Himachal Pradesh Forests for Prosperity Project

Environment Assessment & Management Framework

Submitted By

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EXECUTIVE SUMMARY

About the Project

In Himachal Pradesh (HP), forests are an important natural asset with 67% of forest land of total geographical area. In this total forest area, 46 % of land support, coniferous and broad-leaved forests while the remaining 54 % include, high altitude areas above the tree line, snow peaks, alpine pastures, and river beds. In Himachal Pradesh, Himachal Pradesh Forest Department (HPFD) owns and manages the forest related issues. It is a unitary body and undertakes all functions of forest management, spanning from policy formulation and planning, to provision of forest goods and services, to monitoring and evaluation, to enforcement of rules and regulations. According to HP Forest Sector Policy and Strategy of 2005, the goal of the HPFD is to promote sustainable forest management in the state to maintain and rehabilitate forests and enhance rural livelihoods. As per the provisions of the 14th Finance Commission, the HPFD secure financial resources for state development programs, while maintaining forest cover of the state. Timber, firewood, fodder, and other Non-timber Forest Products (NTFP) produced by HPFD on public forests enhance local livelihoods. Similarly, HPFD ensure sediment retention and water regulation services to the benefit of the hydropower sector though catchment area management plans. The Department has also zoned 22.65% of the legally classified forest area as protected areas (5 national parks, 26 wildlife sanctuaries and 3 conservation reserves) to protect biodiversity and promote ecotourism in these areas. It also manages all the activities falling place in these areas.

Project Description

The Project Development Objective is *to improve forest management and communities' access to markets in selected watersheds in Himachal Pradesh.* Short- to medium-term outcomes captured by the PDO are expected to contribute to improved water flow and sediment regulation in the targeted watersheds in the long term. The critical aspects in this objective are the institutional improvements and the institutional development approach to address the issues mentioned before. These two elements will contribute to building the momentum for reforming the forest sector. The project will contribute to improving forest quality in the state of Himachal Pradesh by strengthening the core functions and service delivery of the HP Forest Department; and facilitating participation of communities and private sector in forest sector activities. This will ensure the sustainable delivery of key ecosystem services from forest land while contributing to the state's economic development goals. Systemic improvements in the states afforestation programs will help to increase the fiscal allocations to the state, from the center, a part of which are made based on forest quality. This will lead to an overall increase in the state budget for development programmes. A more inclusive institutional regime will enable the provision of incentives for community participation in forest and pasture management. The project will focus on increasing benefits from sustainable managed value chains of Non-Timber Forest products (NTFPs). Institutional changes will also be brought about to increase accountability and create an enabling policy environment for private sector investments in the forestry sector.

Project Components

The HP Forests for Prosperity Project is designed to address: i) the poor quality and density of HP's forests (caused by increasing pressure on the forests and the low technical and institutional capacity of the HPFD), through a combination of institutional reform of the HPFD (while encouraging greater cooperation and synergy of all institutions involved in watershed management), capacity building and investments in the field targeted through a watershed management based approach; and, ii) the limited community participation and benefit sharing from forest and pasture management. These issues are then addressed through a number of critical interventions, so that the project can help HP move towards improved forest management and community participation in the medium term, with the outcomes of improved quality of forest and pasture, increased central budget allocation from the Finance Commission, strengthened climate resilience of forests and pastures and improved livelihoods, jobs, and income for targeted communities in the longer term.

Component 1. Institutional Reform and Capacity Building for Integrated Watershed Management (IWM) and Improved Forest Management

The objective of this component is to facilitate a better alignment of institutional mandates for IWM and strengthen the HPFD's institutional structure and capacity for improved forest service delivery. It will be implemented through a combination of technical assistance (TA) and public investments.

Subcomponent 1A: Building consensus for integrated watershed management

Through the convening power of the HPFD and its role in managing watersheds, this subcomponent will provide TA to support the state in improving the integrated management of its water resources through awareness raising, capacity building, and analytical and knowledge-sharing activities.

Subcomponent 1B: Institutional reform and strengthening of the Himachal Pradesh Forest Department

This subcomponent will support the preparation process for long-term institutional reforms and will implement an initial set of reforms. It will provide TA and investments to (a) conduct a comprehensive functional review of forest institutions (FRFI) that will produce a vision, goal, and time-bound action plan for change; (b) implement an initial set of prioritized HPFD institutional reforms; and (c) strengthen the HPFD's capacity to deliver its core mandates. This subcomponent will be implemented in parallel to, but will also be informed by, the longer-term reform process to catalyze IWM under Subcomponent 1A.

Finally, this subcomponent will finance training and capacity-building activities for the HPFD based on a comprehensive training plan, including the development and delivery of trainings by internal and external providers using virtual technologies and international exposure. The subcomponent will also finance minor infrastructure improvements at the State Forest Training Institute at Chail. These trainings will build HPFD's capacity to inform community members, including women, about their forest-related rights, duties, entitlements, and obligations, as well as the roles of communities and the HPFD in the preparation and implementation of participatory, inclusive, and responsive forest management plans.

Component 2. Improved Investments in Participatory and Sustainable Land and Water Management

This component aims to promote participatory and sustainable land and water management through financing the planning and implementation of investments in selected catchments based on the Sutlej Basin Comprehensive CAT (CCAT) plan and range-level site-specific management plans (SSMP) to be developed under this component. This component will also include investments in the Shimla catchment to enhance the availability and sustainability of water sources for water supply in the city of Shimla. The

main implementers and beneficiaries of this component will be HPFD staff and community organizations, particularly JFMCs, located within the selected catchments. The component will be implemented through a combination of TA, public investments, and partnerships with other public agencies and will lead to improved forest cover (and hence carbon capture), increased water and sediment regulation, reduced erosion, and improved community participation in forest management.

Subcomponent 2A: Improved planning for participatory and sustainable land and water management

Subcomponent 2A will (a) review implementation progress and revise the existing Sutlej Basin CCAT plan; (b) support additional diagnostic studies, designs, and assessments to inform the land and water management investments; and (c) develop SSMPs based on the CCAT plan through a participatory process led jointly by the relevant JFMCs. The CCAT plan review will first assess the implementation of all activities identified in the original CCAT plan and identify the most cost-effective interventions implemented to date. The review will also propose revisions to the CCAT plan investments and their location based on new hydrological and sediment load modeling and will incorporate the districts of Bilaspur and Una.

This subcomponent will also support other assessments to inform priority investments, including (a) an assessment of grassland damage caused by invasive species and the design of scientific control interventions; (b) an assessment of historical fire lines and development of new fire lines given future climate and land use patterns; (c) an assessment of the existing pasture management and livestock management practices and design of improved practices; and (d) the design and implementation of a remote sensing-based forest fire danger rating and early warning system to be implemented by the Forest Survey of India (FSI). Finally, because the CCAT plan identifies investments over a large geographic scale (division level), this subcomponent will support the development of more detailed SSMPs to operationalize the CCAT plan at the forest range level, which will be developed through a participatory process led by the forest range officer together with the relevant JFMCs and other line departments.

Subcomponent 2B: Implementation of participatory and sustainable land and water management investments

This subcomponent will finance the implementation of new and previously unimplemented investments specified in the CCAT Plan and SSMPs. These investments will be based on the improved planning supported by Subcomponents 1A and 2A and will contribute to improved forest cover and quality, as well as improved water and sediment regulation. The investments will be implemented by the HPFD and the JFMCs according to the SSMP, and all goods, works, and services associated with CCAT plan/SSMP implementation in the selected catchments will be financed by the project. Because women prefer wage labor to NTFPs as a source of cash income but are underrepresented in forestry operations, female facilitators will work with forest officers to ensure female laborers are hired for these investments.

Activities supported by this subcomponent include, but are not limited to, the following areas:

(a) Soil and water conservation measures. Vegetative measures, such as grass seeding, grass turfs, brushwood, check dams, live hedge, and spurs, as well as mechanical measures, such as drop structures, crate wire spur structures, and drainage line treatments, like gully plugging.

(b) Development of high-quality seed stands. Establishment of a geo-referenced seed production system (linked to the Forest Management Information System [FMIS]); construction of a centralized seed center to process, treat, store, and test the seed in controlled conditions; design and implementation of a seed certification and distribution system; and construction of a climate-controlled seed bank.

(c) Nursery development. Provision of machinery and equipment and the production of approximately 200,000 additional seedlings in each of 19 nurseries (one per range) for subsequent planting in forest plantations. Nursery and species selection will incorporate JFMC inputs.

(d) Plantation management. Planting and management of trees in open and medium density forests and slopes vulnerable to soil erosion and protection of plantations. The locations and species will be selected based on JFMC inputs and ecological conditions.

(e) Pasture management. Introduction of rotational grazing, delineation of forest areas for the supply of fodder, and the introduction of voluntary systems to prevent livestock from grazing in nurseries and young forest plantations and avoid the loss of seedlings.

(f) Forest fire prevention and suppression. Organization of community fire protection groups; provision of locally appropriate firefighting equipment, including small vehicles, to the HPFD offices and participating communities; and training of communities on controlled burning, developing van-sarovars (small ponds) to douse fires, and the collection and use of pine needles.

Component 3. Strengthened and Inclusive Value Chains for NTFPs and Other Commodities

This component aims to incentivize community participation in sustainable land and water management by removing barriers to private investment in NTFP value chains and increasing local incomes from sustainable production and increased value addition. It will support value chains for NTFPs and other high-value commodities (agriculture, horticulture or animal husbandry) given the relatively small contribution of NTFPs to local livelihoods at present. This component will target NTFP collectors, who are often women, and the producers interested to cultivate NTFPs (medicinal, aromatic plants) and other high-value commodities identified for value chain development. This component will support the development of a Value Chain Development Cell (VCDC) within the SPMU that will (i) coordinate and monitor the overall implementation of this component and (ii) manage consultant contracts between the SPMU and qualified support entities, such as NGOs, consulting firms, and research institutes that will implement many of the component activities. Alignment with the relevant line departments (e.g., agriculture, horticulture, and animal husbandry) will be ensured through the project State Level Steering Committee (SLSC). In addition to improving local livelihoods, the proposed activities will reduce pressure on forests and contribute to increased carbon sequestration and reduced erosion. Component 3 through, strengthened NTFP value chains and institutional strengthening with a focus on women, will enhance livelihood diversification and improve communities' resilience to climate change.

Component 4. Institutional Coordination and Project Management

The project will be implemented through the HPFD and will be coordinated with other line departments through a project SLSC, as described in the following two subcomponents.

Subcomponent 4A: Institutional coordination

This subcomponent will finance the creation and maintenance of the project SLSC and its recurrent expenditures to ensure multisectoral coordination and participation across the HPFD and other relevant line departments and institutions involved in the project and/or that have the institutional mandate to advise or implement activities related to watershed management and NTFPs/agribusiness. The project will finance (a) SLSC technical meetings; (b) quarterly district meetings for convergence with other developmental schemes/programs of the Government; (c) exposure visits to project activity sites for information sharing and learning from project implementation; and (d) international exposure visits.

Subcomponent 4B: Project management

This subcomponent will finance project management activities (mainly through operational costs) undertaken by a State Project Management Unit (SPMU) in the HPFD, including (a) budgeting; (b) preparing annual work plans; (c) contract management; (d) financial management (FM); (e) procurement; (f) environmental and social risks management; (g) communications; and (h) M&E.

Preparation of Environment Assessment and Management Framework

The Environmental Management Framework (EMF) is developed to incorporate environmental and social concerns into the main project planning, execution and operation. It will be applied to all the sub-projects in different stages of the project cycle. The framework has been developed considering three broad stages of project cycle viz. project preparation, project implementation and project operation. For each stage, potential adverse environmental and social issues have been identified and mitigation measures proposed that have been integrated with the EMF implementation process.

The specific objectives of the EMF are as under:

a. To provide a systematic approach for identifying the various possible environmental impacts at the different stages of the project cycle.

b. To identify appropriate mitigation measures for addressing the identified environmental impacts.

c. To devise an institutional arrangement for mainstreaming environmental management in project implementation processes.

Environmental Baseline

Himachal is in the western Himalayas covering an area of 55,673 km^2 Most of the state lies on the foothills of the Dhauladhar Range. At 6,816 m Reo Purgyil is the highest mountain peak in the state of Himachal Pradesh.The drainage system of Himachal is composed both of rivers and glaciers. Himalayan rivers crisscross the entire mountain chain. Himachal Pradesh provides water to both the Indus and Ganges basins. The drainage systems of the region are the Chandra Bhaga or Chenab, Ravi, Beas, Sutlej, and Yamuna rivers. These rivers are perennial and are fed by snow and rainfall. They are protected by an extensive cover of natural vegetation.

- The state is divided into three main topographical regions; (i) the Shivalik (ii) the lesser Himalayas and (iii) the Greater Himalayas.

- The Sutlej valley has relatively poor sandy loam constituting exposed bedrock, and gravel soil. The soils in the study area as grouped under Udalts – Ochrepts soils are shallow, veneer and brown in color with high base in Lahul and Spiti and Kinnaur region; Othents – Ochrepts soil are combination of shallow red loamy and sandy ideally suitable for horticulture in Kullu and Kinnaur district; Udoll soil characterization of cold desert and found in Kinnaur district.

- The elevation in Sutlej basin varies from 300 meters to 7000 meters. After Mandi district, the variation in altitude of Sutlej catchment area is not high as much as in Kinnaur, Kullu, Shimla, and Mandi districts. It flows from moderate slope at an altitude of 656 meters to 290 meters

- The Sutlej basin lies in seismically sensitive zones (zone V and IV) as per the Seismic Zoning Map of India (Ref: IS: 1893-1984 Fourth Revision). Thirty Two percent of the total geographical area of the State is prone to the severe seismic risks as it falls into the Very High Damage Risk Zone V.

- The climate of the state varies from place to place depending on the altitude. It varies from hot and sub-humid tropical (450-900 m) in the southern low tracts, warm and temperate (900-1,800 m), cool and temperate (1,900-2,400 m) and cold alpine and glacial (2,400-4,800 m) in the northern and eastern high mountain ranges.

- The climate of basin varies from hot and sub-humid tropical in the southern part and while the glacier and alpine are seen in the eastern and northern part of the basin. In the region, the temperature generally starts rising from the beginning of March till June, which is the hottest month of the year.

- Sutlej basin receives precipitation from western disturbances. The western disturbance passes over the northwestern part during the winter. Sutlej valley faced the heavy monsoon of the outer Himalayas and heavy snowfall of the arid Tibetan.

- Climate change is affecting ecosystems and vegetation in the state. Vegetation in Himachal Pradesh especially in upper altitudes is more vulnerable because of its sensitivity to higher temperatures. Analysis of temperature trends in the Himalayan region shows that temperature increases are greater in the uplands than that in the lowlands (Shrestha et al., 1999).

The total area of Himachal Pradesh is 55,673 km^2, out of this 66.52% of the area of the state is legally defined as forestland (37033 $km^{2)}$. But forest and tree cover constitute only 27.63% of the total geographical area (FSI, 2013). It has been reported that only 30.5% of the recorded forest area can support vegetation, as rest of the area is uncultivable because of terrain and snow (HPFD, 2005). State has 14683 sq km of forest cover and 697 sq. km of tree cover constituting a total of 15380 sq. km of forest and tree cover (ibid). Forests are distributed across four zones in the State- viz sub-tropical forests, sub-temperate forests, wet-temperate and dry temperate forests (GoHP, 2002).

The forest Types in Himachal Pradesh are:

- Sub-tropical forests occur at an elevation up to 915 meters above mean sea level (msl) with annual rainfall between 700 to 1000 mm.

- Sub temperate forests are found at an elevation between 916 to 1523 MSL with an annual rainfall of 900 to 1200 mm.

- Wet temperate forests are found at an elevation ranging from 1524 to 2472 meters above msl with annual rainfall of 1000 to 2500 mm.

- Dry temperate forests are found above 2472 meters where mean annual precipitation of 2500 mm.

Forests fall under three legal categories of reserve, protected and unclassed forests. The reserve forests offer minimum rights of use for local people (5.12%). The protected forests recognize many rights including timber, grazing and non-timber forest produce for local people. Almost 90% of the state forests

fall under this category, 57% of the protected forest areas have not been demarcated i.e. their limits have not been set through legislative orders. The unclassed is a category of forest in transition i.e. after surveys and settlement of rights, these could be either shifted to reserve or protected forest category (Vasan, 2001)

In case of Himachal Pradesh, the area under very dense forest cover has been stable from 2005 to 2013. Area under the category of moderately dense forests has slightly declined during this period. The open and scrub forest area constitute 35% of the total forest cover.
The hills contain western Himalayan broadleaf forests and Himalayan subtropical pine forests. Various deciduous and evergreen oaks live in the broadleaf forests, while chir pine dominates the pine forests. Western Himalayan subalpine conifer forests grow near tree line, with species that include East Himalayan fir, West Himalayan spruce, deodar (the state tree), and blue pine.
Himachal Pradesh supports 463 birds and 359 animal species, including the leopard, snow leopard (the state animal), ghoral, musk deer and western tragopan. Himachal Pradesh has two National Parks, (Great Himalayan National Park and Pin Valley National Park, (The Great Himalayan National Park in Kullu district was created to conserve the flora and fauna of the main Himalayan range, while the Pin Valley National Park to conserve the flora and fauna of the cold desert), 30 Wildlife Sanctuaries, and 3 conservation reserves. Of which two wildlife sanctuaries fall within the project area.

The permanent pastures including alpine meadows form a very important and stable ecosystem, and cover more than 12,000km^2 and constitute 21% of state geographical area. Various natural scrub forests cover an area of 566km^2 and constitute another 1% of the state geographical area. Both alpine and scrub pastures provide important habitats to medicinal and aromatic plants in the state. HP land use estimates indicate the area under permanent pastures and grazing lands was 1,163,402 Ha (11,634 km^2) in 1966, 1,193,602 (11,936 km^3) in 1995 and 1,471,536 (15,190km^2) in 2000. The increase in alpine pasture are recorded in 4 districts (Shimla, Kinnaur, Lahaul and Spiti, Una, and Hamirpur) where settlement operations have been fully or partially completed, otherwise all other districts show a decrease.
Himachal's landscape and pastures are under threat by invasive species and weeds, and this has become a cause of serious concern from the ecological, biodiversity, socio-economic and health point of view. Key species of concerns are Lantana *camara* L.; *Parthenium hysterophorus* L.; *Ageratum conyzoides* L; *Eupatorium adenophorum* Sp. These invasive are a major issue in the subtropical and lower temperate areas in the State and affect the quality of forests and the pasture lands, and availability of fodder.

