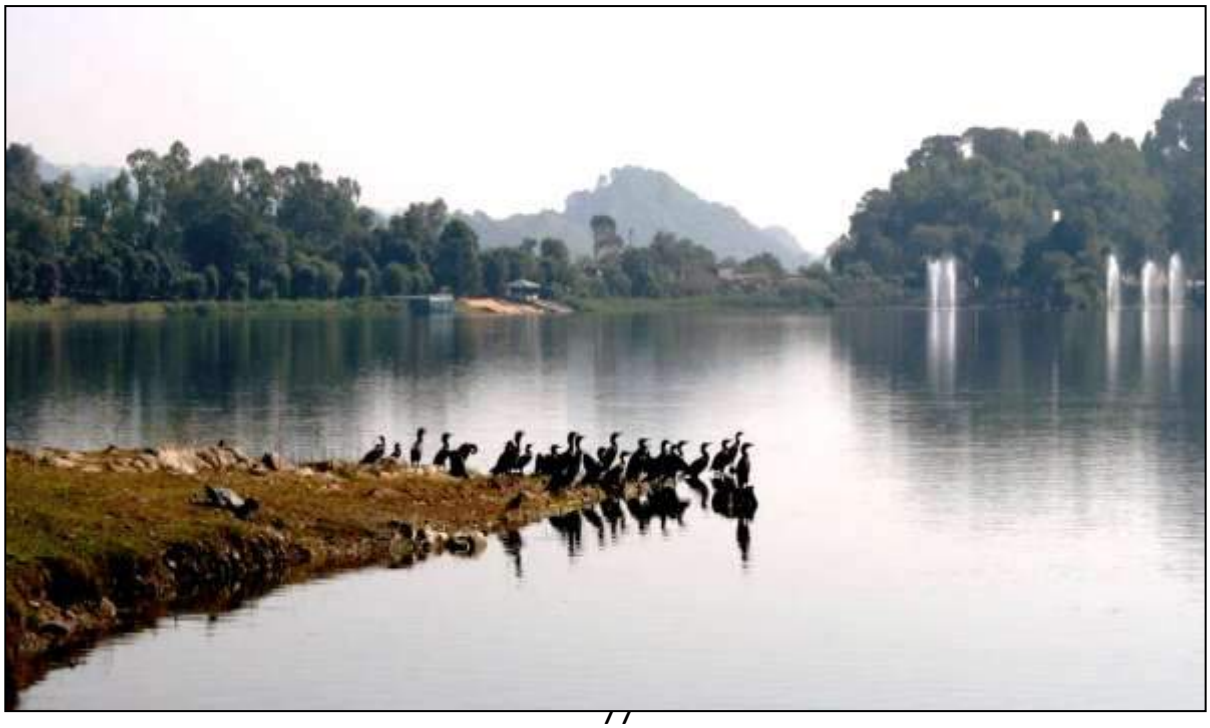
Seabuckthorn has the unique characteristics to grown in marginally fertile soil of cold desert. The shrub can withstand extreme temperature from -43°C to +40°C and is considered drought resistant. These two characteristics make the shrub an ideal plant species to establish in cold deserts. In the cold desert of Ladakh, the seabuckthorn is

naturally found in the river bed and adjacent areas where water is available naturally. The livelihood of local people of this area is directly linked with it. The SHGs are formed in the locality for this purpose. They collect the berries for processing and market it in various forms such as soft drinks.

An area of 1750 ha is identified for planting the seabuckthorn in next five years under the Green India Mission with the financial implication of Rs. 17.50 crores.

CHAPTER-IX
WETLANDS OF JAMMU & KASHMIR STATE

Tso moriri Lake (wetland) in Ladakh.



Mansar Lake (wetland) in Jammu.

CHAPTER-IX
WETLANDS OF JAMMU & KASHMIR STATE

Wetland ecosystems hold huge biodiversity, offer socioeconomic advantages, play important hydrological role, maintain environmental balance and provide the ecosystem services. There are more than one thousand smaller and larger water bodies as assessed with the help of satellite imagery in Jammu, Kashmir and Ladakh. But none of these water bodies, barring a few lakes in the valley, two in Jammu and one in Ladakh, ever catches anybody's attention. The state of Jammu and Kashmir, having a diverse geographic and climatic makeup, is replete with lakes, wetlands, bogs, swamps etc. of considerably varying physicochemical and biological characteristics. But very little is known about them. Even the very famous lakes are dying and deteriorating despite separate agencies being attributed to their management and conservation.

Wetlands covering about six per cent of the earth surface are among the world's most productive environments. By providing sufficient water and the primary productivity, they sustain and harbour a vast range of biological diversity. Local and regional importance of wetlands is even more pronounced and pivotal from both ecological and socioeconomic viewpoints. More than three billion people, around half the world's population, obtain their basic water needs from inland freshwater wetlands. The same number of people relies on rice as their staple food, a crop grown largely in natural and artificial wetlands. In some parts of the world, almost the entire local population relies on wetland cultivation for their livelihoods. In addition to food, wetlands supply fibre, fuel and medicinal plants.

International importance of wetlands gets recognized and amply reflected in the Ramasar Convention. The intergovernmental agreement adopted on 02.02.1971 for the conservation and wise use of wetlands underscores the need for a major shift in our attitudes towards wetlands. The Convention stresses, in its 2013 report, on the urgency of recognizing their value in delivering water, raw materials and food. They are essential both for life and the sustainability of world's economies. India having a huge network of wetlands across its length and breadth is one of the signatories to the Ramsar Convention. There are more than twenty six Indian water bodies identified as Ramsar sites which are deemed to be of international importance and thus, demand special conservation focus under the Convention.

Wetlands of the State

The state of Jammu and Kashmir houses considerably good number of small and large water bodies whereof four also figure among Ramsar-sites list. Among a total of

Dal Lake in Srinagar.

1230 lakes/wetlands listed in a recent ENVIS document prepared by the State, 415 lies in Kashmir, 150 in Jammu and 665 in Ladakh. Dal, Wular, Mansar, Surinsar, and Pangong are the only few which attract the attention of one and all. Unfortunately most of these water bodies face severe threats of varying nature and extent.

Ecological role of wetlands

Water bodies play central role in local hydrological budget, climatic regulation and in controlling the water linked natural disasters like floods and droughts by absorbing heavy surpluses of water at times and releasing them when highly needed. In addition to the ecosystem services provided by them, local agricultural sector is usually found to be linked with adjoining wetlands in more than one ways. Fishing, tourism, boating, swimming, bird watching, hunting and other similar activities revolving around water bodies provide economic outputs and commercial bases. Besides being home to native fish and other life forms these wetlands serve recreational, training and educational purposes.

Causes of wetland degradation

Loss of vegetation, illegal encroachments, excessive inundation, land degradation, soil and water pollution, invasive species, excessive development and road building, have all damaged the country's wetlands. Anthropogenic pressures are on rise everywhere. In the state, many water bodies, having significant tourism weightage and international fame, have shrunk in size considerably in the recent past. Tourism and settlements in and around these waters have damaged them irreparably.

Pollution in Dal Lake, Srinagar.

Pollutions of various types and degrees have degraded the water quality and scenic splendor of these lakes besides staking the life of innumerable floral and faunal beings.

Migratory Birds in Gharana Wetland, Jammu.

Migratory Birds in Hokersar Wetland, Kashmir.

At Gharana and Hokarsar wetlands the number of our winged visitors is being reported to have declined due to deteriorating ecosystems. Others have been converted into garbage disposal sites. Many high altitude lakes in the Pir Panjal Himalayan belt are seem to disappear even before their proper inventorying. Disturbances in wetland ecosystems will end up not only in water and soil related crises, crop failure or disrupted local socio-economies but in wider ecological disasters. All these unnatural changes as

accelerated by human interference in the ecological domain are consequently bound to affect one and all.

Our wetlands demand protection from encroachments, invasions, pollution, modifications and excessive human interference. A proper mechanism needs to be in place in the state to for detailed investigations and management of the wetlands spread in various regions. Tourism needs to be fully replaced by the ecotourism. We need to map and adopt a fruitful strategy for conservation of already threatened wetlands.

Wetland Reserves of J&K State:

S.No	Name of the Wetland Reserve	District	Area in sq.kms.
1)	Hokera (Ramsar Site)	Srinagar	13.75
2)	Mirgund	Baramulla	4.00
3)	Shallabugh	Ganderbal	16.00
4)	Hygam	Baramulla	7.25
5)	Malgam	Bandipora	4.50
6)	Pampur	Pulwama	0.50
7)	Gharana	Jammu	0.75
8)	Pargwal	Jammu	49.25
9)	Kukarain	Jammu	24.23
10)	Nanga	Jammu	15.25
11)	Snagral - Asa Chak	Jammu	7.00
12)	Tsomoriri (Ramsar Site)	Leh	Part of Chnagthnag WLS
13)	Norrichain (Tsokar Wetland)	Leh	Part of Chnagthnag WLS
14)	Hanley / Chushul Marshes	Leh	Part of Chnagthnag WLS

Brief description of Wetlands of International Importance of J&K under Ramsar Convention

1) Surinsar-Mansar Lakes

Surinsar Lake, Jammu.

Mansar Lake, Jammu

Date of Declaration: 08/11/05; Area:350 ha; Location: 32°45'N 075°12'E. Wildlife Sanctuary, Hindu sacred site. Freshwater composite lake in semi-arid Panjab Plains, adjoining the Jhelum Basin with catchment of sandy conglomeratic soil, boulders and pebbles. Surinsar is rain-fed without permanent discharge, and Mansar is primarily fed by surface run-off and partially by mineralised water through paddy fields, with inflow increasing in rainy season. The lake supports CITES and IUCN Redlisted *Lissemys punctata, Aspideretes gangeticus,* and *Mansariella lacustris.* This composite lake is high in micro nutrients for which it is an attractive habitat, breeding and nursery ground for migratory waterfowls like *Fulica atra, Gallinula chloropus, Podiceps nigricollis, Aythya fuligula,* and various *Anas* species. The site is socially and culturally very important with many temples around owing to its mythical origin from the Mahabharata period. Although the lakes support variety of fishes, fishing is discouraged for religious values. The main threats are increasing visitors, agricultural runoff, bathing and cremation rituals. Conservation is focused on awareness-raising. Ramsar site no. 1573.

2) Hokersar

Hokersar lake, Kashmir.

Date of Declaration: 08/11/05; Area: 1,375 ha; Location: 34°05'N 074°42'E. Located at the northwest Himalayan biogeopgraphic province of Kashmir, back of the snow-draped Pir Panchal (1,584 m msl.), Hokera wetland is only 10 km from scenic paradise of Srinagar. A natural perennial wetland contiguous to the Jhelum basin, it is the only site with remaining reedbeds of Kashmir and pathway of 68 waterfowl species like Large Egret, Great Crested Grebe, Little Cormorant, Common Shelduck, Tufted Duck and endangered White-eyed Pochard, coming from Siberia, China, Central Asia, and Northern Europe. It is an important source of food, spawning ground and nursery for fishes, besides offering feeding and breeding ground to a variety of water birds. Typical marshy vegetation complexes inhabit like Typha, Phragmites, Eleocharis, Trapa, and Nymphoides species ranging from shallow water to open water aquatic flora. Sustainable exploitation of fish, fodder and fuel is significant, despite water withdrawals since 1999. Potential threats include recent housing facilities, littered garbage, and demand for increasing tourist facilities. Ramsar site no. 1570.

3) Wular Lake

Date of Declaration: 23/03/90; Area: 18,900 ha; Location: 34°16'N 074°33'E. The largest freshwater lake in India with extensive marshes of emergent and floating vegetation, particularly water chestnut, that provide an important source of revenue for the State Government and fodder for domestic livestock. The lake supports an important fishing industry and is a valuable source of water for irrigation and domestic use. The area is important for wintering, staging and breeding birds. Human activities include rice cultivation and tree farming. Ramsar site no. 461.

Wular Lake , Kashmir

4) Tsomoriri

Date of Declaration: 19/08/02. Area: 12,000 ha. Location: 32°54'N 078°18'E. Wetland Reserve. A freshwater to brackish lake lying at 4,595m above sea level, with wet meadows and borax-laden wetlands along the shores. The site is said to represent the only breeding ground outside of China for one of the most endangered cranes, the Black-necked crane (*Grus nigricollis*), and the only breeding ground for Bar-headed geese in India. The Great Tibetan Sheep or Argali (*Ovis ammon hodgsoni*) and Tibetan Wild Ass (*Equus kiang*) are endemic to the Tibetan plateau, of which the Changthang is the westernmost part. The barley fields at Korzok have been described as the highest

Tsomoriri – Pangong Lake, Ladakh.

cultivated land in the world. With no outflow, evaporation in the arid steppe conditions causes varying levels of salinity. Ancient trade routes and now major trekking routes pass the site. The 400-year-old Korzok monastery attracts many tourists, and the wetland is considered sacred by local Buddhist communities and the water is not used by them. The local community dedicated Tsomoriri as a WWF Sacred Gift for the Living Planet in recognition of WWF-India's project work there. The rapidly growing attraction of the recently opened area to western tourists (currently 2500 per summer) as an "unspoilt destination" with pristine high desert landscapes and lively cultural traditions brings great promise but also potential threats to the ecosystem. Ramsar site no. 1213.

Kishansar Lake, Kashmir

CHAPTER-X

PLANTATION MODULES TO BE ADOPTED IN GIM

Fencing, Nurseries & Plantation modules for GREEN INDIA MISSION (GIM)

CHAPTER-X
PLANTATION MODULES TO BE ADOPTED IN GIM

Plantation Modules to be adopted in GIM

Green India Mission aims at the holistic development of the entire watershed area, sustaining the ecological services provided by the conventional forest areas and restores the degraded forest areas to its original glory. Different kinds of degraded forest areas will be treated accordingly to restore its status with appropriate technical inputs.

The natural forests of the State are having soil with adequate fertility level and favourable edaphic factors, but due to severe pressure including human factors on these forests, ultimately resulted in their degradation. Hence, the factors degrading these forests must be addressed so that the forests will be regenerated. The various plantation modules with provision for planting and protection are designed based on the prevailing degrading factors.

Plantation Module for Moderately dense forest cover, but showing degradation

The forests areas which are having moderate dense forest cover, but showing the early signs of degradation will be covered under this category. In most of the cases the forest land is flat and having deep soil. The forests are already well stocked; but due the slight human activity the forests started showing degradation. The movement of the human being and their livestocks inside these forests must be restricted by strong fencing. Hence, the module advocates only fencing of the area.

Item of work	Rate	year	Phy	Fin
Fencing with PCC Square at 10'	50.00	1	300	15000
Grand Total				**15000**

Under this category, the degraded land in the watershed will be treated in a year.

Plantation Module for Eco-restoration of degraded open forests - Type A

The forests areas falling in this category also adequately dense; but started showing few signs of degradation. The forest land may be flat to gentle slope and in many cases compacted. Overwood may be adequate; in some places water is also a limiting factor. Human pressure existing now on these forests will be tackled under this

category by fencing and loosening of the forest soil by tillage of the soil for dibbling and patch sowing. Natural seeds fall on these patches will also germinate and likely to establish in the treated forest areas. Hence, accordingly the module is proposed as under:-

Item of work	Rate	year	Phy	Fin
Fencing with PCC Square at 10' distance	50.00	1	300	15000
Dibbling	3.53	1	150	530
Patch sowing	3.35	1	140	470
Grand Total				**16000**

Under this category, the degraded land in the watershed will be treated in a year.

Plantation Module for Eco-restoration of degraded open forests - Type B

The forests areas falling in this category found to be open; also it started showing

many signs of degradation. The forest land may be gentle slopy and in many places it is open. Overwood may be open in many patches; due to its slopy nature, water availability is a limiting factor. Habitations in and around these forests exert considerable pressure on these forests and it will be tackled by fencing and planting of conifer and other native saplings in these degraded forests. Also it is facilitated by dibbling and patch sowing. Also, the natural seeds fall on these patches will also germinate under the protected environment would likely to establish in the treated forest areas. Hence, accordingly the module is proposed as under:-

Item of work	**Rate**	**Year**	**Phy**	**Fin**
Nursery Plant Production (Including BUC) PB	6.42	1	300	1926
Maintenance of PB Plants	1.50	1	300	450
Fencing with PCC Square at 10' distance	50.00	1	300	15000
S & MC works	499.40	1	8	3995
Dibbling	3.53	1	150	530
Patch sowing	3.35	1	150	502
Maintenance of Closure			600	600
Sub total				**23003**
Maintenance of Closure			600	600
PB Plants maintenance	1.50	2	300	450
Sub total				**1050**
Maintenance of Closure			600	600
PB Plants maintenance	1.50	3	300	450

Planting PB (Including BUC)	13.17	3	300	3951
Sub total				**5001**
Maintenance of Closure			600	600
Fence repair	7.72	4	30	232
Miscellaneous		4		114
Sub total				**946**
Grand Total				**30000**

These areas will be treated in a span of four years.

Plantation Module for Eco-restoration of degraded open forests - Type C

The forests areas falling in this category found to be open and degraded completely. The forest land may be steep slopy and in many places it is open and barren.

Over wood is not adequate and many places are bushy; due to its steep slopy nature, water availability is not available. Most of the time, these stretches are dry devoid of even blade of grass. Due to heavy erosion, many places are rocky without top soil. Habitations in and around these forests had been exerting tremendous pressure on these forests. The area must be closed for all human activity by fencing and planting of conifer and other native saplings in these degraded fore

Quality plants produced in the nurseries

The planting will be supplemented by dibbling and patch sowing. Also, for conservation of natural water, water harvesting structures will also be constructed to improve the over-all water regime of the area. Also, the natural seeds fall on these

patches will also germinate under the protected environment would likely to establish in the treated forest areas. Hence, accordingly the module is proposed as under:-

Item of work	Rate	Year	Phy	Fin
Nursery Plant Production (Including BUC) PB	6.42	1	1350	8667
Maintenance of PB Plants	1.50	1	1350	2025
Fencing with PCC Square at 10' distance	50.00	1	300	15000
Maintenance of Closure			600	600
Sub total				**26292**
Maintenance of Closure			600	600
PB Plants maintenance	1.50	2	1350	2025
Sub total				**2625**
Maintenance of Closure			600	600
PB Plants maintenance	1.50	3	1350	2025
Planting PB (Including BUC)	13.17	3	1350	17779
Sub total				**20404**
Maintenance of Closure		4	600	600
Miscellaneous		4		79
Sub total				**679**
Grand Total				**50000**

These areas will be treated in four years.