Legal and Regulatory Framework

Project would be implemented with following key applicable acts, notifications, and policies: Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006; National Policy on Tribal Development, 1999;Panchayati Raj Act, PESA 1996; Right to Information Act, 2005; Environment (Protection) Act and amendments,1986; National Forest Policy, 1988; Indian Forest Act, 1927; Forest Conservation Act, 1980; HP State Forest Policy, 1980; Payment for Ecosystem Services (PES) policy 2013; Wildlife (Protection) Act, 1972; Himachal Pradesh Participatory Forest Management Regulations, 2001 etc. World Bank' operational policies on Environmental Assessment OP/ BP 4.01; Natural Habitats OP/BP

4.04; Forests OP/BP 4.36; Pest Management OP/BP 4/.09; Physical and Cultural Resources OP/BP 4.11 and World Bank EHS Guidelines would be applicable as well.

Stakeholder Consultations

In accordance with the World Bank Safeguard policies, consultations have been carried out with all relevant stakeholders those who have been identified through stakeholder analysis. The consultation process has been carried out at three levels (state, district, and village level).

- Two district level consultations were held in Reckong Peo (District Kinnaur) and Rampur (District Shimla) with the representatives from HP forest department, associated line department officials, block officers, forest guards, elected members of village assembly, JFMCs, NTFP collectors and sellers, community members, NGOs, and technical/research groups. The objective of the consultation sessions was to improve the project's interventions regarding environmental management and to seek views from the stakeholders on the environmental issues and the ways these could be resolved.

- Village level consultation meetings were also held in 14 villages to create awareness and generate understanding about the project among stakeholders, and to collect their opinion, suggestions for planning and designing of the project.

- State level institutional consultations were undertaken with government officials in Forest Department, Wildlife Conservators, Department of Environment, Science and Technology, Agriculture Producer Marketing Board, Forest Development Corporation, Forest Training Institute, and Himalayan Forest Research Institute, and Indian Grassland and Fodder Research Institute.

- Following disclosure of the draft EMF, comments and two public disclosure workshops were held one at Reckong Peo (Schedule-V area), Distt Kinnaur and other at Rampur bushar, Distt. Shimla for wider publicity on dated 23.08.2018 and 24.08.2018, respectively.

- During the workshops power point presentations were given by the Scientist's from GB Pant Institute regarding the project activites and their implications on the lives of the communities and environment in general.

- The suggestions by the participants were also invited during these workshops and were duly incorporated in the report and in project design.

The key objective of consultations was:

a. To create awareness and generate understanding about the project among stakeholders, and to collect their opinion, suggestions for planning and designing of the project
b. To find out whether the communities are likely to accept the measures suggested under the HPFPP and to find out whether these measures have no or little environmental impacts on the communities.
c. To assess positive as well as adverse environmental impacts in the area through participatory methods such as walk through and focus group discussions.
d. To identify the need and concern of the stakeholders
e. To assess cultural patterns and behavior of local communities towards the project

f. To understand the environmental issues associated with the project through discussions
g. To understand suggestions and opinions of the community, Government officials and NGOs on mitigation measures to counter and check the adverse and negative impact that threaten the environment in the area.
h. To understand the satisfaction level of people with proposed mitigation and management measures proposed for the project.

Key Environment Risks and Impacts

The forests of Himachal Pradesh are a storehouse of rich biodiversity, in addition to providing forest cover, they feed perennial rivers that are the source of drinking water, irrigation, and hydropower and provide ecosystem services such as carbon sequestration, soil moisture regulation, erosion control, support pollination and water and climate regulation. The forests currently face challenges of degradation, including (i) irregular and diminished flow of natural springs, (ii) loss of soil fertility due to erosion (iii) widening gap between demand and supply of fuel wood and fodder, and (iv) increase incidences of forest fires, and invasive weeds leading to deterioration in habitat quality and pastures. The project interventions themselves are designed to mitigate these issues.

There are no major significant and/ or irreversible impacts expected as a result of the project. Even though the project would be implemented in environmentally sensitive areas (protected forests, wildlife sanctuaries, and eco- sensitive buffer zones) the overall impact of the project is expected to be positive. The interventions will lead to improving the quality and management of forests and pastures in the selected ranges of the Sutlej basin, reducing silt load, increasing carbon sequestration and providing stronger incentives and engagement for communities to manage threats faced by the forest areas.

The potential adverse impacts/risks of project financed activities have been identified as part of the safeguards assessment- these include (i) pest control in forest nurseries (ii) management of wastes, plastic root trainers and polybags through nursery operations (iii) integration of species selection, nursery planning with the planting site selection, to maintain good survival rates (iv) construction and repair of small erosion control structures (check dams) if not implemented appropriately could lead to localized drainage problems and/or habitat disturbance (v) health and safety risks for community workers in forest operations and (vi) with project investment in value chain infrastructure and enterprise support to NTFPs, there could be unsustainable expansion/intensification of NTFP harvesting, and demand for feeder roads. At the same time, activities supporting NTFP harvesting and marketing need to ensure that incentives provided to communities to manage forests are sustainable from an environmental and silviculture standpoints.(vi) Small scale civil works (NTFP post-harvest infrastructure, nursery upgradation, forest fire fighting infrastructure, and construction of staff quarters, storage areas) if not implemented appropriately could lead to adverse impacts on soil, drainage, noise and air quality that could impact sensitive and pristine habitats.

Since the precise details and exact locations of the site-specific investments within the targeted ranges will take place during project implementation, and are not yet known, an Environmental Management

Framework (EMF) has been prepared in accordance with the provisions of OP/BP 4.01 category B requirements. Plans for environmental screening and mitigation measures to deal with risks and impacts identified them have been developed.

Environmental Management

The Environmental Management Framework (EMF) is developed to incorporate environmental and concerns into the main project planning, execution and operation. The main purpose of the EMF is to provide a transparent framework with clear accountability for managing environment impacts and risks associated with the project, outlining the criteria and procedures that the project should follow to help ensure compliance with the Bank's safeguard policies.

Since, the precise details and exact locations of the site-specific investments within the targeted ranges will take place during project implementation, and are not yet known, an Environmental Management Framework (EMF) has been prepared in accordance with the provisions of OP/BP 4.01 category B requirements. The EMF mainstreams environmental considerations within the project, minimizing adverse impacts and provides mitigation actions, institutional and monitoring requirements for supervision, which will be integrated into the Project Implementation Manual. All civil works supported by the project will be screened for environmental risks, and specified mitigations will be adopted, where required, such as in the case of a centralized seed center, a standalone EMP would be prepared before any works commence. Specific to the project activities the EMF includes (i) screening of project investments based on their potential environmental impacts and benefits; (ii) compliance measures with regulatory requirements and forest department management plans (iv) impact identification and associated mitigation measures, and (v) guidelines based on best management practices for (a) seed collection, management and storage; (b) nursery upgradation and management; (c) plantation establishment; (d) soil and water conservation works (e) pest and disease control; (f) forest fire control and response; (g) management of invasive weeds; (h) NTFP and MAP harvesting; (i) development of NTFP pre and post-harvest value chain infrastructure, and enterprise facilitation centres; (j) health and safety management in forestry operations; and, (k) detailed guidance on preparation of standalone EMPs for investments which will be identified through detailed studies in project implementation such as the seed center.

Institutional and Implementation Arrangements

The project implementation arrangements are anchored on the HPFD. The project will be managed under the overall umbrella of the forest governance and management structure in India and following the HPFD rules, including circles, division's, ranges and JFMCs.

(a) *State Level:*

i. State Level Steering Committee: The project management and coordination will be the responsibility of the HPFD under the overall supervision and control of the State Level Steering Committee (SLSC). The SLSC will be headed by the Additional Chief Secretary of the Government of HP who also heads the Department of Forest and Environment

ii. State Project Management Unit (SPMU): The project will be implemented by HPFD through a State Project Management Unit headed by a Chief Project Director (CPD) who would have day-to-day executive control of the project. The core personnel of the SPMU are 3 Deputy

Project Directors (DPD) one each for (ia) General Administration, (iib) Operations, and (iii) Liaison, Coordination and Training (LCT). Project will have Subject Matter Specialists (SMS) one each for Social and Community Institution Development, Environment Management, Forest Based Livelihood, Communications and Knowledge Management, IT, Procurement, Monitoring and Evaluation). Besides, activities such as Finance and Accounts, Administration and Staff Matters will be handled by the superintendent staff deputed from the HPFD to the project.

iii. Circle Office Level: The administrative control of all forest divisions rests with respective Circles Offices headed by the Conservator of Forests who will execute the project at the field level. An officer of the level of DFO will be appointed to coordinate and plan project activities at the Circle level and supervise performance of divisions with respective circles. The nodal officer will be supported by a Superintendent, Junior Engineer (JE) and an Office Assistant.

iv. Division Office Level: The project operations at the division will be planned and supervised by respective Division Forest Officers. He will be supported by an Assistant Conservator of Forests, Senior Assistance and Office Assistant.

v. Range Office Level: Range will be the basic unit of project planning and implementation. All activities of component 1 and 2 will be planned through a Range Management Plan. Each Range Officer will be supported by their respective Dy. Rangers, Office Assistants and Beat Managers (Forest Guards). Each beat will have community facilitator, hired from the local community, to mobilize communities for project activities.

vi. JFMC / CUG Group Level: all operations will be conducted through JFMCs / NTFP CUGs

Monitoring and Evaluation

The Forest Department, GoHP has prior experience and expertise to implement World Bank funded operations. It is agreed that GoHP will have an Environmental Specialist as a core team member in the SPMU who will be supported, as required; by consultants. The SPMU will monitor overall implementation of the EMF. In addition, focal points may be identified at the range level for site-based monitoring of project interventions, facilitating the screening, and reviewing the implementation of mitigation measures. The Environment Specialist would be responsible for analysis of the screening process and inspection of project sites to assess compliance with EMF procedures, work with the communities to integrate any required measures into the activities. Implementation of mitigation actions and environmental good practice guidelines will be regularly monitored by the project M&E system and during supervision missions.

Implementation Plans

The SPMU will undertake overall planning and implementation of the project. It will be responsible for reviewing and finalizing fund flow mechanisms, procurement management, reporting and monitoring, policy advocacy and awareness generation. It will prepare guidelines and technical manual for programme activities, including the community operational manual. Moreover, it will provide infrastructural and institutional support to district, block and village level units. Specifically, the DPD – Operations will be responsible for planning and implementation of field operations such as development of range-plans, nursery management, plantations, fire management, community mobilization and and forest-based livelihood promotion.

Budget

Under the Project Implementation Plan (PIP), the cost for EMF implementation comprises of staffing arrangements at SPMU level, and associated trainings. The EMF will also support application of environmental best practices in preparation and implementation of the range management plans, trainings, capacity building workshops, action/innovation research, monitoring, tools etc. Most of the mitigation actions are already mainstreamed into the project design and do not require activities such as special constructions. The initial budget lines and estimate of lump sum amount necessary to cover the EMF. The cost of implementing some of the provisions of the EMF, over 5 years of the project, is up to 1% of the total project cost, for ensuring implementation of all activities proposed under the EMF.

Disclosure

The draft EMF report alongwith Executive summary (Hindi & English) were disclosed on the website of the Department of Forests (HPFD) http://hpforest.nic.in/pages/display/NHNkZmFjg3dkNGY2NQ==-himachal-pradesh-forests-for-prosperity-project, on dated 16th June 2018, publicized in newspapers (national and local) and hard copies were made available to the project stakeholders through all the Divisional forest offices (10 nos.) in Project area on the same day.

Chapter 1 Introduction to the Project

1.1 Background to the HP FPP

In Himachal Pradesh (HP), forests are an important natural asset with 67% of forest land of fatal geographical area. In this total forest area, 46 % of land support, coniferous and broad-leaved forests while the remaining 54 % include, high altitude areas above the tree line, snow peaks, alpine pastures, and river beds. In Himachal Pradesh, Himachal Pradesh Forest Department (HPFD) owns and manages the forest related issues. It is a unitary body and undertakes all functions of forest management, spanning from policy formulation and planning, to provision of forest goods and services, to monitoring and evaluation, to enforcement of rules and regulations. According to HP Forest Sector Policy and Strategy of 2005, the goal of the HPFD is to promote sustainable forest management in the state to maintain and rehabilitate forests and enhance rural livelihoods. As per the provisions of the 14th Finance Commission, the HPFD secure financial resources for state development programs, while maintaining forest cover of the state. Timber, firewood, fodder, and other Non-timber Forest Products (NTFP) produced by HPFD on public forests enhance local livelihoods. Similarly, HPFD ensure sediment retention and water regulation services to the benefit of the hydropower sector though catchment area management plans. The Department has also zoned 22.65% of the legally classified forest area as protected areas (5 national parks, 26 wildlife sanctuaries and 3 conservation reserves) to protect biodiversity and promote ecotourism in these areas. It also manages all the activities falling place in these areas.

Himachal Pradesh, the land of apples and snow, is situated in the northern tip of India. It has geographical area of 55,673 km^2 and constitutes nearly 11 % of the total area of Himalaya (Map). Nearly 30 % of its geographical area is permanently under snow and more than 66 % is designated as forest with nearly 15 % falling within the Protected Area (PA) network. The state almost wholly comprises of mountain ranges, hills and valleys, and has 4 major agro-climatic zones viz., Sub-tropical low hills (Shivalik Range, below 800 ml), Mid-hills sub-temperate zone (between 800 to 2800 m), High hills, temperate wet and sub- alpine (above 2800 m) and High hill, temperate dry alpine zone (higher reaches of inner and outer Himalaya).

The High Hill Region covering Kinnaur, Lahaul & Spiti and Chamba districts accounts for > 30% of states geographical area. This zone is further divided into sub- alpine zones lies at an altitude of 3000 - 3500 m and alpine zone lies above 3500 m. About 80 % Inner Himalaya is under pastures, with cultivated and forested areas spreading over 10 % of land and inhabited by transhumant indigenous communities that use these alpine pastures for grazing their livestock.

Forestry interventions have largely managed forests for tree production, with few interventions to augment the supply of firewood, fodder and grasses to meet the needs of local populations. The gap between demand and supply for these resources has subsequently been widening. To add to the problem, many forest areas that in the past served as grazing lands, including alpine pastures, have been negatively affected by invasive species. Similarly, while the NTFP resources of the state has a potential to supplement

the livelihood of rural communities by adding the value of the products. The economic contribution of this sector has largely remained underexploited in the state.

Provision of forest ecosystem services to the hydropower sector is also falling short. Projects above 10 MW capacities are required to contribute at least 2.5% of total project investment costs to be invested by the HPFD to reduce the flow of sediment and regulate the flow of water to hydropower facilities. Despite investments in developing and implementing CAT plans, sediment continues to reduce the efficiency of hydropower facilities in the state. In 2012, the Nathpa Jhakri project alone was said to have lost USD 1.3M as a result of high levels of silt in the river, which halted power generation. In general, the technical capacity required to design effective CAT plans which is currently lacking in the state. Also, the resources invested are insufficient to implement CAT plan activities at a large scale for the interventions to have an impact on sediment retention. At the same time, the lack of monitoring of CAT plan implementation and impacts has resulted in a lack of accountability. The state is also yet to realize the economic potential of forest ecotourism. Therefore, there is a need to revise the concession policy to promise private sector participation with the necessary checks and balances to prevent forest degradation.

Recognizing the challenges facing the forest sector, many of which are institutional and systemic, the Government of Himachal Pradesh (GoHP) has articulated a clear vision and commitment to reform the sector. Improving the effectiveness of forest-services provision by the HPFD – be it maintenance and improvement of forest cover, provision of timber, firewood, and fodder to local communities, catchment area management for sustainable hydropower – and minimizing the role of the HPFD in areas such as NTFP value chains and ecotourism where communities and private sector have a role to play, are the two main prongs of the reform strategy. These priorities underpin the scope of the proposed Project. The GoHP has requested this Project as a follow on to the successful DPOs financed by the World Bank to realize the vision of a forest sector as an additional engine of green growth. This operation is part of a broader World Bank's strategic re-engagement with the forestry sector in India to achieve multiple goals: livelihoods, jobs, better service provision, and climate change adaptation and mitigation.

Along with the many forest services listed above, forests also provide another key service, namely, the provision on drinking water. Springs and local streams play an important role in the provision of drinking water in hill states. Over 8000 schemes of the Irrigation and Public Health Department of Himachal Pradesh depend heavily on natural flows of water from springs, streams and rivers for providing water for drinking and domestic use and irrigating agriculture. However, in the last few decades the discharge in springs and streams is reducing and becoming seasonal. Such declines are common across the Himalayas and are linked to changes in precipitation patterns, climate change, infiltration, land use change, number of snow retention days etc., all leading to reduce infiltration and reduced base flows especially in summer. In addition, demand has increased exponentially, leading to a search for water further and further away. Revisiting forest management to integrate managing for water is an essential requirement in ensuring drinking water security. By improving the capacity of the HPFD to provide ecosystem services to the hydropower sector, namely by improving their capacity to management the catchment, the project will also enable the HPFD to provide other services provided by the catchment, including drinking water.

The Environmental Management Framework (EMF) is developed to incorporate environmental and social concerns into the main project planning, execution and operation. It will be applied to all the sub-projects in different stages of the project cycle. The framework has been developed considering three broad stages of project cycle viz. project preparation, project implementation and project operation. For each stage, potential adverse environmental and social issues have been identified and mitigation measures proposed that have been integrated with the EMF implementation process.

1.2 Project development objective (PDO)

The Project Development Objective is *'To improve forest management and communities' access to markets in selected watersheds in Himachal Pradesh.* Short- to medium-term outcomes captured by the PDO are expected to contribute to improved water flow and sediment regulation in the targeted watersheds in the long term.

1.2 Project Beneficiaries

Key project beneficiaries include communities living in forest areas, especially women and NTFP collectors, as well as nomadic/transhumant/pastoral communities, who will benefit from improved access to and value from NTFPs, including fodder, medicinal and aromatic plants, and fruit trees. Improvements in fodder availability will particularly benefit women and scheduled tribes, as they are most involved with livestock management. Women, and the community at large, will also benefit from employment opportunities in nursery and plantation activities and the development of NTFP and agricultural value chains. Community members will benefit from training on forest management (including rights, obligations, and entitlements), improved production and postharvest practices, and basic business skills, as well as technical and financial support to invest in sustainable value chain and enterprise development in partnership with the private sector. The project will also increase the skills and capacity of the HPFD and other government officials, as well as private companies involved in the selected value chains.