Plantation Module for Restoration of Grasslands

The native grasslands of the State degraded due to excessive exploitation of the grasslands. The grasslands must be brought to its original glory by proper protection and

augmentation planting of palatable species. Major reason of degradation is unregulated grazing and selective browsing of palatable species. Hence, the unpalatable grasses slowly dominated and presently the grasslands unable to feed as many number of animals as it was feeding. During treatment of the degraded grasslands, patching sowing of annual fodder species and planting of tree species so that the short term and long

term needs will be addressed. Accordingly the treatment is designed and presented below.

Item of work	Rate	Year	Phy	Fin
Nursery Plant Production (Including BUC) NR	2.26	1	200	452
Maintenance of NR Plants in nursery	1.50	1	200	300
Fencing with PCC Square at 10' distance	50.00	1	300	15000
S & MC works	499.40	1	3.50	1748
Patch sowing	3.35	1	1000	3350
Sub total				**20850**
Maintenance of Closure			600	600
Planting NR (Including BUC)	10.56	2	200	2112
Patch sowing	3.35	2	1000	3350
Sub total				**6062**
Maintenance of Closure		3	600	600
Patch sowing	3.35	3	1000	3350
Sub total				**3950**
Maintenance of Closure		4	600	600
Miscellaneous		4		188
Patch sowing	3.35	4	1000	3350
Sub total				**4138**
Grand Total				**35000**

The degraded grasslands will be treated in four years.

Plantation Module for Restoring Scrub lands

The scrub lands are completely degraded forest lands and lack any tree stand. The large stretch of scrub lands in plain areas are presently infested with weeds and needs to be afforested by appropriate planning. Intensive planting, protection from biotic inference

Scrub lands

by fencing and adequate watch and ward would result in adequate tree stand. The targeted areas will be treated in three years.

Item of work	Rate	Year	Phy	Fin
Nursery Plant Production (Including BUC) PB	6.42	1	1350	8667
Maintenance of PB plants	1.50	1	1350	2025
Fencing with PCC Square at 10' distance	50.00	1	300	15000
Maintenance of Closure			600	600
Sub total				**26292**
Maintenance of Closure			600	600
PB Plants maintenance	1.50	2	1350	2025
Sub total				**2625**
Maintenance of Closure			600	600
PB Plants maintenance	1.50	3	1350	2025
Planting PB (Including BUC)	13.17	3	1350	17780
Sub total				**20405**
Maintenance of Closure			600	600
Miscellaneous				78
Sub total				**678**
Grand Total				**50000**

Plantation Module for enhancing tree cover in urban & Peri-urban areas (including institutional lands

The tree covers in urban and peri-urban areas act as green lungs to reduce the pollution load in atmosphere. The urban and peri-urban areas belong to special category where availability of adequate junk of land for afforestation is difficulty. The availability of smaller patches of land compels the huge investment per hectare area of treatment. Also, tall plants are needs to be planted in these areas. Accordingly, the treatment plan is devised and presented below. The area needs to be treated in four year span.

Item of work	Rate	Year	Phy	Fin
Nursery Plant Production (Including BUC) PB	6.42	1	1500	9630
Maintenance of PB plants	1.50	1	1500	2250
Fencing with PCC Square at 10' distance	50.00	1	1100	55000
Maintenance of Closure			1000	1000
Sub total				**67880**
Maintenance of Closure			1000	1000
PB Plants maintenance	1.50	2	1500	2250
Sub total				**3250**
Maintenance of Closure			1000	1000
PB Plants maintenance	1.50	3	1500	2250
Planting PB (Including BUC)	13.17	3	1500	19755
Sub total				**23005**
Maintenance of Closure			1000	1000
Fence repair	7.72	4	500	3860
Miscellaneous				1005
Sub total				**5865**
Grand Total				**100000**

CHAPTER –XI
PROJECT COMPONENTS AND ACTIVITIES


Closures creating


Plant production

Water Harvesting


Tree planting

Distribution of plants

CHAPTER -XI
PROJECT COMPONENTS AND ACTIVITIES

Methodology for selection of interventions

GIM document envisages multipronged activities to establish and improve the green cover of the landscape with the following interventions.

- Providing conducive environment for regeneration of native species in degraded areas
- Improving the ground water regime
- Evolving formal mechanisms- both institutional and systems for involving local people
- Provision of R&D support
- Improving the capacity of the personnel involved in the mission
- Application of technology for planning & Monitoring

Activities proposed under the Mission

Sub-Mission 1: Enhancing quality of forest cover and improving ecosystem services

Under Sub-Mission 1, all public lands, which provide goods & services to the people, have been selected for the activities under the Sub-Mission.

a). Moderately dense forest cover, but showing degradation

Augmentation of Natural Regeneration

In the moderately dense forests, areas close to habitation are the best suited place to be treated under this category. Sometimes these forests are accessible to local people in a limited way due to geographical reasons such as steepness, unaffordable river flowing between the village and forests etc. The Assisted Natural Regeneration includes protection of the area by fencing along with opening of the top soil for sowing of the seed in the form of patch sowing and dibbling of seeds at favourable spots. In most of the places in the State, mere protection improves the natural regeneration and facilitates better stand than an unprotected area. The continued physical protection and improved silviculture practises will augmenter of natural species of the crop stand in close the opening created in the dense forests.

Fire-protection measures

Fire management in the selected micro-watersheds would be facilitated by involving local communities. For this purpose long term ties would be forged with representative bodies of villagers by devising suitable incentive mechanism. Involvement of local institutions/ individuals would be elicited for protection against illegal felling and encroachments, grazing control in prohibited area, anti-poaching measures and sharing of valuable information in this regard.

The activities to be funded from the mission proceeds would include cutting of new fire lines, maintenance of old fire lines, providing watch and ward during fire season, providing speedy communication systems and transport means. Also, provision will be made for payment of incentives in those villages where forest fires do not take place for a defined period. Also, staff will be rewarded for outstanding fire protection works. Wages will be paid to villagers engaged for fire protection works.

Soil-Moisture Conservation works

Check dams to control water flow

Soil-Moisture conservation works involve construction of mechanical structures like diversion channels, gully plugging and nalla control through brushwood check dams, stone check dams, crate wire or wire mesh check dams, contour trenching construction of spur walls, stabilization of slips using multiple measures, development of ponds and natural springs so that surface runoff flow of water is regulated and infiltration rate is improved. The basic aims of soil-moisture conservation work are reduction of velocity in case of downward flowing water and improving the infiltration in case of stagnant water so that ultimately the groundwater is recharged. The Soil-Moisture Conservation works are benefitting the environment in both ways such as reducing the loss of valuable topsoil and conserving the water and storing in the under the ground level.

Grazing control

In the State, people own a large no. of livestock. Most part of the fodder

requirement of these livestock comes from the forest. Large scale migration of tribal people along with their animals from plains to the alpine pastures and retreating during

onset of winter is the characteristic feature of the State. The migratory graziers are using the alpine grassland and the local people shares the grassland adjacent to the villages. Direct control of grazing is impractical, however grazing regulation is planned to be achieved in indirect manner. Augmentation of grass availability through formation of grass production units, closing of a small patch for grazing and improving the tree growth, supply of silage from outside, genetic improvement of unproductive breeds into productive animals with higher bio-efficiency are the steps contemplated to achieve desirable results. Formation of closures for production of grass and tree fodder is achievable in the watershed areas. The agrostology wing of Forest Department can plan for creation of closures in forest land, village community land for improving the availability of grass and fodder in the village.

b). Eco-restoration of degraded open forests

The area falling under the sub-component is selected based on the satellite imagery classification. The degraded area is closed and the package of practises enabling Assisted Natural Regeneration is implemented to induce regeneration. In general, the ANR practise must be implemented in text book manner to get the best results.

The characteristic feature of the degraded open forest areas is the area is comparatively open and the degradation is visible in patches inside or on the periphery of the forests. In case of Chir forests, the top soil is hard due to repeated forest fire incidences; whereas in case of temperate forests, the thin top soil might have been lost due to erosion in steep slopes. Ultimately, there are denuded patches in the open forests due to degradation. The treatment, even though it is based on the principles of ANR, it varies depending upon the type of forests and involvement of casual agents. In case of sub-tropical Chir forests, soil treatment and protection of young recruits from grazing and fire would bring desirable results. In case of temperate conifer forests, the soil conservation measures in steep slopes to retain the topsoil, patch sowing, dibbling and grazing control will yield better results. Also, in case of larger gaps, raising of nurse crops at the initial stage will provide required shade to the current recruits.

Sub Mission 2: Ecosystem Restoration and Increase in forest cover

The Sub-component aims at restoring those forest ecosystems which are unlikely to regenerate naturally. The Artificial Regeneration is the only option. Prolonged unsustainable biotic pressures or sudden accidental factors like landslides, etc. have led to virtual devastation of such areas. Hence, the treatment has to be decided based on the field condition.

a). Restoring scrub lands and open public lands

Two distinct categories are recognised such as forests with scrubby vegetation, largely adjacent to villages and public lands which are used for grazing purpose. The treatment will be prescribed based on the field condition.