1.4 Detailed Description of the Project Components

Building on global best practice, the project is designed to emphasize community engagement and the sustainable use and processing of forest resources as key entry points to longer-term institutional and policy reforms, which this project will also support through identification and initial implementation. This will be achieved in a context of enhanced land and watershed planning.

Component 1. Institutional Reform and Capacity Building for Integrated Watershed Management (IWM) and Improved Forest Management

The objective of this component is to facilitate a better alignment of institutional mandates for IWM and strengthen the HPFD's institutional structure and capacity for improved forest service delivery. It will be implemented through a combination of technical assistance (TA) and public investments.

Subcomponent 1A: Building consensus for integrated watershed management

Through the convening power of the HPFD and its role in managing watersheds, this subcomponent will provide TA to support the state in improving the integrated management of its water resources through awareness raising, capacity building, and analytical and knowledge-sharing activities. The subcomponent will support an IWM institutional assessment to (a) identify the institutions that affect water supply, quality, use, and management and their roles, responsibilities, and mandates; (b) conduct a strengths, weaknesses, opportunities, and threats analysis of the current institutional framework and highlight any overlaps and/or gaps that undermine IWM; (c) identify opportunities for institutional coordination and synergy; and (d) build consensus on the need for reform and develop the goals and vision for institutional collaboration, a time-bound action plan, and an implementation road map. The results of this assessment are expected to inform the GoHP on the necessary longer-term reforms to the relevant state institutions that will result in effective interagency cooperation and, ultimately, IWM.

Subcomponent 1B: Institutional reform and strengthening of the Himachal Pradesh Forest Department

This subcomponent will support the preparation process for long-term institutional reforms and will implement an initial set of reforms. It will provide TA and investments to (a) conduct a comprehensive functional review of forest institutions (FRFI) that will produce a vision, goal, and time-bound action plan for change; (b) implement an initial set of prioritized HPFD institutional reforms; and (c) strengthen the HPFD's capacity to deliver its core mandates. This subcomponent will be implemented in parallel to, but will also be informed by, the longer-term reform process to catalyze IWM under Subcomponent 1A.

The FRFI will analyze the key challenges and constraints that limit the sector's performance, identify and develop ownership for the vision and goals of the reform process, and—in collaboration with key stakeholders—develop a time-bound road map for implementation. The review will include an analysis and benchmarking of national and state legal, regulatory, and institutional frameworks to identify constraints and bottlenecks, including the effective and accountable participation of the private sector and communities, and will clarify and address any overlapping or conflicting institutional responsibilities. This subcomponent will also support the HPFD in implementing an initial set of prioritized institutional governance reforms through TA and investments, including the purchase of the required equipment. These reforms include the (a) development and implementation of a comprehensive HPFD IT and knowledge strategy that integrates all relevant applications on a common geospatial platform based on open source technology and allows for watershed-level planning;[1] (b) development and implementation of a comprehensive HPFD monitoring and evaluation (M&E) system to support forest management; (c) establishment of a centralized staff performance monitoring system for the HPFD linked to the IT platform; and (d) development of regulatory and management standards for pastures.

Finally, this subcomponent will finance training and capacity-building activities for the HPFD based on a comprehensive training plan, including the development and delivery of trainings by internal and external providers using virtual technologies and international exposure. The subcomponent will also finance minor

[1] The preparation of the IT strategy will include the analysis of the most appropriate disruptive technologies.

infrastructure improvements at the State Forest Training Institute at Chail.[2] These trainings will build HPFD's capacity to inform community members, including women, about their forest-related rights, duties, entitlements, and obligations, as well as the roles of communities and the HPFD in the preparation and implementation of participatory, inclusive, and responsive forest management plans.

Component 2. Improved Investments in Participatory and Sustainable Land and Water Management

This component aims to promote participatory and sustainable land and water management through financing the planning and implementation of investments in selected catchments based on the Sutlej Basin Comprehensive CAT (CCAT) plan and range-level site-specific management plans (SSMP) to be developed under this component.[3] This component will also include investments in the Shimla catchment to enhance the availability and sustainability of water sources for water supply in the city of Shimla.[4] The main implementers and beneficiaries of this component will be HPFD staff and community organizations, particularly JFMCs, located within the selected catchments. The component will be implemented through a combination of TA, public investments, and partnerships with other public agencies and will lead to improved forest cover (and hence carbon capture), increased water and sediment regulation, reduced erosion, and improved community participation in forest management.

Subcomponent 2A: Improved planning for participatory and sustainable land and water management

Subcomponent 2A will (a) review implementation progress and revise the existing Sutlej Basin CCAT plan; (b) support additional diagnostic studies, designs, and assessments to inform the land and water management investments; and (c) develop SSMPs based on the CCAT plan through a participatory process led jointly by the relevant JFMCs. The CCAT plan review will first assess the implementation of all activities identified in the original CCAT plan and identify the most cost-effective interventions implemented to date. The review will also propose revisions to the CCAT plan investments and their location based on new hydrological and sediment load modeling and will incorporate the districts of Bilaspur and Una (not covered by the current plan). The CCAT plan review will include the design and implementation of a comprehensive M&E system for CCAT plan investments across the entire Sutlej Basin, including installation of instruments to measure water flows and sediment loads to refine the existing hydrological models and ensure that the CCAT plan investments maximize silt retention and surface water absorption given likely climate change impacts. The CCAT plan review and M&E system will be linked to and informed by Subcomponent 1A and the geospatial database developed under Subcomponent 1B.

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[2] The trainings will cover diverse subjects that will be designed with a climate change lens, including on management of seed stands, nursery management, range management, forest protection, community mobilization, and institutional development.

[3] The CAT plan outlines the types of sustainable land and water management investments, including soil and water conservation measures, like check dams, plantations, landslide protection, and pasture management, and their general location based on best practices and available watershed modeling. The detailed technical specifications (e.g., species and specific sites) will be developed by the forest range officer together with the JFMC, including women members, through the SSMP.

[4] This project will support the rejuvenation of springs based on a proposal prepared in coordination with the Council for Science Technology and Environment to protect water sources critical for the city of Shimla in 24 key locations. The Bank is supporting the preparation of the First Programmatic Water Supply and Sewerage Service Delivery Reform Development Policy Loan for Shimla-Himachal Pradesh (P167246) for improved and financially-sustainable water supply and sewerage services.

This subcomponent will also support other assessments to inform priority investments, including (a) an assessment of grassland damage caused by invasive species and the design of scientific control interventions; (b) an assessment of historical fire lines and development of new fire lines given future climate and land use patterns; (c) an assessment of the existing pasture management and livestock management practices and design of improved practices; and (d) the design and implementation of a remote sensing-based forest fire danger rating and early warning system to be implemented by the Forest Survey of India (FSI).

Finally, because the CCAT plan identifies investments over a large geographic scale (division level), this subcomponent will support the development of more detailed SSMPs to operationalize the CCAT plan at the forest range level, which will be developed through a participatory process led by the forest range officer together with the relevant JFMCs and other line departments.[5] All JFMC members will be trained on the SSMP process, basic forest management and group administration, and the CCAT plan to facilitate their informed participation in the SSMP development process. Separate trainings and community consultations with women and men will also be held to (a) enhance their awareness about women's and men's forest-related entitlements and obligations and (b) develop clarity on the rules for women and men to engage in forest-related decision-making and access and benefit from forest resources. Where JFMCs have yet not been formed, are not fully functioning, or are not fully inclusive of all community members, especially women and scheduled castes/tribes, training and community consultation support involving female facilitators will be provided to (re)establish community groups, build cohesion, ensure that women occupy leadership roles in the JFMC executive committees, and provide leadership training to women.

Subcomponent 2B: Implementation of participatory and sustainable land and water management investments

This subcomponent will finance the implementation of new and previously unimplemented investments specified in the CCAT Plan and SSMPs. These investments will be based on the improved planning supported by Subcomponents 1A and 2A and will contribute to improved forest cover and quality, as well as improved water and sediment regulation. The investments will be implemented by the HPFD and the JFMCs according to the SSMP, and all goods, works, and services associated with CCAT plan/SSMP implementation in the selected catchments will be financed by the project.[6] Because women prefer wage labor to NTFPs as a source of cash income but are underrepresented in forestry operations, female facilitators will work with forest officers to ensure female laborers are hired for these investments.

Activities supported by this subcomponent include, but are not limited to, the following areas:

(a) **Soil and water conservation measures.** Vegetative measures, such as grass seeding, grass turfs, brushwood, check dams, live hedge, and spurs, as well as mechanical measures, such as drop structures, crate wire spur structures, and drainage line treatments, like gully plugging.

(b) **Development of high-quality seed stands.** Establishment of a geo-referenced seed production system (linked to the Forest Management Information System [FMIS]); construction of a centralized seed

[5] The SSMP will include detailed technical specifications (for example, species, sites, treatments, and so on) and budgets for each investment and will identify the entity responsible for implementation, for example, the forest range officer or the JFMC.

[6] Catchments selected for inclusion in this project were deliberately chosen to avoid geographic overlap with other projects.

center to process, treat, store, and test the seed in controlled conditions; design and implementation of a seed certification and distribution system; and construction of a climate-controlled seed bank.

(c) **Nursery development.** Provision of machinery and equipment and the production of approximately 200,000 additional seedlings in each of 19 nurseries (one per range) for subsequent planting in forest plantations. Nursery and species selection will incorporate JFMC inputs.

(d) **Plantation management.** Planting and management of trees in open and medium density forests and slopes vulnerable to soil erosion and protection of plantations[7]. The locations and species will be selected based on JFMC inputs and ecological conditions.

(e) **Pasture management.** Introduction of rotational grazing, delineation of forest areas for the supply of fodder, and the introduction of voluntary systems to prevent livestock from grazing in nurseries and young forest plantations and avoid the loss of seedlings.

(f) **Forest fire prevention and suppression.** Organization of community fire protection groups; provision of locally appropriate firefighting equipment, including small vehicles, to the HPFD offices and participating communities; and training of communities on controlled burning, developing *van-sarovars* (small ponds) to douse fires, and the collection and use of pine needles.

Component 3. Strengthened and Inclusive Value Chains for NTFPs and Other Commodities

This component aims to incentivize community participation in sustainable land and water management by removing barriers to private investment in NTFP value chains and increasing local incomes from sustainable production and increased value addition. It will support value chains for NTFPs and other high-value commodities (agriculture, horticulture or animal husbandry) given the relatively small contribution of NTFPs to local livelihoods at present. This component will target NTFP collectors, who are often women, and the producers interested to cultivate NTFPs (medicinal, aromatic plants) and other high-value commodities identified for value chain development. This component will support the development of a Value Chain Development Cell (VCDC) within the SPMU that will (i) coordinate and monitor the overall implementation of this component and (ii) manage consultant contracts between the SPMU and qualified support entities, such as NGOs, consulting firms, and research institutes that will implement many of the component activities. Alignment with the relevant line departments (e.g., agriculture, horticulture, and animal husbandry) will be ensured through the project State Level Steering Committee (SLSC). In addition to improving local livelihoods, the proposed activities will reduce pressure on forests and contribute to increased carbon sequestration and reduced erosion. Component 3 through, strengthened NTFP value chains and institutional strengthening with a focus on women, will enhance livelihood diversification and improve communities' resilience to climate change.

Subcomponent 3.A: Creating enhanced market opportunities for NTFPs and other commodities

Building on the maximizing finance for development approach, this subcomponent will support (a) a value chain and marketing analysis;[20] (b) the HPFD to reform its approach to managing NTFP value chains; (c) the development of a model for the sustainable harvesting of selected NTFPs; (d) the development of geographic indications and certification systems/standards; and (e) limited operating costs (e.g. meetings, trainings, tools) to promote viable business partnerships between private sector value chain actors and groups of NTPF

[7] The project will pilot innovative methods using simple treatment replication trials and scale up successful methods.

collectors/commodity producers (community user group [CUG]), such as marketing platforms, Private-Public Dialogues, knowledge events, business promotion events, and/or trainings (e.g., on certification systems) for private companies. In targeted project areas, taking into consideration the altitude and climate zone, a detailed study and mapping of NTFPs will be undertaken to identify 'priority NTFPs' that may be propagated in the wild to increase supply and in cases of rare species, enhance their chances of survival.

Subcomponent 3.B: Increasing sustainable collection/production and linking producers to markets

This subcomponent aims to (i) mobilize the NTFP collectors and producers of other potential commodities into CUGs; (ii) build their capacity for sustainable collection, production, and business development through trainings and technology demonstrations; (iii) support the establishment of "productive alliances" between CUGs and private sector value chain actors to increase private investment in sustainable value chains and the value forest fringe communities capture from these value chains; and (iv) support high-performing, growth-oriented federations of eligible CUGs to develop into 'sustainable enterprises' by financing secondary/tertiary processing, larger-scale storage, and marketing activities. The subcomponent will provide initial seed grant funding[21] and TA to finance CUG establishment, including the development of by-laws and the opening of a group bank account, and to establish partnerships with private sector value chain actors, for example through buyer fairs and study tours. This subcomponent will also finance two sequential rounds of competitive matching grants[22] to finance (1) eligible sustainable and climate-smart production[23] and primary processing and storage investments identified in the business plans and (2) eligible secondary/tertiary processing activities.[24] The second (sequential) round of competitive matching grants will be offered to transform eligible federations of groups supported under the first round into sustainable enterprises by co-financing secondary/tertiary value addition equipment and facilities with federations that have proven to be high performing and growth-oriented according to performance criteria developed by the VCDC. The eligibility criteria and terms for all three grant rounds will be identified in the Project Implementation Plan (PIP) and in the Operational Manual, with special emphasis on extending support to women-only groups to help them productively participate in the supported value chains. Female facilitators will also be hired and trained to provide additional training and support to women-only groups to help them identify partners and ensure they benefit from the matching grants schemes.

Qualified support agencies (e.g., NGO, consulting firm, or research institute) will implement the mobilization, organization and capacity building of the CUGs and federations with field assistance from facilitators at the range level. These agencies will prepare training locally-appropriate materials, develop manuals and other operational guidelines, and provide Training of Trainers to the facilitators, who will implement the field-level trainings for the CUGs and related technology demonstrations.

Component 4. Institutional Coordination and Project Management

The project will be implemented through the HPFD and will be coordinated with other line departments through a project SLSC, as described in the following two subcomponents.

Subcomponent 4A: Institutional coordination

This subcomponent will finance the creation and maintenance of the project SLSC and its recurrent expenditures to ensure multisectoral coordination and participation across the HPFD and other relevant line

departments and institutions involved in the project and/or that have the institutional mandate to advise or implement activities related to watershed management and NTFPs/agribusiness. The project will finance (a) SLSC technical meetings; (b) quarterly district meetings for convergence with other developmental schemes/programs of the Government; (c) exposure visits to project activity sites for information sharing and learning from project implementation; and (d) international exposure visits.

Subcomponent 4B: Project management

This subcomponent will finance project management activities (mainly through operational costs) undertaken by a State Project Management Unit (SPMU) in the HPFD, including (a) budgeting; (b) preparing annual work plans; (c) contract management; (d) financial management (FM); (e) procurement; (f) environmental and social risks management; (g) communications; and (h) M&E.

1.5 Project Implementation Area

The project includes state-level activities, especially in Component 1. The target areas for Components 2 and 3 will be implemented following the nested HPFD institutional arrangement that includes 7 districts: Kinnaur, Kullu, Mandi , Shimla, Solan, Una, and Bilaspur; 5 forest circles: Rampur, Mandi, Shimla, Bilaspur, and Hamirpur; 10 forest divisions: Kinnaur, Rampur, Ani, Karsog, Kotgarh, Shimla, Shimla Urban, Kunihar, Una, and Bilaspur; and 21 forest ranges: Kalpa, Moorang, Kilba, Rampur, Nankhari, Bahali, Kumarsain, Kotgarh, Bhajji, Dhami, Pangana, Seri, Magru, Karsog, Chowai, Shimla Urban, Darla, Ramgarh, Bangana, Shri Naina Devi, and Kalol.

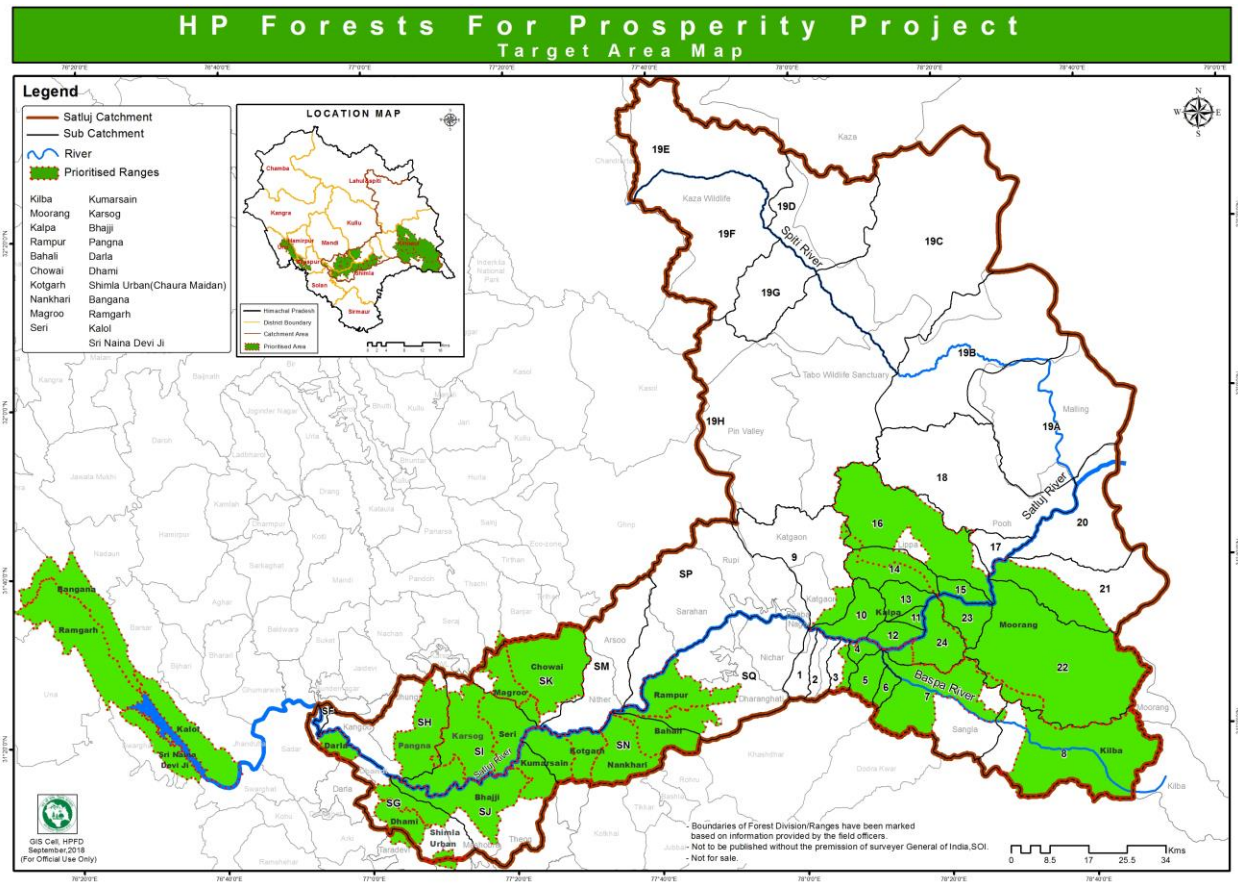


Figure 1 Project Area Forest Ranges

1.6. Methodology for Preparation of EMF

1.6.1 Objectives of the EMF

To ensure that the environmental issues are systematically identified and addressed in the various stages of the implementation of subprojects, an Environment Management Framework (EMF) has been developed for this project. The term EMF is used to depict operations with multiple subprojects/ interventions and spread over the lifetime of the project over a wide geographic area. Design of subprojects, exact locations as well as impacts are not determined at the preparation stage of the project

The specific objectives of the EMF are as under:

d. To provide a systematic approach for identifying the various possible environmental impacts at the different stages of the project cycle.

e. To identify appropriate mitigation measures for addressing the identified environmental impacts.

f. To devise the institutional arrangement, capacity building strategy and monitoring plan for mainstreaming environmental management in project implementation processes.

The Environment Assessment is conducted by G.B. Pant Institute of Himalayan Studies, Kullu by a team subject specialist on environmental issues and field facilitators.

1.6.2 Methodology

Task 1: Desk Review of Literature and Similar Projects

Review of secondary data and literature from the viewpoint of identifying key environment issues across the state, and the project area pertaining to forest and natural resource management. The review also included relevant environment policies, legal and regulatory provisions of the World Bank, Government of India and Government of Himachal Pradesh. Further, relevant projects of WB viz. HP Mid Himalayan Watershed project (HPMHWDP), HP Development Policy Lending phase I & II (HP DPL) and other donor funded projects such as KfW Himachal Pradesh Forest Ecosystems Climate Proofing Project, Indo-German Indo-German Eco-Development Project. and JICA funded "Himachal Pradesh Forests Ecosystem Management and Livelihoods Improvement Project" having an objective to manage and enhance forests area ecosystems in the project area by sustainable forests ecosystem management, biodiversity conservation, livelihoods improvement support and strengthening institutional capacity, thereby contributing to environmental conservation and sustainable socio-economic development in the project area in the state of Himachal Pradesh. Subsequently, field visits for validating the above issues were conducted to the identified GP clusters. (For details of field visit please see Annex). Based on the desk review of forest sector in HP and initial discussions/ consultations with the various state agencies/ stakeholder's, the consultants have documented the key environmental issues that are identified in the project, and investments/activities that could pose higher environmental risks.

Task 2: Review of Legal and Policy Framework

Compliance of the project with the relevant legislations of GoI (MoEF & CC), GoHP, and policies of World Bank has been ascertained. Applicable legislations during implementation of the project and necessary provisions for compliance has also examined. The data gaps generated between these policies has been identified and fulfilled. The World Bank safeguard policies /directives that would be applicable by the proposed interventions has been reviewed, and the implications of which have been outlined.

Task 3: Generation of Baseline Data

For the accomplishment of objectives, both primary and secondary data were collected, analyzed, synthesized and documented. To identify the salient characteristics of the state, region and subproject districts, a complete profile of the environmental characteristics has been compiled. The secondary information are collected in such a way that are relevant to understanding the baseline, as well as the design of mitigation and enhancement measures, as pertaining to physical (topography, geology, soil characteristics, climate, seismicity, water resources (surface and groundwater), water quality, air quality, biological (flora, fauna, protected areas (sanctuaries, national parks, bio reserves, wetland etc.,) and forests (protected forest, reserved forest social forest etc.,)) and economy, Eco Tourism, and NTFPs. Secondary data was collected from the relevant Central/State Government Departments, Universities, different research organizations, local authorities etc. (Please see Annexure I for sources of information)**.** Field surveys were also undertaken in the done through interviews, interactive meetings and PRA's in selected villages in Kinnaur, Shimla, Ani, Karsog, and Kunihar Forest Divisions. Questionnaire based surveys and samplings will be done for the information on changes in land use pattern, floristic diversity, status of water resources, natural hazards, impacts of developmental activities on forest resources.

Task 4: Stakeholders Consultation and Disclosure

Consultations has been carried out with all relevant stakeholders those who have been identified through stakeholder analysis, these include government, community institutions, and private sector. The consultation process has been carried out at three levels (state level, forest division level, forest department officials and beneficiaries) in discussion with the respective line departments. In this context consultation-cum-interaction meetings were conducted at Reckong Peo (District Kinnaur) and Rampur (District Shimla) with the representatives from HP forest department, local NGO, elected members of village assembly, JFMC and residents of concerned villages. The objective of the consultation sessions is focused to improve the project's intervention with regard to environmental management and to seek views from the stakeholders on the environmental issues and the ways these could be resolved. The procedure for conducting stakeholder and public consultations with relevant consultation formats/ questionnaires/ checklists has been prepared and enclosed with the EMF in Annexure 3, which acts as a guide for conducting consultations at any stage of the subproject implementation. In addition to consultations with community institutions, forest guards, NGOs and village members, the project also undertook institutional consultations with Forest Department, Department of Environment, Science and Technology, Agriculture Producer Marketing Company, Forest Corporation, Forest Training Institute, and Himalayan Forest Research Institute. A second round of consultations will be carried out once the draft EMF has been disclosed on the project website for stakeholder views and suggestions.

Task 5: Impact Prediction & Mitigation Measures

The potential impact (both positive and negative) due to the subprojects intervention has been determined through the identification, analysis and evaluation of these impacts on sensitive areas (natural habitats; sites of historic, cultural and conservation importance), and forest range areas. These have been identified as significant positive and negative impacts, direct, indirect, and residual impacts. For each impact that has been predicted from the above analysis, if unavoidable, a feasible and cost-effective mitigation measures have been identified in order to reduce or mitigate them.

Task 6: Environment Management Plan

Based on the assessed Environmental Impacts, specific Environmental Guidelines, and EMPs are prepared, in such a manner that these are amenable for incorporation in the bidding/contract document. The EMP is prepared as per the requirements of Bank's safeguard polices. The EMP includes detailed environmental mitigation measures; separate for pre-construction, construction and operation period.

Task 7: Institutional Arrangement to Manage Environment Impacts Effectively

The institutional arrangement in HP Forest PMU for implementing the safeguards has been reviewed and outlines with roles and responsibilities, this pertains to inter-sectoral arrangements, management procedures and training, staffing, operation and maintenance and budgeting.

Public Disclosure: The draft EMF report alongwith Executive summary (Hindi & English) were disclosed on the website[8] of the Department of Forests (HPFD), dated 16th June 2018, with executive summary hindi translation. Hard copies were made available to the project stakeholders through all the Divisional forest offices. Two public

[8] http://hpforest.nic.in/pages/display/NHNkZmFjg3dkNGY2NQ==-himachal-pradesh-forests-for-prosperity-project

consultations were undertaken based on the disclosed report in Reckong Peo, Kinnaur and Rampur Bushar, Shimla in September 2018. Comments and feedback were integrated into the final EMF report.

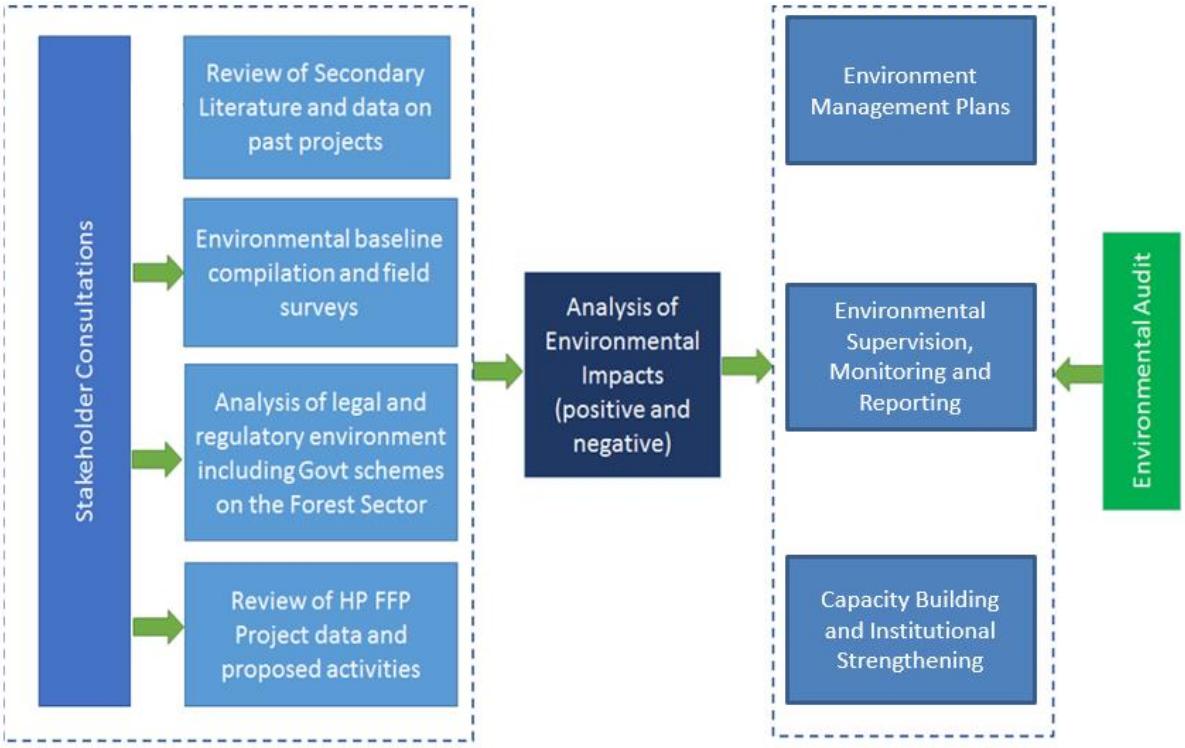


Figure 2 HP FFP EMF Methodology Overview

Chapter 2 Environmental Baseline

2.1 Introduction and overview of Himachal Pradesh

Himachal Pradesh is a mountainous state with two-thirds of its geographical area under forest and other natural ecosystems (DoEST, undated). It is bound by Tibet to the east, Uttarakhand to the south, Punjab to the west and Jammu and Kashmir to the North. More than 90% of the population in the state is rural, most of which is dependent on forests for at least part of their livelihoods (DoEST, 2012; DoEST, undated). Besides supporting the livelihoods of people in the State, forests protect catchment of important river systems such as Sutlej, hence providing hydrological services to millions of people downstream (HPFD, 2005). Forests of the state also regulate climate and rainfall across the entire region, hence influencing the economies of neighboring states such as Haryana and Punjab.

The state is rich in floral and faunal biodiversity. Its vegetation varies from dry scrub forests at lower altitudes to alpine pastures at higher altitudes (HPFD,). The state also has established a large network of protected areas including two national parks, thirty wildlife sanctuaries and three conservation reserves.
But there are many challenges affecting the quantity and quality of forests in the area.

Table 1 General Overview of Himachal Pradesh

FACTS ON THE STATE		
1	Total Area of the State	55,673 km^2 (1.7% of country)
2	Administrative Districts	12 [Shimla, Kullu, Kinnaur, Lahaul and Spiti, Mandi, Solan, Chamba, Hamirpur, Sirmaur, Nahan, Kangra and Bilaspur]
3	Villages	20,011
4	Population	6.08 million (0.57% of country)
5	Livestock population	5.11 million (1.1% of country)
6	Grazing land available per livestock	0.26 ha
7	Recorded Forest Area	37,033 sq km (66.52%)
8	Forest Cover	15,100 sq km
9	Forest area under snow cover	16,376 sq km
10	Extent of Water Bodies in Forests	455 sq km
11	No. of Protected Areas [NPs and WLs)	2 NPs; 30 WLS
12	Canopy density (Very Dense Forests)	3,110 sq km
13	Canopy density (Medium Dense Forests)	6705 sq km
14	Canopy density (scrub)	5285 sq km
15	Hydropower Potential	21000 MW
19	Tourists	5.5 million per annum

Source: *State of Environment Report for HP, Forest Department and FSI Report for Himachal Pradesh, 2017*

2.2 Overview of the Sutlej Basin

River Sutlej traverses a course of 320 km within Himachal Pradesh and considered as the largest river among the four rivers int eh State (Beas, Ravi, Yamuna and Chenab). The Sutlej basin covers 45 per cent of the total geographical area of the state. The elevation of the basin varies between 6680 m in sub catchment near Tidong in Kinnaur district; to 540 m in Bilaspur district. Along its course the river passes through Lahaul & Spiti, Kinnaur, Shimla, Kullu, Mandi, Solan and Bilaspur districts. The catchment area of the River Sutlej is located above the permanent snow line at an altitude of 4,500 meters. Agriculture, horticulture and animal husbandry are the mainstay of 60-70% of the population despite very small area under irrigation. The major portion of the Sutlej catchment comprises of steep to very steep high hills, and natural disasters experienced include earthquakes, landslides, flash floods, cloud bursts and avalanches. The area is prone to the seismic risks as it falls into the Very High Damage Risk Zone V.

There are several major hydroelectric projects on the Sutlej, e.g., the 1000 MW Karcham-Wangtoo Hydroelectric project, 1500 MW Nathpa-Jhakri Project, Shongtong-Karcham project-450 MW, Rampur Hydropower project 412 MW, Baspa Hydropower project- 300 MW, Kashang project 243 MW, Tidong project 100 MW.

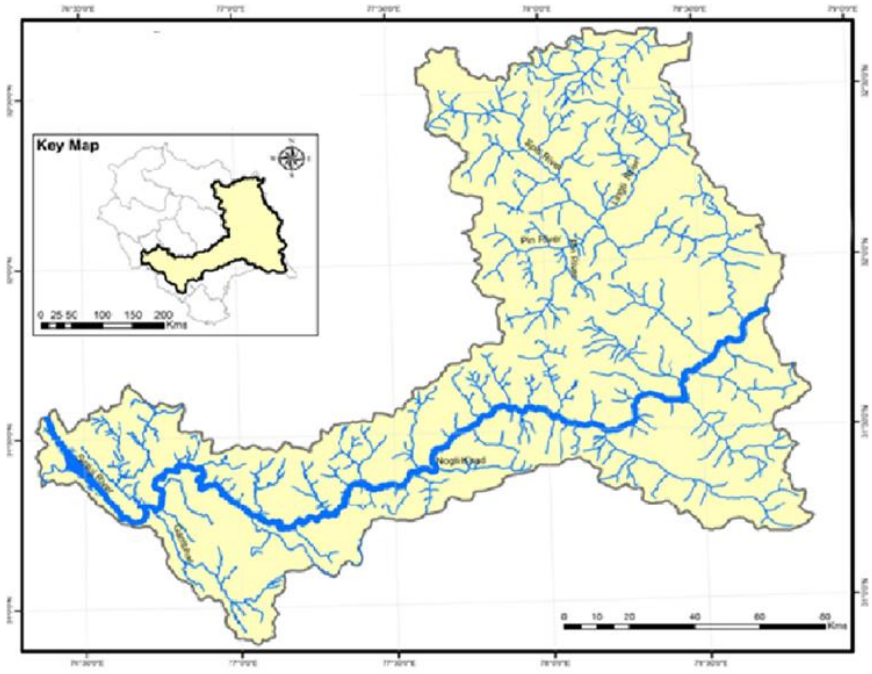


Figure 3 Geographical Map of Sutlej basin

Catchment Area Treatment Plan (CAT Plan)

In recognition of the important role that dense forests play in reducing sediment run-off downstream, the state government has mandated that hydropower projects include investment in Catchment Area Treatment (CAT) plans. Projects above 10 MW capacity are required to contribute at least 2.5% of total project investment costs to be invested by the HPFD to reduce the flow of sediment and regulate the flow of water to hydropower facilities. At the same time, low forest quality contributes to erratic water flows (floods and droughts) and a reduction in the number and productivity of the freshwater springs that support agriculture and urban water

supplies, as well as reduced carbon sequestration. Increased sedimentation from denuded hillsides is also reducing hydropower efficiency.

Despite investments in developing and implementing CAT plans, sediment continues to reduce the efficiency of hydropower facilities in the state. In general, the technical capacity required to design effective CAT plans is lacking in the state, and the resources invested to date are insufficient to implement CAT plan activities at a large enough scale for the interventions to have an impact on sediment retention. At the same time, the lack of monitoring of CAT plan implementation and impacts has resulted in a lack of accountability.

The CCAT Plan of Sutlej River basin covers an area of 20,000 km² upstream of Kol dam (drawn up in 2009/2010.). It envisages an expenditure of Rs. 1440 crore on various treatment measures, over a period of ten years, to reduce the silt load in the hydro projects. The activities envisaged under the CAT plan (such as afforestation/reforestation, pasture management/rehabilitation, and erosion prevention infrastructure (e.g. check dams, trenching etc.) were based on thorough field evaluations and consultation and thus represent a strong foundation for the improved delivery of services from forestry in the catchment.

The plan has been prepared for this purpose with the following objectives:

i To facilitate the hydrological functioning of the catchment and to augment the quality of water of the river and its tributaries

ii Conservation of soil cover and to arrest the soil erosion, floods and siltation of the river and its tributaries and consequent reduction of siltation in the reservoir of the project

iii Demarcation of the priority of sub watersheds of treatment based on soil erosion intensity in the catchment area

iv Rehabilitation of degraded forest through afforestation measures

v Soil conservation through biological and engineering measures to reduce sediment load in river and tributaries, thus improving the quality of water

vi Ecosystem conservation resulting from increased vegetative cover and water retaining properties of soil

2.3 Environmental Baseline

This section details the existing environmental profile of the project areas, namely Kinnaur, Kullu, Mandi, Shimla, Solan, Una, and Bilaspur. The environmental profile is based on the review of secondary information/ data collected from the respected departments, literature/ journals, websites and also observation obtained from the site visits to the project districts.