The scrubby vegetations are considered as weeds of forests which ultimately reduce the ecosystem services of the forest land. The unpalatable vegetation must be removed to increase the availability of species useful to the local people. Lantana is the major threat in subtropical plain areas in Jammu and surrounding districts. These landscapes have to be treated to restore their capacity to provide eco-services.

The public lands adjacent to the villages were also degraded in the selected landscapes. The common property public lands were exploited by unsustainable usages. Due to the continued heavy grazing in the limited land, gradually the palatable grasses reduced both in abundance and diversity. The unpalatable species which were not under pressure have dominated the palatable species and hence the public land lost its capacity to be the grazing land and catalogued as unproductive scrub lands.

b). Planting multipurpose trees

The forests are being subjected to tremendous unsustainable pressure by the local people for various goods and services. The planting of multipurpose trees in the accessible areas of villages will reduce the pressure of people on the conventional forests. The local species must be selected for planting in consultation with villages. The indigenous fodder yielding trees, trees for small timber needs, trees for firewood etc will attract the people to large extent. Planting of trees around the villages in forest land indirectly removes the existing encroachment on the piece of forest land or it indirectly conveys the limit of forest boundary and the forest land at the back of the tree line is saved from encroachment. The village people spend significant proportion of time in collection of firewood and fodder for their animals and bringing potable water to the family. If multipurpose trees/ closure are raised near their habitation it will improve their livelihood indirectly as the time saved in collection of essential commodities can be used for increasing their income. It is pertinent to mention here that package of practises for many of the local species needs to be standardised. The R&D plays an important role in this operation.

c). Stabilization of landslides and restoration of lands affected by natural calamities

The stabilization of landslides involved multi-dimensional approach. The affected area must be treated from top downwards. The course of water flow must be regulated by soil engineering works. The land affected by natural calamities will also be treated after evaluating the quantum of damage and factors causing the damage.

Sub-Mission 3: Enhancing tree cover in urban and peri urban areas:

Urban and peri-urban areas

Plantation in Srinagar by Social Frestry Deptt.

Plantation in Jammu by forest Deptt.

About 1.5 crore tourist are visiting the State for tourism purpose. Most of them visit both Jammu and Srinagar cities. Also, these cities serve as State capitals during winter and summer respectively. Another important issue is the encroachment of forest lands and Government lands in the twin cities. Hence, the areas need to be fenced and planted for effective protection as well as to serve as the green lung of the cities. The project is prepared considering the factors as discussed.

Sub Mission 4: Agro forestry and Social Forestry

Planting on private land holdings

This sub-component will be implemented in private land holdings, institutional areas, protected premises of government offices, educational institutes, local bodies and other willing people and organisations. In case of village areas, the trees which are helpful to agriculture will be planted selectively. In case of organisational lands, trees with beautiful flowers and foliage will be planted.

Plantation of multipurpose tree species

Multipurpose trees fulfill the variety of needs of village people. The villagers need firewood, fodder, timber and other needs which will be fulfilled from these multipurpose trees. The woodlots will be situated near to village and intensive planting will be done.

Plantation on private holdings

The fodder trees will be planted in private landholdings with the aim of reducing the pressure of people moving to the conventional forests. The male poplar and willow can be planted in private land holding in Kashmir valley to augment the tree cover as well as to be used in forest based industry. In Jammu area, timber yielding species such as Dalbergia, Khair and Amla like fruit trees can be planted in large scale so that community will reap the benefits.

Horticultural plantation on private holdings

In Jammu area fruit yielding trees like mango etc will be distributed to people for plantation. In Kashmir valley and Chenab valley, saplings of apple, walnut etc will be distributed to the people.

Cultivation of medicinal plants

The State of J&K is the home of sub-tropical and temperate medicinal plants. The important medicinal plants are Patees (*Aconitum heterophyllum*), Sujanjado (*Colchicum luteum*), Dhoop (*Jurinea dolmiaea*) Bankakri (*Podophyllum hexandrum*), Kuth (*Saussurea costus*), Banafsha (*Viola odorata*) Atropa, etc. The some of the medicinal plants must be raised in nursery and planted in the forests. Some other needs the sowing of propagules at appropriate time.

The role of R&D is very important in these studies. In the same time, package of practises of many unknown medicinal plants needs to be standardised as well.

Some important medicinal plants of J&K State.

Nursery up-gradation & supply of improved planting material

The nursery is the backbone of the entire mission. The timely availability of quality planting material must be ensured for the successful plantation. In plain areas the concept of centralised nursery works very well. In unconnected areas especially in Chenab valley the temporary nursery proved fit for the terrain provided adequate monitoring is ensured at the level of DFO's level. The nursery should be planned in such a way to raise large variety of quality local plants in adequate numbers.

Cross-cutting Interventions

a). Promotion of alternate source of energy & charcoal making from chir pine needles

The need of the alternate source of domestic fuel should reach the people so that the forest will be saved from firewood extraction. Also the people shall get the new form of energy in relatively cheaper costs. The economics of extraction & carriage of fuelwood shall be explained to local people so that they are veined away from the present practise.

Making of charcoal from the chir pine needles has many advantages as in one hand it reduces the fire hazard in the natural chir pine forests and on the other hand it is an alternate, eco-friendly and safe fuel to the end users. The charcoal briquetting machine shall be procured and installed in the villages under the mission. The local people will be trained to produce the briquettes so that their livelihood is improved.

Recharge of natural water sources

Water Harvesting/Recharge module.

The demand of potable water for domestic purpose exists in many parts of sub-tropical regions of the State. So, the monsoon rain water needs to be stored in appropriate places to improve the water regime of the surrounding areas. Construction of small check dams in catchment area will increase the water storage and reduce the siltation in the downstream hydro-electric projects. The water stored in these check dams will serve as the waterhole for the wildlife of the area.

Strengthening GIS & IT cell

GIS & IT cell would play a major role in site selection, transmission of data and monitoring of works carried out under the mission. The real time high resolution satellite imagery helps in planning of activities in hilly terrain accurately. At the later stage, it would help in monitoring of the progress of works. The geo-tagged photographs of the works, progress reports of the field officers will helpful in better understanding of the progress of the works.

Financial requirement for J&K Green India Mission (GIM)

(Rs. In Crores)

#	Submission/ intervention	Category	Cost (Rs/ha)	Area in Ha	Fin. In Crores
1	Sub Mission 1 : Enhancing quality of forest cover and improving ecosystem services (11,000 ha)	Moderately dense forest cover, but showing degradation	15000	5000	7.50
		Eco-restoration of degraded open forests. Type A	16000	2000	3.20
		Eco-restoration of degraded open forests. Type B	30000	2000	6.00
		Eco-restoration of degraded open forests. Type C	50000	1000	5.00
		Restoration of grasslands.	35000	1000	3.50
2	Sub-Mission 2 : Ecosystem restoration and increase in forest cover (11750 ha)	Restoring Scrublands	50000	10000	50.00
		Restoring/planting Seas buckthorn	100000	1750	17.50
3	Sub-Mission 3: Enhancing tree cover in Urban & Peri-urban areas (including institutional lands): 6000 ha.		100000	6000	60.00
4	Sub-Mission 4 : Agro-Forestry and Social Forestry (Increasing biomass and creating carbon sink) : 4500 ha	Farmer's land including current fallows	20000	1000	2.00
		Shelterbelt plantations	80000	1500	12.00
		Highways/ Rural roads/ Canals/ Tank Bunds.	70000	2000	14.00
5	Sub-Mission 5: Restoration of Wetlands: 1000 ha		60000	1000	6.00
6	Promoting alternative fuel energy	Biogas, Solar devices, LPG, Biomass-based systems, improved stoves	3300 per house hold	10000 House holds	3.30
	Sub-total of A			**34250**	**190.00**

#	Submission/ intervention	Category	Cost (Rs/ha)	Area in Ha	Fin. In Crores
B. For Support Activities					
	Activities Cost				
7	Research (2% of A)				3.80
8	Publicity/ Media/ Outreach activities (1% of A)				1.90
9	Monitoring and Evaluation (1% of A)				1.90
10	Livelihood improvement activities (17% of A)				32.30
11	Strengthening local-level institutions (5%)				9.50
12	Strengthening FDs (5%)				9.50
13	Mission Organisation, operation and maintenance, contingencies and overheads (4%)				7.60
	Sub-Total of B				**66.50**
	Total Cost				**256.50**

CHAPTER-XII
IMPLEMENTATION, MONITORING & IMPACT ASSESSMENT

Green India Mission envisages a new approach in forest management i.e. through Strengthening Institutions for Decentralized Forest Governance. As the implementation of the Mission would require several cross-sectoral linkages and innovations there is a need for adequate and appropriate institutions with sufficient manpower. The main features of institutional framework are as follows.

Village level

It will be the Village Forest Committees, which will plan and implement the Mission activities at the village level. The revamping of JFMCs includes setting up of JFMCs by the people of the village following due process as may be specified in the SRO-61. The plans will be approved. It will have explicit linkages with Panchayat level planning to ensure maximum convergence. Financial powers will be jointly exercised by the JFMC President and the Member Secretary.