2.3.1 Physiographic Profile

Himachal Pradesh is in the western Himalayas covering an area of 55,673 km^2. At 6,816m Reo Purgyil is the highest mountain peak in the state of Himachal Pradesh.The drainage system of Himachal is composed both of rivers and glaciers. Himachal Pradesh provides water to both the Indus and Ganges basins. The

drainage systems of the region are the Chandra Bhaga or Chenab, Ravi, Beas, Sutlej, and Yamuna rivers. These rivers are perennial and are fed by snow and rainfall.

Topography: The state can be divided into three main topographical regions

i *The Shivalik or Outer Himalaya:* It covers the lower hills of Kangra, Hamirpur, Una, Bilaspur, lower parts of Mandi, Solan and Sirmour districts. Within this zone, altitude varies from 350 m to 1500 m.

ii *Inner Himalayas or Mid-mountains*: Altitude varies from 1500 m to 4500 m and includes areas such as the upper parts of Pachhad and Renuka in Sirmaur district, Chachiot and Karsog tehsils of Mandi district and upper parts of Churah tehsil of Chamba district.

iii *Alpine zone or the Greater Himalaya:* Has altitude above 4500 m and comprises areas of Kinnaur district, Pangi tehsil of Chamba district and areas of Lahaul & Spiti district.

Soils: The Sutlej valley has relatively poor sandy loam constituting exposed bedrock, and gravel soil. The soils in area as grouped under Udalts and Ochrepts. Ochrepts soil are combination of shallow red loamy and sandy ideally suitable for horticulture in Kullu and Kinnaur district; Udoll soil characterization of cold desert and found in Kinnaur district. Glaciers and snow cap soils are found where the glaciers and snow cover are present throughout the year in Lahual and Spiti, and Kullu district. Medium deep, well-drained soil with loamy surface was observed in the lower reach of the Sutlej with limited area.

Geology: In the Sutlej basin plutonic rocks or hypabyssal rocks like Granites, Syenites, Diorites, Gabbros, and Volcanic rocks are found and are charecterised by strong and durable character, interlocking texture, hard silicate mineral composition, absence of any inherent weak planes, and resistance to weathering. The well cemented siliceous sandstones have good compressive strength. The Quartzites are very hard and highly resistant to weathering and suitable for foundation of dam sites.

Topography and Elevation: The elevation in Sutlej basin varies from 300 meters to 7000 meters. The Kinnaur district varies from 2,550 meters to 6,791 meters. At the altitude of 2,670 meters Kalpa village is situated which is connected by link road of 14 kilometers from Powari to Rekong Peo. Village Moorang village (2,591 meters) is situated about 39 kilometers away from Kalpa on left bank of River Sutlej. Due to such variations in the altitudes, Sutlej River flows with high speed in district Kinnaur. Just after Kinnaur, River Sutlej has entered Shimla district. The altitude of district varies from 300 meters to 6,000 meters. Rampur is situated on the banks of River Sutlej with an altitude of 924 meters along the Hindustan-Tibet road. Mandi district extents upto 754 meters of heights. Bilaspur varies between altitudes of 290 meters to 1,980 meters. From Kinnaur to Mandi River Sutlej flows from an altitude of 6000 meters to 656 meters. After Mandi district, the variation in altitude of Sutlej catchment area is not high as much as in Kinnaur, Kullu, Shimla, and Mandi districts. It flows from moderate slope at an altitude of 656 meters to 290 meters.

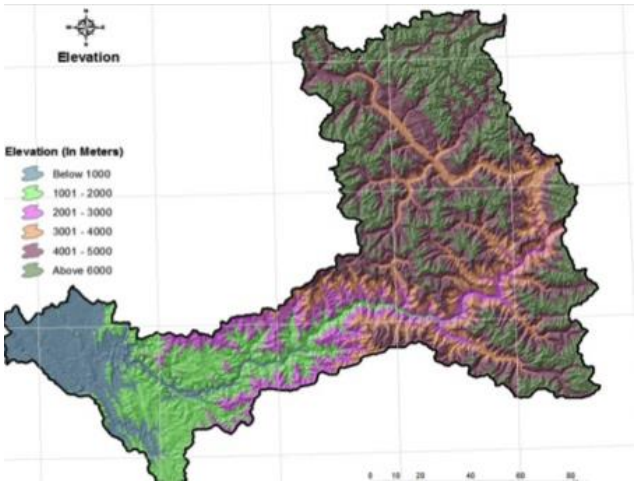


Figure 4 Elevation of Sutlej Basin

Natural Disasters the Sutlej basin lies in seismically sensitive zones (zone V and IV) as per the Seismic Zoning Map of India (Ref: IS: 1893-1984 Fourth Revision). Thirty Two percent of the total geographical area of the State is prone to the severe seismic risks as it falls into the Very High Damage Risk Zone V. The Kinnaur earthquake of January 19, 1975 (Magnitude (M) = 6.7) and the Dharamshala earthquake of April 26, 1986 (M = 5.7) are well recorded in respect of damages caused and losses incurred. During the past five decades, 20 earthquakes with magnitude > 5 have been recorded from the Sutlej Valley (Wulf et al., 2012).

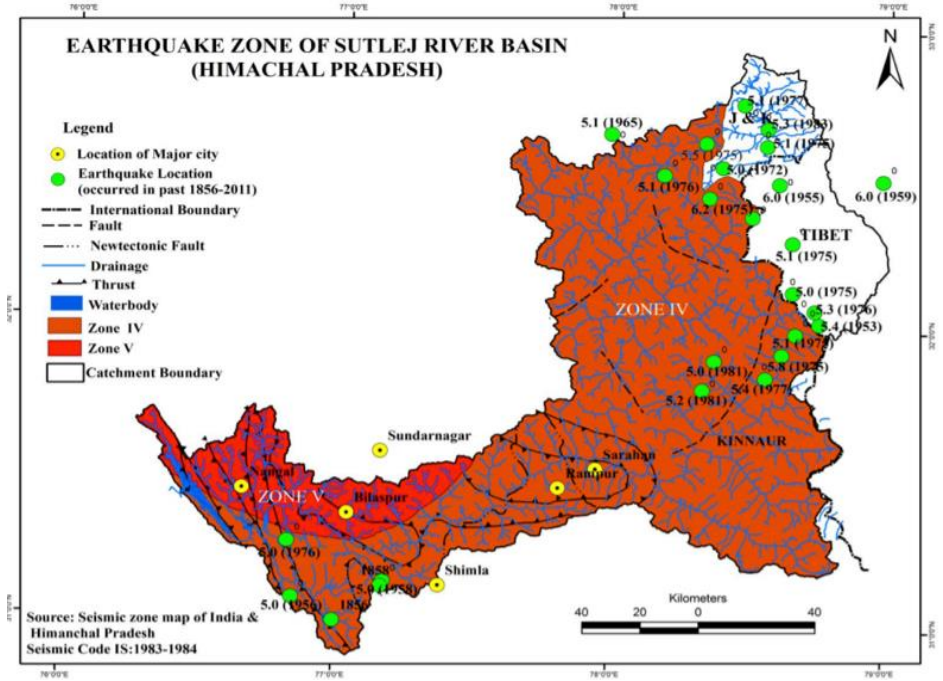


Figure 5 Earthquake Zones within the Sutlej basin

The hills and mountains are liable to landslides during monsoons and high intensity earthquakes. The vulnerability of the geologically young and not so stable steep slopes has been reported to be increasing

in the recent decade due to inappropriate human activity like deforestation, road cutting, terracing and agriculture shift to cultivation of crops that require more intense watering. (State Council for Science, Technology and Environment and Disaster Management, Himachal Pradesh 2012).

Climate The climate of the state varies from place to place depending on the altitude. It varies from hot and sub-humid tropical (450-900 m) in the southern low tracts, warm and temperate (900-1,800 m), cool and temperate (1,900-2,400 m) and cold alpine and glacial (2,400-4,800 m) in the northern and eastern high mountain ranges.

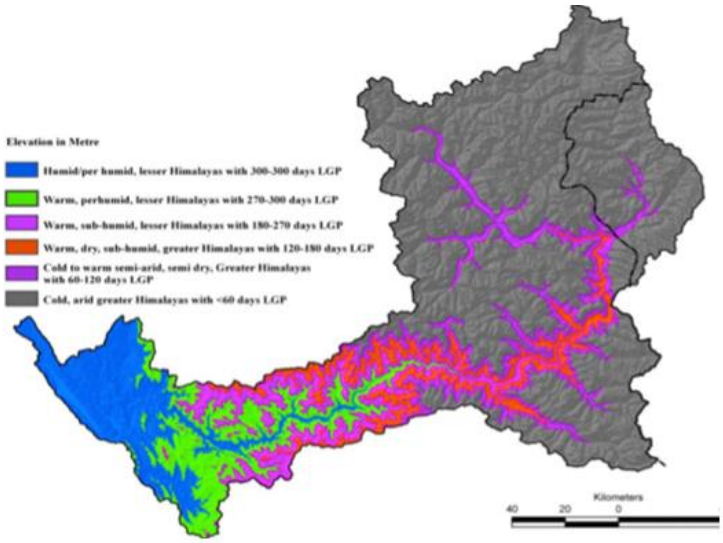


Figure 6 Climate Zones of Sutlej Basin

Temperature The climate of the basin varies from hot and sub-humid tropical in the southern part and glacier/ alpine in the eastern and northern part of the basin. The mean minimum and maximum temperature generally fall between 15.6°C to 24°C in the region. With the onset of monsoons by the end of June, temperature begins to fall. The month of January is the coldest month when the mean maximum and minimum temperatures seen in usually between 8.9°C and 1.7°C. During winters, under the influence of the western disturbances, the temperature falls considerably, and it may go even below 0°C.

Table 2 Month temperature at selected stations of Himachal Pradesh

Maximum Temperature (in Celsius)													
Sl. No	**Centres**	**Months**											
		Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec
1	Kalpa	3.60	1.90	9.70	16.60	21.70	22.30	23.60	22.50	21.30	19.20	14.00	10.20
2	Shimla	12.20	12.50	19.00	21.40	26.40	24.40	23.50	22.70	23.10	20.90	18.40	15.50
3	Solan	117.70	18.00	24.20	26.90	32.20	28.80	28.30	28.30	28.00	26.20	23.50	19.90
Minimum Temperature- (in Celsius)													

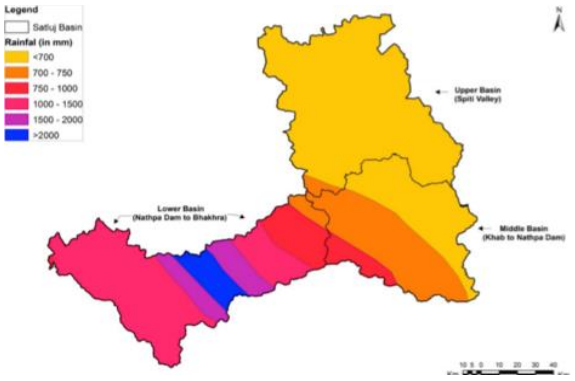
		Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec
3	Kalpa	-5.30	-4.80	0.70	3.50	8.30	12.00	14.60	13.90	9.60	6.40	0.90	-1.70
7	Shimla	2.80	3.80	9.10	11.70	17.10	16.50	17.20	16.60	14.70	12.20	7.60	4.80
9	Solan	1.10	4.60	8.30	11.50	15.50	18.50	19.70	19.50	15.70	12.40	4.70	2.00

Source: Statistical Year Book of Himachal Pradesh 2013-2014

Precipitation: The total annual rainfall is observed about 766 mm in Kinnaur and 800 mm at Rampur. The maximum rainfall is received from January to March. About 55% of the total rainfall is received during winter season. Overall, humidity ranges during winter from 35 to 54.2%. While in monsoon months, humidity is observed more than 90%.

Table 3 Rainfall pattern in Different districts of Himachal Pradesh District (in mm)

Sl. No.	District	2010	2011	2012	2013
1	Kinnaur	1107.8	573.5	477.1	1055
2	Kullu	1732.5	1292.8	1351.1	1286.4
3	Mandi	1495.4	1470.5	1462.9	1616
4	Shimla	1272.3	912.1	1057.4	1236.9
5	Solan	1377.3	911.1	1057.4	1236.9



Climate Change Analysis of temperature trends in the Himalayan region shows that temperature increases are greater in the uplands than that in the lowlands (Shrestha et al., 1999). Observed impacts of historical trends include movement of apple orchards to higher altitudes, loss of certain tree species, drying of traditional water sources, changes in bird populations, and increased vulnerability of winter cropping due to changes in rainfall patterns and planting dates (ADB, 2010). Himachal Pradesh is likely to experience an increase in temperature by 3 deg by 2100 (DoEST, 2012). It has been reported that even under a moderate climate change scenario forests in 56% of the grids in the state are vulnerable to climate change. The forest types and species composition are likely to change as early as by 2030 in these areas. In the long term, (by 2080) more than 80% of the state forests are vulnerable to change. These changes might affect forest composition and productivity.

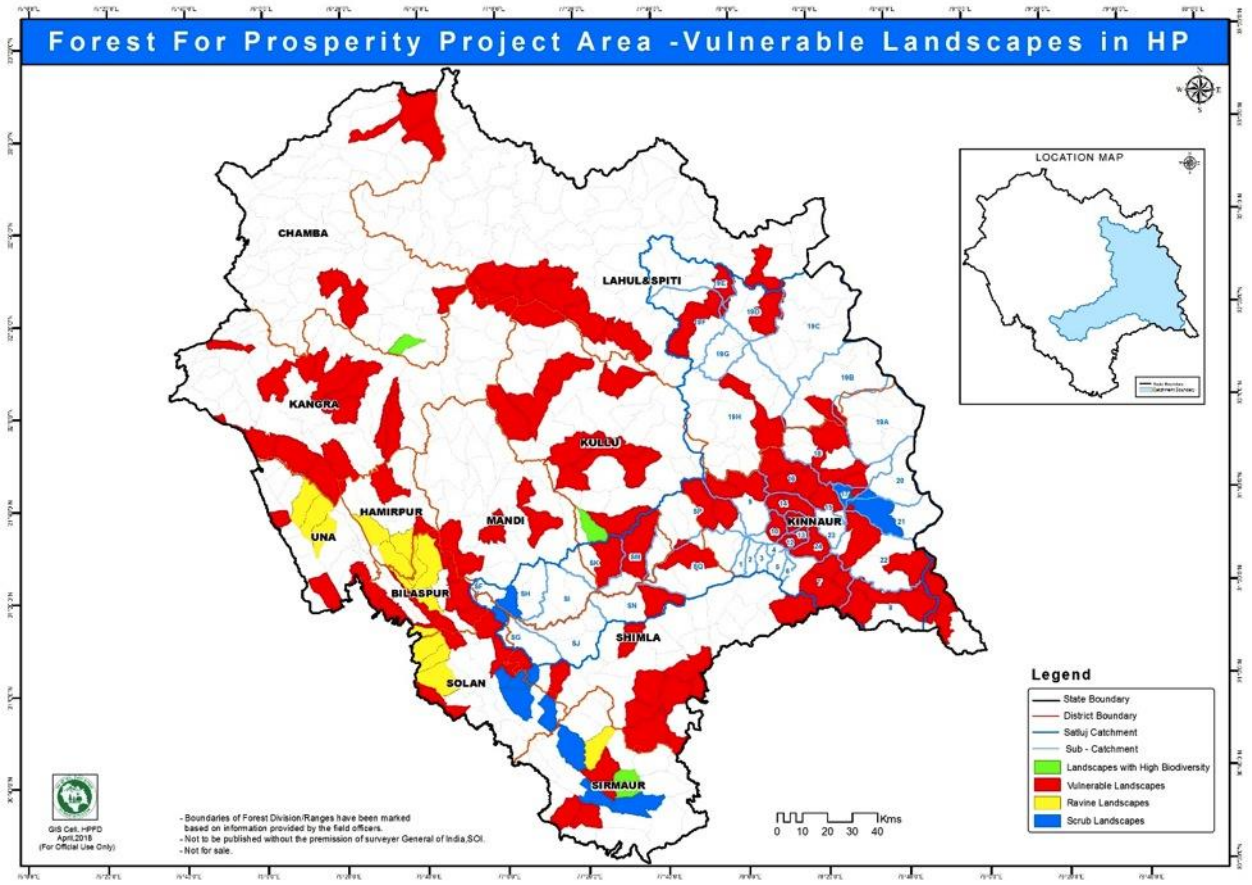


Figure 7 Map of Vulnerable, Ravine and Scrub Areas

Many forest species are migrating to higher altitudes and some species even face extinction (Dubey et al., 2003; Rana et al., 2009). It has been reported that floral species such as *Pinus logifolia*, *Lilium polyphyllum, Aconitum heterophyllum* and *Woodfordia fruticosa* have migrated to 400 to 500 m higher altitude in a span of 100 years (Rana et al., 2009). High altitude species have become more vulnerable. It has been widely reported that *Pinus roxburghii* is invading the habitat of *Quercus leucotrichophora*. Other economic species such as *Cedrus deodara* and *Dalbergia sissoo* are declining sharply due to a mix of anthropogenic and climatic factors in the State (DoEST, 2012).

Besides these impacts, climate change is also likely to increase incidences of forest fire and pest attack due to increase in temperature affecting survival and growth of forest vegetation (DoEST, 2012). District level mapping of Himachal Pradesh using a composite of biophysical, social and technological indicators (1960–1990) showed lowest adaptive capacity for Kullu and highest adaptive capacity for Una, Solan and Sirmour districts (O'Brien et al., 2004). The districts of Hamirpur, Una, Solan, Bilaspur and Sirmour have been categorised as highly exposed and vulnerable towards climate change whereas, Kullu and Shimla have medium level of vulnerability (O'Brien et al., 2004).

2.3.2 Land Use Pattern

The land use in the project area is varying according to the altitude. The maximum area falls under the snow cover and forest class, and the main occupation is agriculture and horticulture sector. The agricultural crops which are sown and harvested mainly include wheat, seed-potato, paddy, maize, barley, pulses, vegetables, etc. The main horticulture fruits are in the study region is apple, pear, almond, apricot, and dry fruits. The Kinnaur district is known as to produce nuts and dry fruits. Chilgoza (pine nuts), medicinal and brewing herbs, and other minor forest produce support the tribal economy. The Kalpa, Ribba, and Rampur are known for the horticulture producing areas. The Solan is famous for tomato production. Bilaspur area under Sutlej catchment is related to the production in the agriculture sector.

Table 4 District wise land use patterns (In hectare) of Project Districts												
Year/District	Geographical area by village papers	Forest Land	Misc. tree crops & Groves (Not included in net area sown)	Permanent pastures & other grazing lands	Culturable waste land	Land put to non-agricultural uses	Barren and unculturable land	Current Fallow	Other Fallow	Net area sown	Area sown more than once	Total cropped area
District – wise												
Bilaspur	111776	14013	151	39583	6061	15845	4437	1535	964	29187	27714	56901
Kinnaur	624216	38590	101	322043	3254	117878	132444	1513	83	8310	2336	10646
Kullu	64224	2520	3804	3911	1300	7931	3207	2604	462	38485	21112	59597
Mandi	397948	175289	352	96250	4505	16567	8590	6558	1062	88775	71835	160610
Shimla	525386	149692	8898	235206	13078	19867	11521	16089	5091	65944	20524	86468
Solan	180923	20271	553	77695	14980	13293	10903	2586	2896	37746	24709	62455
Una	154875	16549	6645	13532	22620	27575	24139	3105	2181	38529	35496	74025

2.3.3 Forests

The total area of Himachal Pradesh is 55,673 km^2, out of this 66.52% of the area of the state is legally defined as forest land (National Forest Policy). However, forest and tree cover constitute only 26.4% of the total geographical area (FSI, 2015). Forests are distributed across four zones in the State- viz sub-tropical forests, sub-temperate forests, wet-temperate and dry temperate forests (GoHP, 2002).

Table 5 Geographical Distribution of Forest (As per FSI Report 2015)

		AREA IN KM^2	% OF GEOGRAPHICAL AREA	% OF FOREST AREA
1	Geographical Area	55673	100	-NA-
2	Forest area Legally Classified	37033	66.52	100
3	Area under Tree Cover	14696	26.4	39.68
	Very Dense Forest	3224	5.79	8.7
	Moderate Dense Forest	6381	11.46	17.23
	Open Forest	5091	9.14	13.74

Forest Classification

Forests fall under three legal categories of reserve, protected and unclassed forests. The reserve forests offer minimum rights of use for local people. These are managed for environmental protection and biodiversity conservation. The protected areas such as national parks and wildlife sanctuaries come under this category of forests. The protected forests recognize many rights including timber, grazing and non-timber forest produce for local people.

Table 6 Legal Classification of Forest

	Area (Km^2)	**Percentage**
1. Reserved Forests	1896	5.12
2. Demarcated protected Forests	11387	30.75
3. Un-demarcated Protected Forests	21656	58.48
4. Unclassed Forests	976	2.63
5. Others (managed by Forest Department	370	1.00
6. Not managed by Forest Department.	748	2.02
Total	37033	100.00

Forest types

The forests of the state can be classified on ecological basis broadly into coniferous forests and broad-leaved forests. As laid down by Champion and Seth the forest types of the state are shown in table below:

i *Sub-tropical forests* occur at an elevation up to 915 meters above mean sea level (msl) with annual rainfall between 700 to 1000 mm. These comprise of dry deciduous Sal, Chir Pine and other miscellaneous species (ibid).

ii *Sub temperate forests* are found at an elevation between 916 to 1523 MSL with an annual rainfall of 900 to 1200 mm. These include Oaks and various broad-leaved species.

iii *Wet temperate forests* are found at an elevation ranging from 1524 to 2472 meters above msl with annual rainfall of 1000 to 2500 mm. The forest vegetation includes conifers, oaks, firs and rhododendron species.

iv *Dry temperate forests* are found above 2472 meters where mean annual temperature is around 10oC. Annual precipitation is about 2500 mm, most of which is received in form of snow. Species include willow, Robinia and Chilgoza (ibid).

Table 7 Forest types in Himachal Pradesh (as per Champion and Seth)

Sr. No.	Major Forest Group	Classification Code	Forest type
1	Tropical Moist Deciduous Forests	3C	Moist Shiwalik Sal forest, Moist Bhabar Sal forest
2	Tropical Dry Deciduous Forests	5B	Dry Shiwalik Sal forest, Northern Dry Mixed Deciduous forest, Dry Deciduous Scrub, Dry Bamboo Brakes, Khair Sissoo Forests
3	Subtropical Pine Forests	9C1	Himalayan subtropical Pine forests
		9DS1	Himalayan subtropical scrub
		9DS2	Subtropical Euphorbia scrub
4	Subtropical Dry Evergreen Forest	10C1	Subtropical dry evergreen forest
		10DS1	Dodona scrub
5	Himalayan Moist Temperate Forests	12	Lower Western Himalayan Ban Oak forests, Lower Western Himalayan Mohru Oak forests, Lower Western Himalayan moist Deodar forests, Lower Western Himalayan Mixed Coniferous forests, Lower Western Himalayan moist temperate deciduous forests, Upper Western Himalayan Kharsu Oak forests, West Himalayan upper Oak/ Fir forest Montane bamboo brakes, Himalayan temperate parklands
6	Himalayan Dry Temperate Forest	13/C	Dry broad leaved and coniferous forest (*Q. ilex- P. gerardiana*), Dry temperate coniferous – Neoza pine forests, Dry temperate coniferous – dry deodar forests, West Himalayan high-level dry blue pine forest, West Himalayan dry Juniper forest
7	Sub-alpine Forest	14/C	West Himalayan sub-alpine Fir forest, West Himalayan subalpine Birch/ Fir forest
		14/DS1	Sub-alpine pastures
8	Moist Alpine Scrub	15/C	Birch/ Rhododendron scrub forest, Deciduous alpine scrub, Alpine pastures
		15/E1	Dwarf Rhododendron scrub
9	Dry Alpine Scrub	16/C1	Dry alpine scrub
		16/E1	Dwarf Juniper scrub

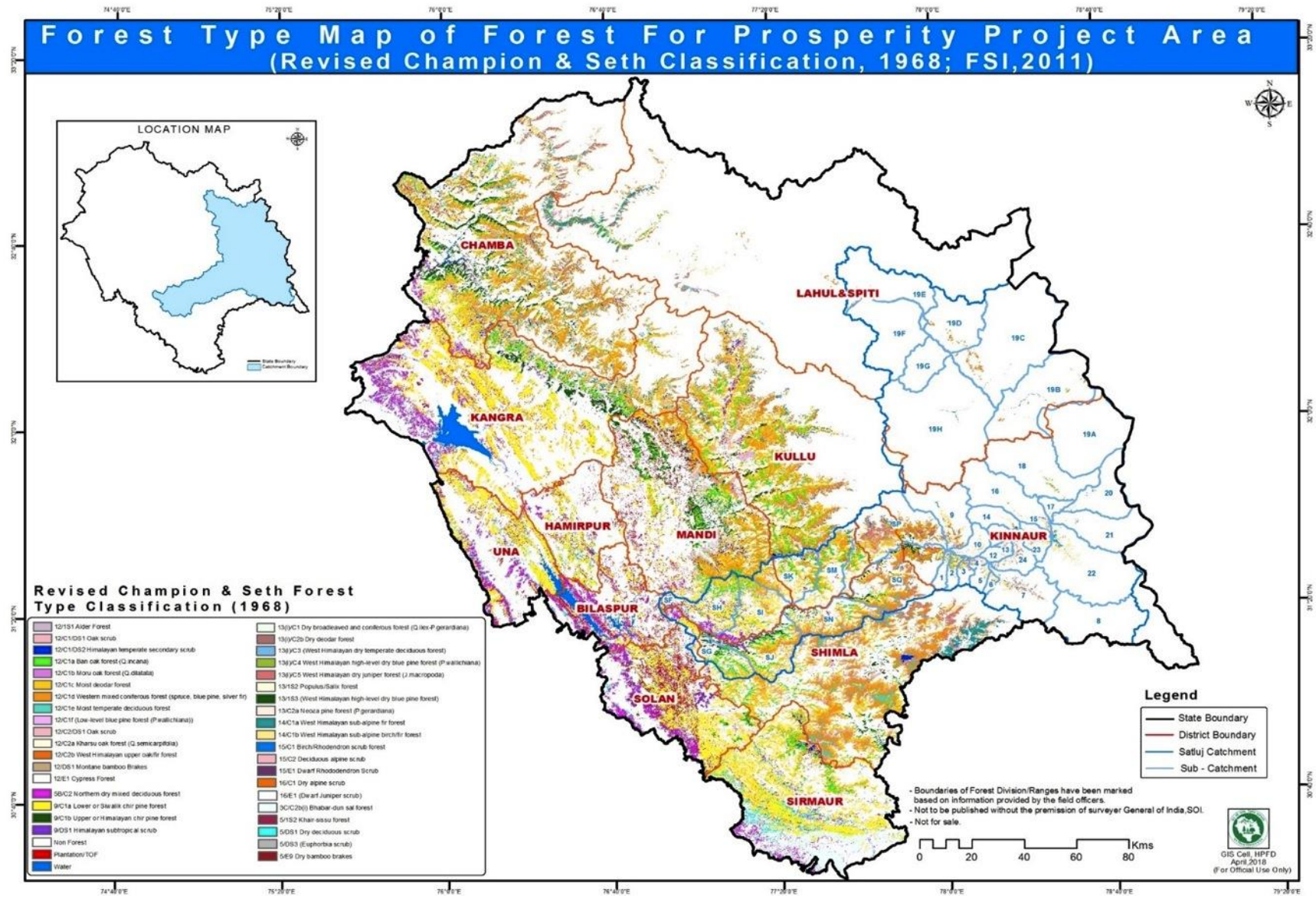


Figure 8 Forest Types of Himachal Pradesh

Forest Types in the Sutlej Basin

The Sutlej basin is known for variation in its biodiversity due to the elevation variation.

i *The Moist Alpine Forests:* Above the 3600-m elevation, these types of forest found. In this region, the dominant forest herbs are Berberies, Corydalis, Geranium, Astragalus and Cotoneaster.

ii *The Himalayan dry Temperate Forests*: The Himalayan dry Temperate Forest found in the Kinnaur district. The dominant tree species are Picea smithiana, Juniperus, Populus ciliata, Salix viminalis and Alnus indica.

iii *The Sub-tropical broad Forests:* In middle basin, sub-tropical broad forest is found. The major forest type from 1800 to 2400 m, is Cedrus Deodara and mixed Coniferous Forests which include pure spruce and kail. The sub-tropical Pine Forests between 600 to 1700 m is found in Solan, Shimla and Bilaspur district, the major forest types are Pinus roxburghii, Lyonia ovalifolia, Acacia catechu and Emblica officinalis, dominant shrubs as Carissa opaca, Carissa spinarum, Dodonea viscosa, Indigofera heterantha, and Rhamnus virgatus.

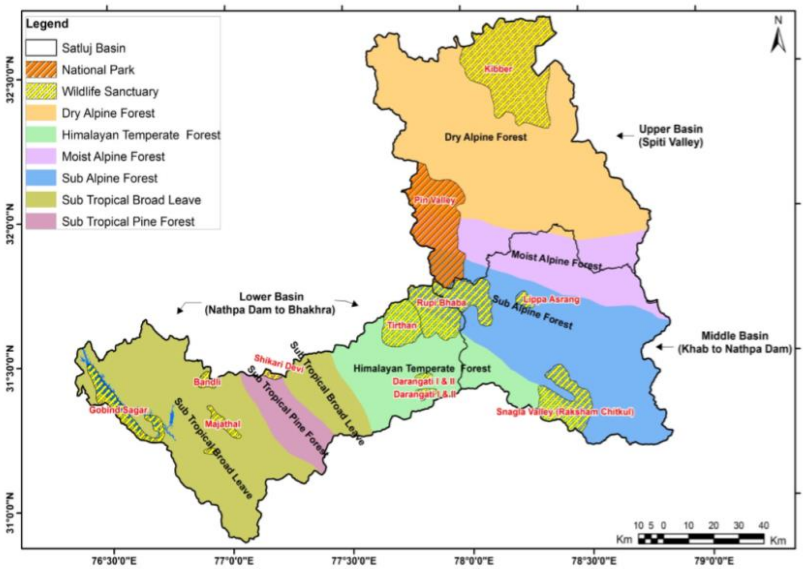


Figure 9 Forest Types in the Sutlej Basin

Forest Density

In case of Himachal Pradesh, the area under very dense forest cover has been stable from 2005 to 2013. Area under the category of moderately dense forests has slightly declined during this period. The open and scrub forest area constitute 35% of the total forest cover. The open forest area has slightly increased where as area under scrub vegetation has decreased for the period. Overall open and scrub forest area has slightly declined, which could be attributed to the plantations. Some of the key factors behind the forest degradation are demand and supply gap of forest products, shifting cultivation and forest fires, which have been discussed in detail in the report.

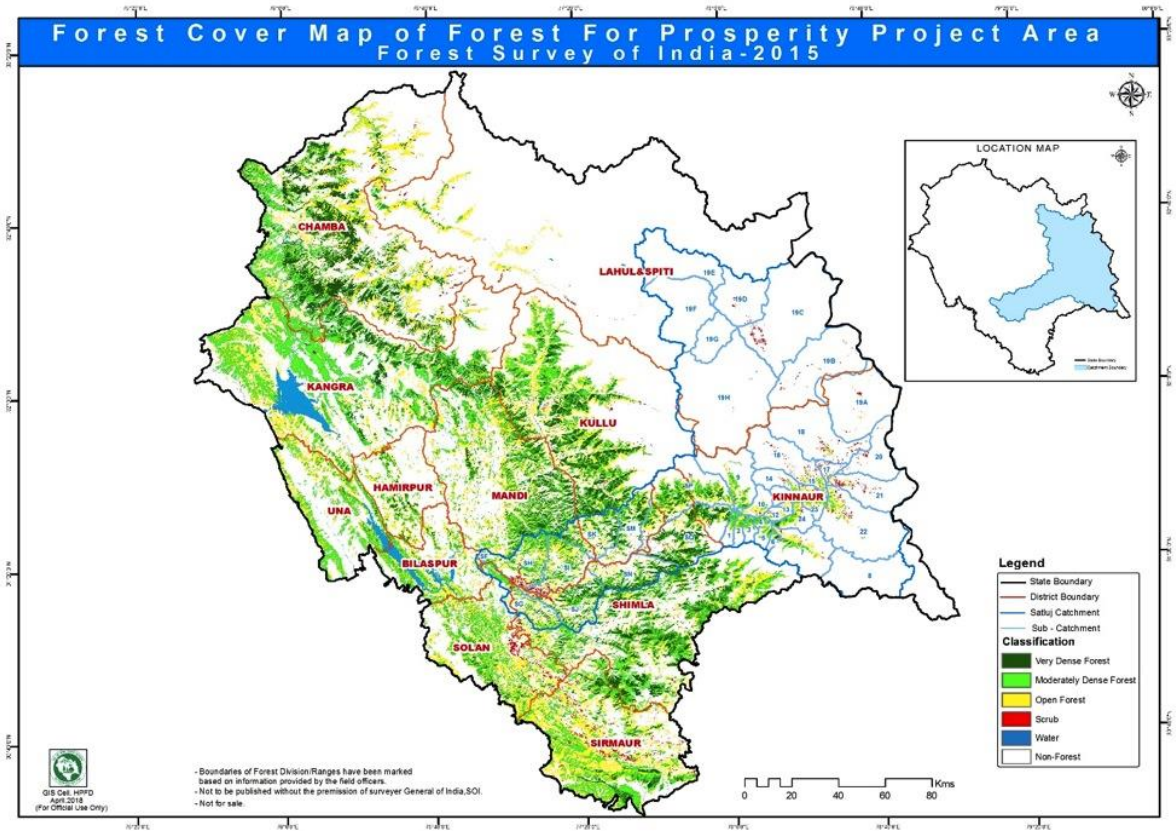


Figure 10 Forest/ Canopy Density Map of HP

Table 8 Project District Forest Density 2015 (Area in Km^2)

District	*Geographical Area*	*Very Dense Forest*	*Mod. Dense Forest*	*Open Forest*	*Total*
Kinnaur	6401	82	262	260	604
Kullu	5503	79	266	278	623
Solan	1936	46	426	394	866
Shimla	5131	736	1039	624	2399
Mandi	3950	368	722	671	1761
Una	1540	18	302	203	523
Bilaspur	1167	24	171	167	362

Natural Habitats

Himachal Pradesh supports 463 birds and 359 animal species, including the leopard, snow leopard (the state animal), ghoral, musk deer and western tragopan. Himachal Pradesh has two National Parks, (Great Himalayan National Park and Pin Valley National Park, (The Great Himalayan National Park in Kullu district was created to conserve the flora and fauna of the main Himalayan range, while the Pin Valley National Park to conserve the flora and fauna of the cold desert), 30 Wildlife Sanctuaries, and 3 conservation reserves. None of the project ranges cover protected natural habitats.

Pastures and Grazing Areas

The permanent pastures including alpine meadows form a very important and stable ecosystem, and cover more than 12,000km^2 and constitute 21% of state geographical area. Various natural scrub forests cover an area of 566km^2 and constitute another 1% of the state geographical area. Both alpine and scrub pastures provide important habitats to medicinal and aromatic plants in the state. HP land use estimates indicate the area under permanent pastures and grazing lands was 1,163,402 Ha (11,634 km^2) in 1966, 1,193,602 (11,936 km^3) in 1995 and 1,471,536 (15,190km^2) in 2000. The increase in alpine pasture are recorded in 4 districts (Shimla, Kinnaur, Lahaul and Spiti, Una, and Hamirpur) where settlement operations have been fully or partially completed, otherwise all other districts show a decrease.