In urban areas, ward level committees linked to Municipality/Municipal Corporation will have role in implementation of the Mission activities.

Landscape/ Cluster Level

In conformity with the Mission objectives, it is imperative to have a cluster level institution to facilitate planning, problem solving and seeking convergence opportunities at the level of cluster (L2 landscape). This will facilitate common approach to different issues arising in the villages of that particular cluster. It may be serviced by Range. The revamped JFMCs office bearers will be represented in the Cluster /landscape level committee, along with ex-officio members. The Chair of the Committee may be elected by the elected office bearers. Cluster level institution like federation of JFMCs in a given landscape/cluster would therefore be a key to oversee and agree upon development of landscape level plan on one hand while planning for those activities that affect them as cluster /sub cluster. For e.g. setting up of Common Facility Centre for NTFP processing that could service the entire cluster.

District level

It will be revamped Forest Development Agency (FDA), under the Chairmanship of Conservator of Forests of the Circle, that will facilitate the Mission activities at the district level. It will have explicit linkages with District Planning Committee.

State Level

A revamped State Forest Development Agency, as autonomous society, will facilitate the Mission implementation within the State. To provide for maximum convergence opportunities and strategic direction to the Mission, a steering Committee under the Chairmanship of Chief Secretary shall be setup by each State Government.

National Level

At National level, the Mission will have an all inclusive Governing Council, Chaired by the Minister, Environment and Forests to provide for overall guidance and synergy of action and the Mission Director as Member Secretary. There shall be a National Executive Council chaired by the Secretary (E&F) which will have overall responsibility for the Mission. There shall be a Mission Directorate at the National level with the Mission Director as its CEO with overall accountability for the Mission deliverables and will be supported by a team of experts and secretarial staff.

So overall, the following institutional structure will exist at National, State and District level:

I. National Governing Council	National Level
II. National Executive Council	
III. Mission Directorate	
IV. State Steering Committee	State Level
V. Revamped SFDA	
VI. District Steering Committee	District Level
VII. Revamped FDA	
VIII. Cluster level Committee	Range Level
IX. Revamped JFMC	Village level

Monitoring and Evaluation

Monitoring and Evaluation (M&E) has been acknowledged as a key programme management function with significant bearing on programme efficiency and effectiveness. Acknowledging the role of M&E in programme delivery, monitoring at four different levels has been spelt out in the Mission document.

M&E Objectives

M&E in the GIM is expected to enable the mission in efficiently deliver the mission outputs and effectively achieve the mission outcomes.

Performance measurement

At the outset**,** the M&E system should enable continuous tracking of Mission performance and therefore should enable continuous measurement of expected results i.e. Outputs and Outcomes. The M&E system therefore would be a

Concurrent Monitoring and Evaluation System that would encompass output and outcome levels rather than the conventional monitoring domains of input and activity tracking.

Planning

The M&E system would be user focused such that iterations and adaptive management is facilitated. The M&E system along with performance tracking would provide critical inputs to the entire planning process so that the feedback of the system can be factored into the planning process and variances accounted for.

Accountability

The system would ensure accountability on part of the implementers at the same time ensure transparency in the process of implementation. The M&E system would thus provide insights into efficiency and effectiveness of results delivered by the Mission.

Learning

The M&E system would provide for iterative learning, promotion of best practices and their dissemination. This would facilitate attainment of project objectives in the best possible way as well share the learning's with stakeholders.

M&E principles

The following would be the guiding principles shaping various M&E initiatives in the Mission.

Simple and comprehensive

The design of overall M&E system would be simple yet comprehensive to encompass all the dimensions of the mission. The simplicity of the system makes it easier to operationalize. The comprehensive nature would ensures keeping track of all the necessary parameters at the desired levels i.e. inputs, activities, outputs and results and the mission focus of biophysical resource status and socio-economic status of the dependent communities.

Participatory

M&E is not the stand alone function of the mission implementers but functional participation of all stakeholders is solicited for M&E. Taking cognizance of the multi-stakeholder environ in which the mission functions, avenues have to be designed that seek participation of other stakeholders at village, district and state level. Thus participation here is not only of the communities, but of other stakeholders impacting and getting impacted by the project.

Analysis and feedback

Analysis and feedback for the implementation process would be a key feature of a mission M&E system. Along with reporting requirements, the M&E system would facilitate analysis of information at various levels ensuring timely and continuous feedback for implementation. This analysis and feedback would help in timely information for planning and feedback to multiple agencies/ stakeholders.

Use of enabling technologies

The mission would integrate application of modern technology like Remote Sensing and GIS etc. for M&E purposes. The Mission would support use of Geomatics (remote sensing with GPS mapping of boundaries) for monitoring at the output/ outcome level. This service will be available for both Mission-financed activities as well as those undertaken and financed by other agencies/ stakeholders.

Capacities for M&E

Development of requisite capacities for effective implementation of M&E activities is quite essential for having a functional Decision-Support System. This necessitates adequate investments in creating necessary capacities for M&E. Capacity development for M&E would therefore be integral component of the M&E system encompassing human, physical and financial capabilities.

Performance monitoring framework (Result Framework)

In consonance with the Government of India (GoI) directives of adopting Results-Based Management (RBM) for design and implementation of state imperatives, the Performance Monitoring Framework (PMF) or Result Framework (RF) would be at the centre of the M&E system.

Monitoring Levels

Monitoring is proposed at four levels-

Level 1: On-ground self-monitoring of the region by the local community, implementing organization and the Forest Department.

Level 2: Field review by an external agency of randomly selected sites and will be primarily for Mission financed activities. Monitoring by third party and long term monitoring of certain eco system services at selected sites has been provided.

Level 3: This will use remote-sensing-based forest cover monitoring by the Forest Survey of India, supplemented by boundaries of areas covered under the Mission. The Mission will work in close collaboration with Forest Survey of India, National Remote Sensing Agency and Indian Institute of Remote Sensing for acquiring mosaic of high resolution satellite images (LISS-IV, CARTOSAT) and

overlaying polygons of areas taken up for interventions under the Mission to help develop a centralized spatial data base in the GIS domain. Density slicing could be used to gauge migration within density class. This service will be available for both Mission-financed activities as well as those undertaken and financed by other stakeholders. The real-time, web-based monitoring system being developed for CAMPA by National Informatics Centre (NIC) will be taken as the starting point for the system.

Level 4: In addition, a few pilot areas will be intensively monitored to assess the impact and efficacy of different old and new practices, in tandem by the implementing agency, the Forest Department, and a support organization. In addition to growing stock and forest cover, other parameters of monitoring will include environmental services and associated factors: ground cover, soil condition, erosion and infiltration, run-off, groundwater levels to develop water budgets, as well as the provision of locally relevant fuel wood, fodder, and other NTFPs, and basic biodiversity analysis. This would facilitate review of different regulatory conditions in the future. This analysis would require extensive support for communities and could form the basis for REDD-based monitoring methodologies.

Social Audit

In addition to these four levels monitoring, the village committee will carry out the social audit of the Mission activities at the village level. The Mission will learn from best practices on social audit, particularly the one designed for MNREGA. Taking a cue from the MNREGA, the Mission will similarly engage village committee to carry out a social audit of all expenses incurred by the VFC's and these reports would be shared in the public domain.

Audit by Government bodies

The Mission accounts will be subjected to audit by Comptroller and Accountant General (CAG) at Centre and by Accountant General (AG) in the States. Achievement of annual targets will be governed by the local conditions/site- specific planning in each State covered under the Mission, and may at times be at variance with the overall Mission targets.

Annexure I

Common Trees of Temperate Forest

S. No.	Common Name	Botanical Name	Family
1	Akhrot	*Juglans regia*	Juglandaceae
2	Bankhor	*Aesculus indica*	Sapindaceae
3	Braari	*Ulmus wallichiana*	Ulmaceae
4	Bren	*Ulmus villosa*	Ulmaceae
5	Brimij	*Celtis australis*	Cannabaceae
6	Chaamp	*Alnus nitida*	Betulaceae
7	Deodar	*Cedrus deodara*	Pinaceae
8	Fir	*Abies pindrow*	Pinaceae
9	Haadi	*Prunus armeniaca*	Rosaceae
10	Hatab	*Parrotiopsis jacquemontiana*	Hamamelidaceae
11	Heru	*Quercus ilex*	Fagaceae
12	Kahu	*Olea cuspidate*	Oleaceae
13	Kail	*Pinus wallichiana*	Pinaceae
14	Kakarsinghi	*Pistacia integerrina*	Anacardiaceae
15	Kanjal	*Acer caesium*	Sapindaceae
16	Postul	*Taxus baccata*	Taxaceae
17	Shisham	*Dalbergia sissoo*	Fabaceae
18	Spruce	*Picea smithiana*	Pinaceae
19	Trikanni	*Acer pictum*	Sapindaceae
20	Tung	*Cotinus coggygria*	Anacardiaceae
21	White willow	*Salix alba*	Salicaceae
22	Zum	*Prunus cornuta*	Rosaceae

Common Medicinal Plants of Temperate Forest

S. No.	Common Name	Botanical Name	Family
1	Agg jari	*Saxifraga jacquemontiana*	Saxifragaceae
2	Ban tambaku	*Verbascum Thapsus*	Scrophulariaceae
3	Banafsha	*Viola odorata*	Violaceae
4	Bankakdi	*Podophyllum hexandrum*	Berberidaceae
5	Belladonna	*Atropa belladonna*	Solanaceae
6	Bhang	*Cannabis sativa*	Cannabanaceae
7	Bhutyata	*Corydalis govaniana*	Papaveraceae
8	Brand	*Phytolacca acinosa*	Phytolaccaceae
9	Chalander	*Viburnum grandiflorum*	Adoxaceae
10	Chora	*Angelica glauca*	Apiaceae
11	Chukri	*Rheum austral*	Polygoniaceae
12	Chuku	*Oxalis corniculata*	Oxalidaceae
13	Dand jari	*Rhodiola himalensis*	Crassulaceae
14	Dhad Kopdi	*Bergenia Stracheyi*	Saxifragaceae
15	Feku	*Ficus palmate*	Moraceae
16	Gaddo	*Salvia moorcroftiana*	Lamiaceae
17	Guggal	*Jurinea dolomiaea*	Asteraceae
18	Gul-e-snobar	*Geranium wallichianum*	Geraniaceae
19	Hamesh bahar	*Calendula officinalis*	Asteraceae
20	Handh	*Taraxacum officinale*	Asteraceae
21	Hillu	*Impatiens glandulifera*	Balsamiaceae
22	Jarjam	*Sanecio chrysanthemoides*	Asteraceae
23	Kaimal	*Berberis lyceum*	Berberidaceae
24	Kajuban	*Arnebia benthami*	Boraginaceae
25	Kalishadi	*Daphne oleoides*	Thymelaeaceae
26	Kanhaji	*Sorbaria tomentosa*	Ranunculaceae
27	Kareel Kaimbul	*Berberis aristata*	Berberidaceae
29	Kesar	*Crocus sativus*	Iridaceae
30	Kim	*Morina longifolia*	Dipsacaaceae
31	Kinns	*Diascorea deltoidea*	Dioscoreaceae
32	Kour	*Picrorhiza Kurrooa*	Scrophulariaceae
33	Kuppad jari	*Sedum ewersii*	Crassulaceae
34	Kuth	*Saussurea lappa*	Asteraceae
35	Mooin	*Artemisa maritime*	Asteraccae
36	Mori	*Delphinium roylei*	Ranunculaeeae
37	Mulam	*Inula royeleana*	Asteraceae
38	Murma	*Valeriana dubia*	Valerianaceae
39	Nag Rus	*Acorus calamus*	Araceae
40	Neel Kanth	*Ajuga bracteosa*	Lamiaceae
41	Nichni	*Rhododendron campannalatum*	Ericaceae
42	Patrishi	*Aconitum heterophyllum*	Ranunculaceae
43	Postul	*Taxus baccata*	Taxaceae

S. No.	Common Name	Botanical Name	Family
44	Sapp Google	*Arisaema flavum*	Araceae
45	Shemar	*Desmodium elegans*	Leguminosae
46	Sheshak	*Rhabdosia rugosa*	Lamiaceae
47	Shutenger	*Rhododendren anthopogon*	Ericaceae
48	Suchal	*Malva neglecta*	Malvaceae
49	Tatnu	*Caltha palustris*	Rannnculaeeae

Common Herbs of Temperate Forest

S. No.	Common name	Botanical name	Family
1	Avens	*Geum elatum*	Rosaceae
2	Baby's breath	*Gypsophila cerastioides*	Caryophyllaceae
3	Black Henbit	*Hyoscyamus niger*	Solanaceae
4	Bladder Campion	*Silene vulgaris*	Caryophyllaceae
5	Burdock	*Arctium lappa*	Asteraceae
6	Cinquefoil	*Potentilla argyrophylla*	Rosaceae
7	Cow Parsnip	*Heracleum candicans*	Apiaceae
8	Crame's bill flower	*Geranium pratense*	Geraniaceae
9	Cudweed	*Gnaphalium hypoleucum*	Asteraceae
10	Dandelion	*Taraxacum officinale*	Asteraceae
11	Darnel grass	*Lolium temulentum*	Poaceae
12	Foreget-me-Not	*Myosotis sylvatica*	Boraginaceae
13	Golden Rod	*Solidago virgaurea*	Asteraceae
14	Granny's Bonnet	*Aquilegia fragrans*	Ranunculaceae
15	Groundsel	*Senecio chrysanthemoides*	Asteraceae
16	Helleborine	*Epipactis latifolia*	Orchidaceae
17	Helleborine Orchid	*Epipactis wallichii*	Orchidaceae
18	Hound's Tongue	*Cynoglossum zeylanicum*	Boraginaceae
19	Kashmir Sage	*Salvia hians*	Lamiaceae
20	Larkspur	*Delphinium vestitum*	Ranunculaceae
21	May Apple	*Podophyllum hexandrum*	Berberidaceae
22	Milkvetch	*Astragalus*	Fabaceae
23	Millfoil	*Achillea millefolium*	Asteraceae
24	Mountain Sorrel	*Oxyria digyna*	Polygonaceae
25	Nepal Cinquefoil	*Potentilla nepalensis*	Rosaceae
26	Nepal Dock	*Rumex nepalensis*	Polygonaceae
27	Northern Bedstraw	*Galium boreale*	Rubiaceae
28	Pink Evening Primrose	*Oenthera rosea*	Onagraceae
29	Red Clover	*Trifolium pretense*	Fabaceae
30	Rock splitter	*Bergenia stracheyi*	Saxifragaceae
31	Silky Woundwort	*Stachys sericea*	Lamiaceae
32	St. John's Wort	*Hypericum perforatum*	Hypericaceae
33	Sun Spurge,	*Euphorbia helioscopia*	Euphorbiaceae
34	Touch me not	*Impatiens thomsonii*	Balsaminaceae
35	Wallich's Willow Herb	*Epilobium wallichianum*	Onagraceae
36	White spotted Lousewort	*Pedicularis punctata*	Orabanchaceae
37	Wild Indigo	*Indigofera heterantha*	Fabaceae
38	Wild Lettuce	*Lactuca longifolia*	Asteraceae
39	Wild Rose	*Rosa webbiana*	Rosaceae
40	Wild Strawberry	*Fragaria nubicola*	Rosaceae

Checklist of Mammals of Temperate Forests

S. No.	Common Name	Scientific Name
1	Beach of Stone Marten	*Martes foina*
2	Brown Bear	*Uirsus arctos*
3	Common Langur	*Semnopithecus entellus*
4	Hangul or Kashmir Stag	*Cervus elaphus hanglu*
5	Himalayan Black Bear	*Ursus thibetanus*
6	Himalayan Marmot	*Marmot bobak*
7	Himalayan Mouse Hare	*Ochotona roylei*
8	Himalayan Yellow Throated Marten	*Martes flavigula*
9	Ibex	*Capra ibex*
10	Jackal	*Canis aureus*
11	Jungle Cat	*Felis chaus*
12	Leopard	*Panthera pardus*
13	Long Tailed Marmot	*Marmot caudata*
14	Musk Deer	*Moschus chrysogaster*
15	Red Fox	*Vulpes vulpes*
16	Snow Leopard	*Uncia uncia*

Check list of birds of Temperate Forests

S. No.	Common Name	Scientific name	Family
1	Alpine accentor	*Prunella collaris*	*Muscicapidae*
2	Alpine swift	*Tachymarptis melba*	*Apodidae*
3	Bearded vulture or Lammergeier	*Gypaetus barbatus*	*Accipitridae*
4	Black and yellow grosbeak	*Mycerobas icterioides*	*Muscicapidae*
5	Black redstart	*Phoenicurus ochruros*	*Muscicapidae*
6	Black tit	*Parus rufonuchalis*	*Muscicapidae*
7	Black-eared Kite	*Milvus migrans*	
8	Black-naped green wood-pecker	*Picus canus*	*Dicidae*
9	Blue rock pigeon	*Columba livia*	*Columbidae*
10	Blue Rock Pigeon	*Columba livia*	
11	Blue rock thrush	*Monticola solitarius*	*Muscicapidae*
12	Blue whistiling thrush	*Myophonus caeruleus*	*Muscicapidae*
13	Blue-headed redstart	*Phoenicurus caeruleocephala*	*Muscicapidae*
14	Blyth's leaf warbler	*Phylloscopus reguloides*	*Muscicapidae*
15	Booted eagle	*Hieraaetus pennatus*	*Accipitridae*
16	Brown bullfinch	*Pyrrhula nipalensis*	*Muscicapidae*
17	Brown dipper	*Cinclus pallasii*	*Muscicapidae*
18	Cheer pheasant	*Catreus wallichi*	*Falconidae*
19	Chukar patridge	*Akectirus chukar*	*Falconidae*
20	Cinamon tree sparrow	*Passer rutilans*	*Muscicapidae*
21	Collared grosbeak	*Mycerobas affins*	*Muscicapidae*
22	Common cuckoo	*Cuculus canorus*	*Cuculidae*
23	Common kingfisher	*Alcedo atthis*	*Alcedinidae*
24	Common myna	*Acridotheres tristis*	*Sturnidae*
25	Crested black tit	*Parus melanolophus*	*Muscicapidae*
26	Crested lark	*Galerida cristata*	*Alaudidae*
27	Durskey crag-martin	*Hirundo concolor*	*Hirundinidae*
28	Eagle owl	*Bubo bubo*	*Strigidae*
29	European roller	*Coracias garrulous*	*Coracidae*
30	Fire capped tit	*Cephalopyurs flammiceps*	*Muscicapidae*
31	Gold billed blue magpie	*Urocissa flavirostris*	*Corvidae*
32	Gold crest	*Regulus regulus*	*Muscicapidae*
33	Golden eagle	*Aquila chrysaetos*	*Accipitridae*
34	Golden oriole	*Oriolus oriolus*	*Oriolidae*
35	Green backed tit	*Parus monticolus*	*Muscicapidae*
36	Grey- headed flycatcher	*Culicicapa ceylonensis*	*Muscicapidae*
37	Grey headed thrush	*Turdus rubrocanus*	*Muscicapidae*
38	Grey tit	*Parus major*	*Muscicapidae*
39	Grey wagtail	*Motacilla cinerea*	*Muscicapidae*
40	Grey winged blackbird	*Turdus boulboul*	*Muscicapidae*