Table 9 Pasture Areas in Project Districts

	Area in Year 1994-1995	Area in year 1999-2000	Area in Year 2001-2002	Change
Una	6877	12935	13427	*Increase*
Bilaspur	42649	44858	40949	*Decrease*
Kinnaur	160,619	318,352	318,131	*Increase*
Kullu	-	-	-	-
Mandi	97151	96624	96383	*Decrease*
Shimla	200803	203047	248660	*Increase*
Solan	78711	77496	78572	

Source: SOER Himachal Pradesh

Pastures are typically grazed throughout the summer, in contrast to meadow which is ungrazed or used for grazing only after being mown to make hay for animal fodder. The main grasses found in sub alpine pastures include *Agropyron longeristatum*, *A. Semicostatum, Bracypodium syvaticum, Bromus asper, B, Japonicus, Dactylus sp., Danthonia sp, Festuca sp, Milium effucsum. Alpine pastures are composed of mesophytic herbs and little grasses such as Primula, Anemone, Fritillaria, Iris and Gentiana spp. At higher altitudes herbs, such as edum crassipes, Primula minutissiuma, Saxifraga imbricate, Potentilla Fruticoca*. Alpine scrub, which ajoins the dry tempertate forests come under heavy grazing pressure. Continuous grazing in forest areas, with lack of green fodder in agricultural fields diminished the productivity and gives rise to bushes and weeds such as Lantana and Ageratum.

Issues associates with current pasture management systems are:

i *Overgrazing*: Excessive grazing by domestic animals and stray cattle beyond the carrying capacity of pastures; untimely grass cutting before their seeding affecting their regeneration capacity result into invasion of alien species in grasslands; giving rise to loss of vegetative cover and soil erosion.

ii *Harvesting practices:* communities not only harvest fodder for their own use but also for selling it in markets.

iii Burning of pastures: Traditionally, communities resort to controlled burning of pastures for getting fresh blades of grass during summer, just before the rains. fires not only destroy forest ecosystems but also affect the supply of NTFPs.

2.3.4. Weeds and Invasive Species

Himachal's landscape and pastures are under threat by invasive species and weeds. Key species of concerns are *Lantana camara L.; Parthenium hysterophorus L.; Ageratum conyzoides L; Eupatorium adenophorum Sp.* These invasives are a major issue in the subtropical and lower temperate areas in the State and affect the quality of forests and the pasture lands, and availability of fodder.

Lantana alone has invaded 150,000 hectares of forest lands, it is the major invasive/noxious species of forest habitats under the administrative control of HP Forest Department. Parthenium, Ageratum and Eupatorium occur over 50,000 hectares of forests, and are the major exotic weed species along road sides and on lands classified as barren, culturable wastes and fallow. Whereas the incidence of Parthenium is largely restricted to degraded and newly opened drier sites along roads and forest fringes, the other three invasive alien species tend to occupy all possible vacant places even under tree canopy.

Table 10 Description of Weed Infestation in Forest Areas

Table 11 Description of Weed Infestation in Forest Areas			
Description of land	Estimated Infestation of Invasive Alien Species (Area ha.)		Total (Area ha.)
	Lantana	**Others** (*Parthenium, Ageratum, Eupatorium*)	
Forest land	1,50,000	50,000	2,00,000
Road sides	2,000	8,000	10,000
Lands classified as barren; culturable wastes & fallow	25,000	1,25,000	1,50,000
Total (Area in ha.):	**1,77,000**	**1,83,000**	**3,60,000**

Management methods involve mainly mechanical removal of the exotic weeds, past efforts have not yielded desired results due to lack of focus on long-term follow up system. Chemical methods (involving mainly application of glyphosate) for control of Lantana/ Parthenium were abandoned after initial trials due to concerns about their adverse environmental implications. The outputs/ returns from using cut Lantana for furniture, briquetting or composting are not considered lucrative.

2.3.5 Fuel Wood and Fodder

Forests have long been a major natural resource available to people living in their vicinity, being a significant source of wood and other non-wood products, such as edible items, fodder, fuelwood, medicinal plants, roofing materials, fiber for ropes, and so forth. It has been reported that 93% of the population of Himachal Pradesh use fuel wood as a source of energy (Parikh, 2009). 94% of the fuel wood users in the state collect it from forests. As per official estimates, 46 MT of fuel wood was extracted from the forests in Himachal Pradesh in 2008-09, Actual fuelwood extraction is much higher and is harvested far beyond the sustainable levels.
This is a consequence of both demand factors- increasing population, and lack of energy alternatives for poor households- and supply side issues, which include low productivity of forests (MoEF 2006).

There are 5.23 million cattle with highly inadequate pasture area in Himachal Pradesh (FSI 2011; DoEST undated-b). The lowest amount of fodder 41.25 kg household^{-1} day^{-1} is collected during winter season in the

middle altitude and the highest amount of fodder 83.27 kg household^{-1} day^{-1} is collected during summer season in the high-altitude villages). During rainy season the fodder consumption was found highest and during winter the lowest.

Table 12 Fodder Collection (Kg) household^{-1} day^{-1} from different altitudinal zones in Himalaya

Season	Altitudinal Zone (m, amsl)								
	500-1000			1000-1500			1500-2000		
	Dry	Green	**Total**	Dry	Green	**Total**	Dry	Green	**Total**
Winter	20.95	28.08	**49.03**	22.00	19.25	**41.25**	22.45	20.05	**42.50**
Summer	22.00	43.50	**65.50**	30.30	64.19	**94.49**	28.00	55.27	**83.27**
Rainy	00.00	55.40	**55.40**	00.00	81.70	**81.70**	00.00	65.10	**65.10**
(Mean)	**21.47**	**42.32**	**56.64**	**26.15**	**55.04**	**72.48**	**25.22**	**46.80**	**63.62**

Table 13 Fodder Consumption (Kg) animal^{-1} day^{-1} in different seasons at different altitudinal zones

Altitudinal Zone (m, amsl)	Seasons			Average Consumption Animal^{-1} Day^{-1} (Kg)	Annual Consumption Animal^{-1} (Kg)
	Winter	Summer	Rainy		
605-1000	12.37	15.43	22.16	16.65	6077.25
1000-1500	16.40	17.12	17.38	16.96	6190.40
1500-2301	18.33	20.96	26.04	21.77	7946.05
Mean	**15.70**	**17.83**	**21.86**	**18.46**	**6737.90**

2.3.6 Non-Timber Forest Products and Medicinal Plants

Non-Timber Forest Products (NTFPs) are resources collected from wild for direct consumption/income generation on a small scale. They include such as wild edible foods (nuts, berrys etc.) medicinal plants, fibre of plants, fungi, resins. Many species have high prices/high value but collected in relatively small quantities. The market is highly unregulated with much raw materials extracted and exported out of HP State unreported and unrecorded. Market demand outstrips supply as Ayurveda / natural and organically produced herbs for health and medicinal purposes is rapidly growing. Supply is dwindling with some species collected close to extinction and are now rare in the wild, through both over extraction and unscientific collection.

Village level processing and value addition is limited using simple and often old technologies for extraction. Grading is often poor due to incorrect picking. Little grading is carried out at the village level due to(i) lack of knowledge of grades and (ii) no price incentives to grade produce correctly. Drying is often done in the open air in un-sanitary environments and packaging materials are basic. Collectors gain some 20-25% of annual income from seasonal collection of medicinal plants with involvement of women and children close by and men usually collecting far from the village. Wholesale markets are very competitive with many buyers and sellers and margins tight once raw materials are exported out of the State.

It is clear that transport systems are reaching further into remote areas, catalyzing forest and woodland clearing for different purposes and this result in the loss of supplies of wild harvested species as habitat declines. Since the 1960's, growing demand from urban areas has catalyzed NTFPs trade, drawing resources from rural areas to towns and cities, for fuel wood, building materials, medicinal or edible wild fruit species (SCBD, 2001). Local communities in Himachal Pradesh have the right to harvest NTFPs from the wild (except those that are nationalized such as Resin and Bamboo). Apart from time spent to walking long distances and collect NTFPs, the income gained is considered net profit to the collector. This is because there has been no major investment in terms of seed, inputs, labour in crop cultivation, that has to be deducted from gross sales that would occur if the crop was cultivated.

However, this collection is often unsustainable and impacts livelihoods in the long run. When market demand and prices offered are high, certain medicinal plants have been over harvested to the point of being threatened with extinction. A boom cycle of high demand and high prices results in a depletion of medicinal plants to the extent that they disappear entirely from certain areas. Further, local communities have been unable to take advantage of the high value and high demand for certain medicinal plant species as they collect and sell the produce individually at the price offered by the local agent who, in turn, gets this price dictated to him by larger traders and companies operating in the national and international market.

The important medicinal plants are *Gucchi (morchella esculenta), Mushakbala (valerina wallichii), Belladona (Atropa spp.), Chora (Angelica glauca), Bichhu buti (Geradiana heterophyllus) and kapoor kachri (Hedychium acuminatum) The most important species collected from High hills/ dry temperate zone are dhoop (Jurinea macrocephela), Patish (Aconitum spp.), Rewand chini (Rheum emodi), Dorigrass (Potentilla nepalensis), Salampanja (Orchis latifolia), salam mishri (Polygenatum vertiuilliem), sathjalori (Ainaliaea aptra), karoo (Picorhiza kuroo), bankakri (Podophyllum emodi), kashmiri patta (Rhododendron compannlatum), kuth (Saussurea lappa), Seski (Artemesia spp.) and Thuth (Polygenatum vertiuilliem).*

2.3.7 Forest Nurseries

Nurseries are the backbone of any forestry activity for ensuring adequate and timely supply of quality seedlings. Nurseries can also be used for ex-situ raising and conservation of genetic resources of desired and threatened plant species. Typically, nurseries operate using traditional method for producing seedlings in polybags of different sizes filled with heavy soil mixes. Recently, tall seedlings (2-3 ft height) plants are being raised to be transplanted in the field as they have a better survival rate. Due to recent project funded by KfW, modern nursery technologies are being proposed, such using root trainers, elevated production and light growing media with high portion of air-filled-porosity is a necessity.

Himalayan Forest Research Institute, Shimla has also initiated studies on the assessment and related management practices in Alpine pastures of Sutlej basin including morphological parameters of assessing quality nursery stock for getting higher survival in the field. Shoot length is widely used parameter for determining the quality of the stock in the nursery. On the basis of height; nursery stock is graded into different categories.

According to Forest Department Manual IV, all planting material (seedlings/stumps) should meet the following criteria. Seedlings should (i) have straight, undamaged and unforked stems (ii) have the stem well lignified for at least half their length (iii) have healthy green leaves (iv) from insect pest and diseases. The transportation of

seedlings in polythene bags from nursery to the plantation site is an important factor in deciding the site of the nursery.

To reduce the transportation cost, chir pine seedlings are mostly raised in temporary nurseries located near the plantation sites. Other factors to be considered in deciding the nursery site are (i) availability of sufficient water for seedling irrigation particularly during dry months of May and June (ii) sites should be open and sunny. Nurseries for 25000-35000 seedlings requiring an area of about 0.05 ha are more economical than smaller ones. To produce 1000 seedlings an effective nursery area of ten square metres is needed. The HP forest department has also issued an SOP document for raising tall plants in forest nurseries. The status of the HP Forest nursery and species grown are given below. The following table gives the months in which seed of important species are collected and sown in the nurseries.

Table 14 Tree Species and their Related Sowing Time

Species	Month of Seed collection	Sowing Time
Abies pindrow	Sep - Oct	Preferably early in December otherwise on melting of snow
Acacia catechu	Jan - Mar	End of June
Aesculus indica	Sep – Oct	Early in December
Bauhinia variegata	May	As soon as seed is collected
Cedrela toona	May - July	As soon as seed is collected
Cedrus deodara	Sep - Oct	Preferably early in December otherwise on melting of snow
Dalbergia sissoo	Nov - Mar	Early in March
Dendrocalamus strictus	May - June	As soon as the seed is collected
Juglans regia	Oct - Nov	December to February
Melia azedarach	Jan - Feb	Soon after the seed is gathered
Picea smithiana	Oct - Nov	Preferably early in December otherwise on melting of snow
Pinus wallichiana	Sep - Nov	Preferably in early December otherwise on melting of snow
Quercus	Dec - Feb	Early spring
Terminalia belerica	Feb	Early spring
Terminalia chebula	Jan - Mar	Early spring

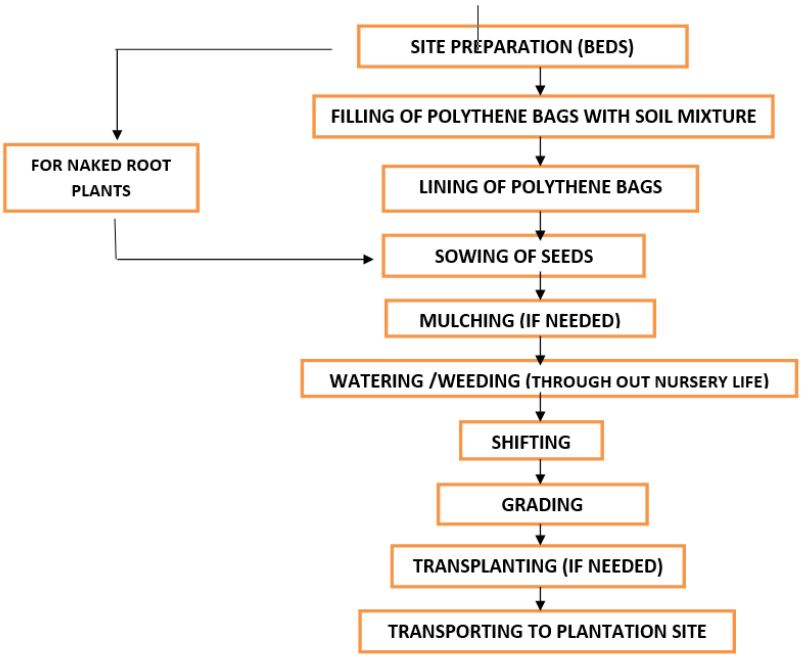


Figure 11 Step Wise Seedling Development Practice in Current Nursuries

The figure above depicts the typical process of raising plants in exiting forest nurseries, overall, nursery management can be improved through (i) integrated pest and disease control techniques (ii) selection of only healthy seedlings to be transported to the planting site (ii) Sowing of seeds sterilized/fumigated, clean beds and adequate watering (iv) Using sterilized budding knife, secateurs, and scissors during budding and grafting (v) keeping planting material under proper sunlight, watering and clean environment (vi) Providing Mycorrhizal inoculums (soil health) for raising quality stock of forestry species in high tech and central nurseries. Common Pests include White grubs, Cutworms, Termites, Crickets and Grasshoppers, Defoliators. Common Diseases include Damping-off (pre-and post-emergence), Collar rot, Root rot, Foliage diseases.

Table 15 Baseline of Foresy nurseries in the different ranges of Rampur and Kinnaur

Name of Division	Name of Range	Name of Block	Name of Beat	Name of Nursery	Area in ha.	Stock of Nursery		Infrastructure of Nursery							
						Name of species	No. of plants	Mali Hut	Vermi compost Unit	Water storage Tank	Poly house	Root trainer	Approach road	Store	Fencing
Rampur	Rampur	Deothi	Deothi	Deothi	0.60	Robinia, Deodar & Khanoor.	29000						√		
		Rampur	Jakhari	Jhakri	0.60	Ban, Daru, Kainth, Jamun, Amla Paza, Ritha, Chil Behmi Tun & Dreak	55610							√	
		Nogli	Nogli	Talai	1.20	Chil, Robinia, Ritha, Daru, Dreak, Kainth, Jakrinda, Amaltash, Tikoma & Chulli.	50049		√	√	√		√	√	
		Rampur	Pashada	Pashada	0.60	Ritha, Paza, Kainth, Robinia, Deodar & Chulli.	21840		√					√	
Rampur	Nankhari	Gahan	Addu	Addu	0.25	Behmi, Rai, Chulli & HC Nut.	16260						√		
		Nankhari	Bagalti	Bhadral	0.25	Deodar, HC Nut, Walnut & Rai.	12115			√			√		
		Sholi	Delath	Sharan	1.00	Dreak, Robinia, Shisham, Ritha, Chulli, Jakranda & Amaltash	20389	√		√			√		
		Gahan	Gahan	Gahan	1.00	Deodar, Tosh, Behmi, Chulli, HC Nut & Ban.	45400			√			√		
		Nankhari	Kungal-Mundar	Kungal	0.50	Deodar Poplar, Ban, Jamun, Robinia, Tosh & HC Nut.	16230						√	√	
Rampur	Bahli	Surad	Beunthal	Beaunthal	0.50	Deodar, Robinia, Dreak, Kainth, Ritha & Chulli.	17200		√						
		Bahli	Jarashi	Jarashi	1.00	Deodar, Rai, Tosh, Khanoor, Chulli & Diascoria.	113970			√			√		
		Surad	Surd	Surad	0.50	Deodar, Chil, Robinia, Dreak, Ban & Chulli.	19910		√	√					
		Taklech	Taklech	Kuban	0.50	Robinia, Chulli, Kainth, Dreak, Paza, Khanoor.	9684								
Kinnaur	Kalpa	Kalpa	Reckongpeo	Reckong peo	0.25	Deodar, Neoza, Chulli, Bhemi	-			√			√	√	

2.3.7 Forest Fires

Forests in HP have a high degree of susceptibility to forest-fires and these forest fires have destroyed precious forest wealth and caused harms to the flora and fauna. It was made clear from the interview of forest officers that forest fire incidences are mainly human induced and are common during the summer season. Local people believe that the burning of forest areas improves the fodder resources by getting a fresh grass and tender herbs in the following season. Some of the common measures to mitigate this is controlled burning, and maintenance of fire lines.

The frequency, size, intensity, seasonality, and type of fires depend on weather and climate in addition to forest structure and composition. The Chil Pinebelt fires are primarily due to negligence by communities, fires are also common in November and Early December in the blue pine forests caused due to dry weather and delay of winter rains. Following fires, soils are exposed to wind and rain leading to higher rates of erosion, recharging of groundwater and flow of springs is also severely affected. The damage due to forest fires varies from just burning of leaf litter and dry grass in case of ground fires to extensive damage to the trees, biodiversity, and ecology in case the fires turn into crown fires. The forest fires also carry the risk of getting out of control and extending to habitations.

The forest fire data for Himachal presented in table below indicates an increasing trend of the number of forest fire incidents and resulting loss. Though latest data for forest fires in the state is not available however, the table indicates that more than 10000 ha of forest area is affected due to forest fires in the state (DoEST, undated). Chil (Pinus roxburghii) forests are prone to forest fires during summer months while fires are very common in the high Blue Pine (Pinus wallichiana) forests during November and early December when winter rains are delayed (ibid).