41	Griffon vulture	*Gyps fulvus*	*Accipitridae*
42	Himalayan Bearded Vulture	*Gypaetus barbatus hemachalanus*	
43	Himalayan Golden Eagle	*Aquila chrysaetos*	
44	Himalayan Griffon Vulture	*Gyps himalayensis*	
45	Himalayan monal	*Lophophorus impejanus*	*Falconidae*
46	Himalayan pied wood-pecker	*Dendrocopos himalayensis*	*Dicidae*
47	Himalayan Rufous Turtle Dove	*Streptopelia orientalis meena*	
48	Himalayan snowcock	*Tetraogallus Himalayensis*	*Falconidae*
49	Himalayan swiftlet	*Collocalias brevirostris*	*Apodidae*
50	Himalayan tree-creeper	*Certhia discolor*	*Muscicapidae*
51	Hodgson's mountain finch	*Leucosticte nemoricola*	*Muscicapidae*
52	Hoopoe	*Upupa epops*	*Upupidae*
53	House crow	*Corvus splendens*	*Corvidae*
54	House sparrow	*Passer domesticus*	*Muscicapidae*
55	House swift	*Affinis*	*Apodidae*
56	India white-backed vulture	*Gyps bengalensis*	*Accipitridae*
57	Indian cuckoo	*Cuculus micropterus*	*Cuculidae*
58	Indian ring dove	*Stretopelia decaocto*	*Columbidae*
59	Indian tree pie	*Dendrocitta vagabunda*	*Corvidae*
60	Jungle crow	*Corvus macrorhynchos*	*Corvidae*
61	Kashmir nuthatch	*Sitta cashmirensis*	*Muscicapidae*
62	Kashmir red breasted Flycatcher	*Ficedula subrubra*	*Muscicapidae*
63	Kastrel	*Falco tinnunculus*	
64	Kestrel	*Falco tinnunculus*	*Falconidae*
65	Kiklas	*Pucrasia macrolopha*	
66	Koel	*Eudynamys scolopaceas*	*Cuculidae*
67	Koklass pheasant	*Pucrasia macrolopha*	*Falconidae*
68	Lesser pied kingfisher	*Ceryle rudis*	*Alcedinidae*
69	Linnet	*Carduelis cannabina*	*Muscicapidae*
70	Little forktail	*Enicurus scouleri*	*Muscicapidae*
71	Little owl	*Athene noctua*	*Strigidae*
72	Little pied flycatcher	*Ficedula westermanni*	*Muscicapidae*
73	Long-eared owl	*Asio otus*	*Strigidae*
74	Monal Pheasant	*Lophophorus impeajanus*	
75	Olivaceous leaf-warbler	*Phylloscopus griselous*	*Muscicapidae*
76	Orange bullfinch	*Pyrrhula aurantiaca*	*Muscicapidae*
77	Orange flanked bush-robin	*Tarsiger cyanurus*	*Muscicapidae*
78	Pallas leaf-warbler	*Phylloscopus proregulus*	*Muscicapidae*
79	Paradise flycatcher	*Terpsiphone paradise*	*Muscicapidae*
80	Pariah kite	*Milvus migrans govinds*	*Accipitridae*
81	Peregrine	*Falco peregrines*	

82	Pied or white wagtail	*Motacilla alba*	*Muscicapidae*
83	Pink-browed rosefinch	*Carpodacus rodochrous*	*Muscicapidae*
84	Plain leaf-warbler	*Phylloscopus neglectus*	*Muscicapidae*
85	Plain or yellow browned leaf-warbler	*Phylloscopus inornatus*	*Muscicapidae*
86	Plumbeous water-redstart	*Rhyacornis fuliginosus*	*Muscicapidae*
87	Red jungle fowl	*Gallus gallus*	*Falconidae*
88	Red turtle dove	*Stretopelia tranquebarica*	*Columbidae*
89	Red-breasted rosefinch	*Carpodacus puniceus*	*Muscicapidae*
90	Red-headed bullfinch	*Pyrrhula erythrocephala*	*Muscicapidae*
91	Red-mantled rosefinch	*Carpodacus rhodochlamys*	*Muscicapidae*
92	Rofous backed shrike	*Lanius schach*	*Lanidae*
93	Rose ringed parakeet	*Psittacula krameri*	*Psittacidae*
94	Rufos-streaked accentor	*Prunella himalayana*	*Muscicapidae*
95	Rufous trustle dove	*Stretopelia orientalis*	*Columbidae*
96	Rufous-tailed flycatcher	*Muscicapa ruficauda*	*Muscicapidae*
97	Scaly-bellied green wood-pecker	*Picus squamatus*	*Dicidae*
98	Shikra	*Accipiter badius*	
99	Slaty blue flycatcher	*Muscicapa leucomelana*	*Muscicapidae*
100	Slatyuheaded parakeet	*Psittacula himalayana*	*Psittacidae*
101	Snow patridge	*Larwa lerwa*	*Falconidae*
102	Snow pigeon	*Columba leuconota*	*Columbidae*
103	Sparrow hawk	*Accipiter nisus nisosimilis*	*Accipitridae*
104	Spot winged grosbeak	*Mycerobas melanozanthos*	*Muscicapidae*
105	Spotted dove	*Stigmatopelia chinensis*	*Columbidae*
106	Spotted forktail	*Enicurus maculates*	*Muscicapidae*
107	Starling	*Sturnus vulgaris*	*Sturnidae*
108	Swallow	*Hirundo rustica*	*Hirundinidae*
109	Swift	*Apus apus*	*Apodidae*
110	Tickells leaf-warbler	*Phylloscopus affinis*	*Muscicapidae*
111	Tree sparrow	*Passer montanus*	*Muscicapidae*
112	Tytler's leaf-warblers	*Phylloscopus tytleri*	*Muscicapidae*
113	Variegated laughing thrush	*Garrulax variegates*	*Muscicapidae*
114	Western tragopan	*Tragopan melanocephalus*	*Falconidae*
115	White breasted kingfisher	*Halcyon omyrnensis*	*Alcedinidae*
116	White cheeked bulbul	*Pycnonotus leucogenys Leucogenys*	*Pycnonotidae*
117	White cheeked nuthatch	*Sitta leucopsis*	*Muscicapidae*
118	White throated tit	*Aegithalos leucogenys*	*Muscicapidae*
119	White-breasted dipper	*Cinclus cinclus*	*Muscicapidae*
120	White-browned rosefinch	*Carpodacus thura*	*Muscicapidae*
121	White-capped water-redstart	*Chairmarrornis leucocephalus*	*Muscicapidae*
122	White-winged redstart	*Phoenicurus erythrogaster*	*Muscicapidae*

123	Wren	*Troglodytes troglodytes*	*Muscicapidae*
124	Wryneck	*Jynx torquilla*	*Dicidae*
125	Yellow wagtail	*Motacilla flava*	*Muscicapidae*
126	Yellow-headed wagtail	*Motacilla citreola*	*Muscicapidae*

Birds of Jammu & Kashmir – A glimpse

The Rare Mammals of the State:

#	**Common Name**	**Zoological Name**
1.	Kashmir Stage or Hangul	*Cervus elephus hanglu.* Linn
2.	Musk Deer	*Moschus chryasogaster*
3.	Tebetan Antelope or Chiru	*Panthelops hodgsoni*
4.	Tibetan Gazelle	*Procapra picticaudata*
5.	Serow	*Carpricorms sumatraensis*
6.	Markhor	*Capra falconeri*
7.	Wild Yak	*Bos grunniens*
8.	Snow Leopard	*Panthera uncial*
9.	Brown Bear	*Ursus arctos*
10.	Ibex	*Capra siberica*






The Rare Birds of the State:

#	Common Name	Zoological Name
1.	Himalayan Golden Eagle	*Aquila chrysatos*
2.	Bearded Vulture	*Gypaetus barbatus*
3.	Monal Pheasant	*Lophopherus impejanous*
4.	Koklas	*Pucrasia macrolopha*
5.	Western Tragopan	*Tragopan malanocephalus*
6.	Black necked crane	*Grus nigricollis*
7.	Indian Black Partridge. Himalayan Snow Cock	*Tatgallus himalayensis*
8.	Bar-headed Goose	*Anser indicus*

J&K's State Bird, Black Necked Crane.

The Migratory Water Birds visiting the State:

#	**Common Name**	**Zoological Name**
1.	Mallard	Anas platrythynchos
2.	Common Teal	Anas crecca
3.	Pintail	Anas acuta
4.	Red Crested Pochard	Netta rufina
5.	Greylag Goose	Anser anser
6.	Wigeon	Anas Penelope
7.	Shoveller	Anas clypeata
8.	Garganay	Anas guerguedula
9.	Coot	Fulica atra
10.	Gadwall	Anas ctripera

Migratory birds in Ghrana Wetlands, Jammu & Pangong lake, Ladakh

Annexure II. Rangewise area to be treated under GIM in J&K State

Province	Name of the Division	Name of the Range	Area to be treated in (Ha.)												
			Moderately dense forest cover, but showing degradation	Eco-restoration of degraded open forests. Type A	Eco-restoration of degraded open forests. Type B	Eco-restoration of degraded open forests. Type C	Restoration of grasslands.	Restoring Scrublands	Restoring/planting Seas buckthorn	Enhancing tree cover in Urban & Peri-urban areas	Farmer's land including current fallows	Shelterbelt plantations	Highways/Rural roads/ Canals/ Tank Bunds.	Wetlands	Total
Kashmir	Bandipora & Kupwara	Bandipora & Kamraj	55	40	40	20	20	100	0	0	20	30	125	0	**450**
	Jehlum Valley	Doabgah & Others	430	170	170	110	115	850	0	0	80	130	125	0	**2180**
	Kamraj	North Lolab	65	30	30	20	20	100	0	0	20	30	125	0	**440**
	Kehmil	Karnah	165	60	60	30	30	250	0	0	40	50	125	0	**810**
	Pirpanjal	Gulmarg & others	1110	430	415	160	150	2520	0	0	220	330	125	0	**5460**
	PP & Shopian	Romeshi/Gulmarg	125	50	50	30	30	180	0	0	20	20	125	0	**630**
	Shopian	Romeshi	500	200	200	110	115	900	0	0	80	130	125	0	**2360**
	Sindh	Manasbal	50	20	35	20	20	100	0	0	20	30	125	0	**420**
	Urban		0	0	0	0	0	0	0	3000	0	0	0	0	**3000**
	Sub total		**2500**	**1000**	**1000**	**500**	**500**	**5000**	**0**	**3000**	**500**	**750**	**1000**	**0**	**15750**
Ladakh	Kargil		0	0	0	0	0	0	875	0	0	0	0	0	**875**
	Leh		0	0	0	0	0	0	875	0	0	0	0	0	**875**
	Sub total		**0**	**0**	**0**	**0**	**0**	**0**	**1750**	**0**	**0**	**0**	**0**	**0**	**1750**
Wetland														**1000**	**1000**
Grand Total			**5000**	**2000**	**2000**	**1000**	**1000**	**10000**	**1750**	**6000**	**1000**	**1500**	**2000**	**1000**	**34250**

Promoting alternative fuel energy	**10000 households @ Rs. 3300 per household**												**3.30 cr**
Plantation Component (In Crores)	7.50	3.20	6.00	5.00	3.50	50.00	17.50	60.00	2.00	12.00	14.00	6.00	**190.00**
Non-Plantation Component (In Crores)													**66.50**
Total													**256.50**

Annexure III. Yearwise Area to be treated & Financial requirement (In crores)

		2015-16		**2016-17**		**2017-18**		**2018-19**		**2019-20**		**2021-22**		**2022-23**		**2023-24**		**2024-25**		**Total**	
		Phy.	**Fin.**	**Phy.**	**Fin.**	**Phy.**	**Fin.**	**Phy.**	**Fin.**	**Phy.**	**Fin.**	**Phy.**	**Fin.**	**Phy.**	**Fin.**	**Phy.**	**Fin.**	**Phy.**	**Fin.**	**Phy.**	**Fin.**
mod den	**I Year Advance Work**	1000	1.50	1000	1.50	1000	1.50	1000	1.50	1000	1.50									**5000**	**7.50**
type a	**I Year Advance Work**	400	0.64	400	0.64	400	0.64	400	0.64	400	0.64									**2000**	**3.20**
	I Year Nursery		0.29		0.10		0.10														**0.49**
	I Year Advance Work			400	0.83	400	0.82	400	0.82	400	0.82	400	0.82							**2000**	**4.11**
	II Year (I maintenance)					400	0.04	400	0.04	400	0.04	400	0.04	400	0.04						**0.20**
	III Year (II maintenance)							400	0.20	400	0.20	400	0.20	400	0.20	400	0.20				**1.00**
type b	IV Year (III maintenance)									400	0.04	400	0.04	400	0.04	400	0.04	400	0.04		**0.20**
	I Year Nursery		0.64		0.21		0.21														**1.06**
	I Year Advance Work			200	0.31	200	0.32	200	0.32	200	0.32	200	0.32							**1000**	**1.59**
	II Year (I maintenance)					200	0.05	200	0.05	200	0.05	200	0.05	200	0.05						**0.25**
	III Year (II maintenance)							200	0.41	200	0.41	200	0.41	200	0.41	200	0.41				**2.05**
type c	IV Year (III maintenance)									200	0.01	200	0.01	200	0.01	200	0.01	200	0.01		**0.05**
	I Year Nursery		0.05		0.02		0.03														**0.10**
	I Year Advance Work			200	0.40	200	0.40	200	0.40	200	0.40	200	0.40							**1000**	**2.00**
	II Year (I maintenance)					200	0.12	200	0.12	200	0.12	200	0.12	200	0.12						**0.60**
	III Year (II maintenance)							200	0.08	200	0.08	200	0.08	200	0.08	200	0.08				**0.40**
grass	IV Year (III maintenance)									200	0.08	200	0.08	200	0.08	200	0.08	200	0.08		**0.40**
scrub	I Year Nursery		6.42		2.14		2.14														**10.70**

		2015-16		2016-17		2017-18		2018-19		2019-20		2021-22		2022-23		2023-24		2024-25		Total	
		Phy.	**Fin.**	**Phy.**	**Fin.**	**Phy.**	**Fin.**	**Phy.**	**Fin.**	**Phy.**	**Fin.**	**Phy.**	**Fin.**	**Phy.**	**Fin.**	**Phy.**	**Fin.**	**Phy.**	**Fin.**	**Phy.**	**Fin.**
	I Year Advance Work			2000	3.11	2000	3.11	2000	3.11	2000	3.11	2000	3.11							**10000**	**15.55**
	II Year (I maintenance)					2000	0.53	2000	0.53	2000	0.53	2000	0.53	2000	0.53						**2.65**
	III Year (II maintenance)							2000	4.08	2000	4.08	2000	4.08	2000	4.08	2000	4.08				**20.40**
	IV Year (III maintenance)									2000	0.14	2000	0.14	2000	0.14	2000	0.14	2000	0.14		**0.70**
	I Year plantation		4.75		1.19		1.19														**7.13**
	I Year Advance Work			2000	11.20	1000	5.60	1000	5.60	1000	5.60	1000	5.60							**6000**	**33.60**
	II Year (I maintenance)					2000	0.65	1000	0.33	1000	0.33	1000	0.33	1000	0.33						**1.97**
	III Year (II maintenance)							2000	4.60	1000	2.30	1000	2.30	1000	2.30	1000	2.30				**13.80**
urban	IV Year (III maintenance)									2000	1.17	1000	0.59	1000	0.58	1000	0.58	1000	0.58		**3.50**
	Fallowland			200	0.40	200	0.40	200	0.40	200	0.40	200	0.40							**1000**	**2.00**
	Shelter belt			300	2.40	300	2.40	300	2.40	300	2.40	300	2.40							**1500**	**12.00**
	Highway			400	2.80	400	2.80	400	2.80	400	2.80	400	2.80							**2000**	**14.00**
	Seabuckthorn			350	3.50	350	3.50	350	3.50	350	3.50	350	3.50							**1750**	**17.50**
	Wetlands			200	1.20	200	1.20	200	1.20	200	1.20	200	1.20							**1000**	**6.00**
Promoting alternative Fuel energy				2000	0.66	2000	0.66	2000	0.66	2000	0.66	2000	0.66							**10000 HH**	**3.30**
Total plantation Component			**14.29**		**32.61**		**28.41**		**33.79**		**32.93**		**30.21**		**8.99**		**7.92**		**0.85**		**190.00**
Non plantation Component			**5.00**		**11.41**		**9.94**		**11.83**		**11.53**		**10.57**		**3.15**		**2.77**		**0.30**		**66.50**
G. Total		**1400**	**19.29**	**7650**	**44.02**	**6650**	**38.35**	**6650**	**45.62**	**6650**	**44.46**	**5250**	**40.78**	**0**	**12.14**	**0**	**10.69**	**0**	**1.15**	**34250**	**256.50**