Table 16 Circle wise forest fire incidences of last two years

Name of circle	Year									
	2015-16					2016-17				
	No. of cases	Affected by fire (in hectare)			Total area	No. of cases	Affected by fire (in hectare)			Total area
		Natural	Plantation	Other			Natural	Plantation	Other	
Kullu	44	501	187.4	0	688.4	7	23.1	0	27	50.1
Mandi	93	172.4	24	90	286.4	270	651.75	176.55	620.8	1449.1
Rampur	89	287	299.3	204	790.3	72	410.5	122.65	110.5	643.65
Shimla	109	581.7	147.18	1	729.88	121	693	46.5	4	743.5

Source: Forest department of Himachal Pradesh

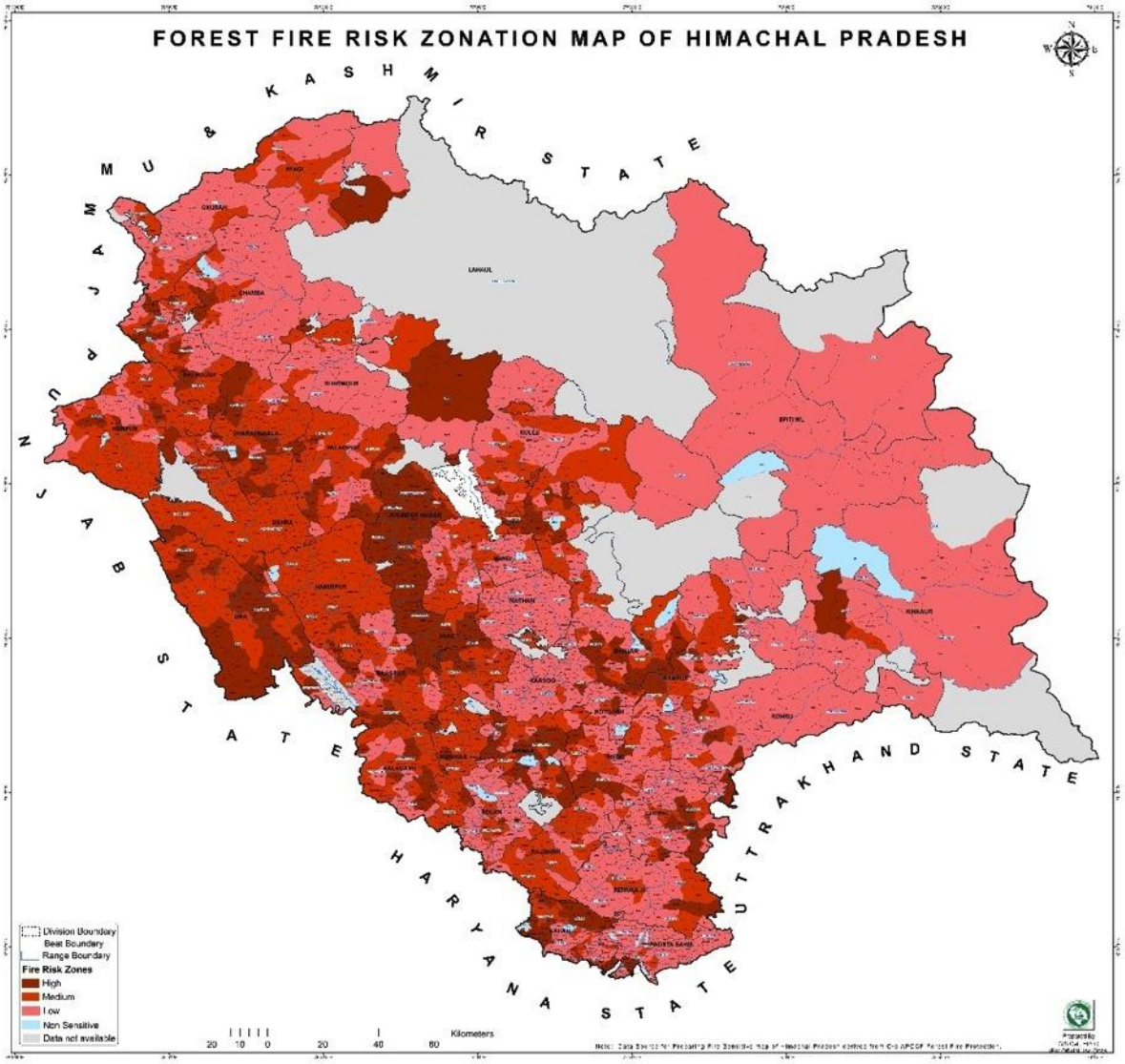


Figure 12 Forest fire risk zonal map of Himachal Pradesh.

Absence of controlled burning and other sylvicultural operations like pruning, cleaning and thinning in regenerating areas have also result in wiping out large tract of Chil forests by forest fires. The HP government has notified Forest Fire Rules, 1999, the department also has a forest fire manual which sets forward the various roles and responsibilities in fire prevention and control.

Award Money of Rs. 5000/- to 10000/- to communities who co-operate in the Forest Fire Prevention [Gram Panchyat and Village Forest Development Committee (VFDC) or Self-Help Group (SHG) and Joint Forest Management Committee (JFMCs)]. The Forest Fire Watchers and Forest Officials who have done commendable job in the prevention of Forest Fires, awarded during Van Mahotsav Programme of Forest Department.

2.3.8 Community Based Forest Institutions

Joint Forest Management (JFM) was initiated in 1990 as a collaborative arrangement between Forest Department (FD) and local communities to regenerate and manage degraded forests. JFM was strengthened through Sanji Van Yojana or participatory forest management scheme in 1998. These committees are receiving benefits in form of fuel wood, fodder and various other non-timber forest products (NTFP).

The appropriate relationship between village forest institutions and local government in the form of *Panchayat Raj* Institutions (PRIs) emerge as a potential common point of intervention, due to their presence throughout HP and their constitutional nature, where the possibility of convergence of all local village level institutions including forest ones is strongest. In January 2000, with a view to strengthening the role of PRIs in the management of local resources and promotion of participatory forest management, the HP Forest Department notified the constitution of *panchayat*, block and district level forest committees. The notification states the composition and functions of the forest committees at the different levels; they are to be in congruence with the three-tier standing committees – *Panchayat, Panchayat Samiti* and *Zila Parishad.*

The draft Himachal Pradesh Participatory Forest Management Rules ('PFM Rules') (1999) and the notification of January 2000 have clearly reflected the futuristic vision of HPFD to integrate its institutions with PRIs. They include descriptions of the powers, responsibilities and duties of the VFDS, as well as the benefits due to them; and state that the role of the HPFD is to 'essentially provide a supportive role to facilitate the process of Joint Forest Planning and Management through VFDS' (through provision of technical guidance, training, and funds). As a first step towards providing organic linkages between the two, this may help the HPFD in defining active and meaningful participation in PRIs in forest-related activities.

Table 17 Status of Community Based Forest Institutions

S. No	Name of Projects/Schemes	Year	Name of Village Institution	No. of Village Institutions	Registered under
1	HP Forestry Project (HPFP)	1994-2001	Village Forest Development Committees (VFDCs)	154	JFM Notification dated 12.5.1993
2	Indo-German Eco-Development Project	1994-2005	Village Development Committees (VDCs)	294	JFM Notification dated 12.5.1993
3	IWD (Kandi) Project	1993-2005	Village Development Committees (VDCs)	137	Societies Registration Act 1860
4	Sanjhi Van Yojana (SVY)	1998	Village Forest Development Societies (VFDS)	360	Societies Registration Act 1860
5	Great Himalayan National Park	1993 Ongoing	Village Eco-Development Committee (VEDCs)	18	Director, GHNP
6	Mid Himalayan Watershed Dev Project	2005	Gram Panchayats	602	---
7	National Afforestation Project (NAP)	2010	Joint Forest Management Committees (JFMC)	963 JFMCs	Registered by CFs/DFOs as per the provision laid down in Revised Operational Guidelines, 2009 of NAEB.
8	Integrated Watershed Management Swan River Project	2006	Project Development Committees	Not available	Societies of Registration Act 1860

2.3.3 Water Resources

There is a network of perennial rivers in Himachal Pradesh, which have glaciers as their sources. Majority of the drainage of the state belongs to Indus River System. Statistics regarding the water sources of the state are presented in the table below. The state is drained by nine river systems. The Satluj, Beas, Ravi, Chenab, Spiti, Parbati, Pabbar, Tons and Giri are the main rivers of Himachal Pradesh. Of these, the Satluj, is the largest river system in the state with a total catchment area of 20,398 km^2, spread over the districts of Lahaul and Spiti, Kinnaur, Shimla, Solan, and Bilaspur before entering Punjab, it enters the large Bhakra dam.

Table 18 District wise detail of Water Resources of Himachal Pradesh

District	Ground Water	Surface Water	Rain Water	Traditional Source	Other Conventional Sources
Bilaspur	827	786	0	461	0
Kullu	0	3392	0	0	0
Kinnaur	76	217	0	24	2
Mandi	833	3924	0	1483	840
Shimla	233	3917	5	2518	9
Solan	344	1090	0	1215	316
Una	832	123	1	21	116

Source: SoER, Himachal Pradesh

Lakes: There are a number of small and large lakes in Himachal Pradesh. These are in Kullu (Bhrigu, Dashair, Seruvalsar, and Mantalai), Mandi (Rewalsar, Prashar), Nako in Kinnaur, and Chandernaun in Shimla. Water storage in Himachal Pradesh is estimated at around 14,000 million m^3. The Gobindsagar reservoir (Bhakra Dam) in the Satluj with 6,900 million m^3 live storage.

River Sutlej: Water Quality is generally good (CPCB Class A, B) but untreated sewage towards Rampur and Bilaspur contribute to deteriorating water quality. [9] The average annual total run-off of river Sutlej is about 16,000 MCM. It traverses a course of 320 km area within Himachal Pradesh, it is divided into 11 sub basins. On the right bank, the tributaries are Spiti, Ropa, Rupi, Kashang, Taiti (Kiran), Mulgaon, Yul, Kerang, Wanger and Throng in Kinnaur. The Tirung, Gayanthing, Duling, Baspa, Solding, Manglad and Nogli streams are left bank tributaries. The Major Tributari Rivers are River Baspa, River Spiti, Nogli Khad and River Soa

[9] HPPCB, 2007

Table 19 Cultural Resources in Project Distircts

CERS	Location	CER	Implications for project design
Protected sites/ monuments/Cultural properties	**Kinnaur**	Kinner Kailash mountain Parvati Kund Shrikhand Mahadev mountain Monasteries Local Deities Temple in every village	1. The project area does not involve any protected monument. 2. Any project works that are undertaken in the proximity of the identified cultural heritage sites will be (a) after consultation with the local community (b) by implementing required mitigation measures to avoid any negative impact on the identified cultural heritage site.
	Solan	Harsang temple Badu Bara temple	
	Shimla	Bhajji Fort Narsingh Temple Koteshwar Mahadev Temple Local Deities Temple	
	Mandi	Mahunag Temple Kamashka Devi Temple Bhimakali Temple Yogini Mata Temple Baan Bhagwati Dev Mahasu Temple Chindi Mata Temple Mahamaya Temple Nag Dhamuni Temple Mamleshwar Temple	
	Kullu	Devi Pachala Temple Nag Gadumbi Temple Natli Nag Temple Local Deities Temple	

Table 20 Baseline of economic activities in the project areas

Activity	Location/types	Issues impacting forests	Implications for project design
Hydropower	• Nathpa Khakri HEP (1500MW) • Karchham Wangtoo HEP (1000 MW) • Shongtong Karchham (450 MW) • Rampur HEP (412 MW) • Baspa-II HEP (300 MW) • Bhabha HEP (120 MW) • Kashang –I HEP (65 MW) • Tidong HEP (60 MW) • Shorang HEP (100 MW) • Ghanvi-I HEP (23 MW)	•Tree felling • Blasting • Muck Disposal •Influx of labour from outside leading to pressure on forest resources.	• Degradation / deterioration of forest area where the interventions have been implemented due to construction activities of the hydro power projects.
Horticulture	The main cash crops grown in the region are the horticulture trees like apple, plum, almond, apricot, walnut, peaches, cherry, lemon etc. These are solely harvested for	•Illegal encroachment of forest land for plantation of cash crops like apple.	• Illegal clearing of the forest area where the interventions have been implemented.

Activity	Location/types	Issues impacting forests	Implications for project design
	Cash and the demand for these fruits all over the country fetches good price. On an average, an apple tree can fetch between Rs. 5000 to Rs. 7000 per season, while plum tree can fetch Rs.2500 to Rs. 4000 per season		
Agriculture	The agricultural crops which are sown and harvested mainly include wheat, seed-potato, paddy, maize, barley, pulses, vegetables, etc.	• Illegal encroachment of forest land for agriculture by individuals.	• Illegal clearing of the forest area where the interventions have been implemented.
Ecotourism	Local tourist inflow is prevalent in Kinnaur and Shimla Districts with many tourist destinations like Chitkul, Rakcham, Sangla, Kalpa, Nako, Sarahan, Tatapani, Mahu Nag Temple, Kamashka Devi Temple, Jalodi Pass, Kinnar Kailash, Srikhand Mahadev etc. Also, trekking routes to Spiti, Kullu, Manali, Rohru, Niti Valley (Uttrakhand) etc.	• Pressure on forest resources • Pollution like plastic waste, solid waste disposal	• Degradation / deterioration of forest area in project due to pressure on forest resources or generation of plastic waste, solid waste etc.
Mining	Mining operations are being done in the project area either by approved agencies/individuals for extraction of river bed material (RBM) for construction activities like hydro power projects, road construction, infrastructure development etc. However, illegal mining is being done by individuals in forest area for sand/clay who are being penalised/ booked by administration or State Mining Department or HPFD	• Change in flow regime of river • This result in increased turbidity of the water in the river stretch making it less usable and aesthetically appealing.	• Degradation / deterioration of project area where the interventions have been implemented due to illegal mining activities. • all construction material for project interventions is sourced from legal and approved quarry sites.
Fishing	Fish catching is not very prevalent in the area. Only a few fishermen do fishing at lower reaches of project area for selling purpose. For commercial purpose, the fish is mainly brought from downstream areas like Bilaspur. At upstream, few sites have been identified for sport fishing i.e. Sangla	• None	• None
Industry	As such no key industries are located in the area along river Satluj. Only one dairy plant is at Bithal. Fewer packaging set-ups at smaller level could be located in upper reaches, where in apple production is in abundance.	• None	• Not envisaged. However, in future if any new industry is being set up in the project area where outside intervention are being planned care must be taken so that it does not impact the objective

Activity	Location/types	Issues impacting forests	Implications for project design
			of the project interventions.
Road construction	Transport sector infrastructure investments are critical to improve mobility of goods and people, and to facilitate trade and commerce. Road being the lifeline of any region for development is a necessity. However, due to hilly terrain the disposal of debris during road construction is a major cause of concern for increasing sediment flow in Sutlej River.	• Muck/debris disposal • Tree felling • Influx of labour from outside leading to pressure on forest resources. •	• Degradation / deterioration of forest area where the interventions have been implemented due to road construction activities. • The direct impacts (such as the direct footprint or clearing land for road or other transport infrastructure construction) can be easily identified and mitigated (through compensation plantations).

Table 31 Analysis of Key Environmental Issues from Baseline Study

Issues /Sector	Baseline conditions and Issues of concern	Possible FFP/ EMF interventions
HEALTH AND QUALITY OF FORESTS	• Demand- Supply Gap for fuel and fodder • Illegal extraction • Choice of the afforestation species needs to match the planting site • No Collective management of natural resources. • Grassland and pasture management practices unsustainable	• Better community participation in grassland management • Creation of enterprises around fuel and fodder for steady supply • Fodder and fuel (dead wood) harvesting and management through community managed depots • Critical evaluation and appraisal of existing programmes of afforestation and deriving meaningful path finders from such evaluation. • Development of plantation models that meet the needs of the planting site, and the communities • Training of forest officials at for nursery development • Assessment of forest fire damage and inventory of the appropriate technology/methodology for prevention and control.

		• Popularization and expansion of the programme on the use of non-conventional energy sources, improved chullahs, use of Solar Energy Systems, biogas, use of LPG and Kerosene oil as a special drive in villages falling in five km. belt around the forest. • Encourage people participation for high rate survival success of afforestation programmes. • Check on the indiscriminate removal/harvesting of MAPs
GRAZING LANDS AND PASTURES:	• Excessive grazing resulting in disappearance of protective cover • development of cattle tracts into channels; compaction of soil resulting in lower infiltration rates. • Growth of invasive species, weeds • Low productivity of pasture. • Less area under cultivated fodder/ grasses/ stall feeding • Lack of desirable composition of grasses and legume in grazing lands. • Lack of people participation in grazing land management. • The livestock population of the state is three times the carrying capacity of grazing lands • Continuous grazing reduces the productivity and gives rise to weeds such as Lantana and Parthenium.	• Cattle need to be reared in villages throughout the year, encourage growth of fodder crops and stall feeding • Nomad cattle grazing could be put into rotation mode • Fencing cost can be high which the project can support • Need Soil and Water conservation measures to reduce dryness in summer • Need location-specific grassland species development for ensuring adequate fodder supply, integrate management of vegetation with other NRM programs to achieve multiple use objectives contained in Forest land. • Pastures need to be managed so that they provide for livestock forage, wildlife food and habitat and contribute to economic and social wellbeing of communities by providing stability for communities that depend on pasture resources for their livelihood • Grazing land management through deferred and rotational grazing. • Need to develop close coordination between the State Forest Development and Animal Husbandry Dept. for management and development of pasture lands. • Introduction of desirable composition of grasses, legumes and fodder trees which are palatable and high in protein content. • Enhancement and restoration of soil fertility with the application for organic manure and bio fertilizers.

		• Fodder development through People's Participation in grazing land and livestock management.
FOREST FIRE	• Burning for fodder • Accidental occurrences	• Introduction of forest fire assessment, ranking, and management system (danger ranking, forecasting) • Increasing public awareness on forest fires, and the associated impacts • Demarcation of fire line • Focus on incentives (economic- NTFP, ecotourism) for the communities to draw from these areas so they help in mitigating fires. • Need better management of controlled burning for fodder • Need management systems for pine-needle collection (earmark areas for collection) • Build incentives/industry around reside management (weeds, pine needles) so communities can support their collection.
CLIMATE CHANGE	• Short duration rains, higher intensity • Quality of forest ecosystems depleting, drying up of springs, loss of soil cover	Treatment of the most vulnerable forest areas with scientific and sylvicultural operations and removal of alien species
QUALITY OF PLANTING STOCK	Current seed stands are old, and expertise amongst local communities to identify good quality seeds is low. Current forest nurseries are low- tech and use polybags Infrastcrture gaps such as (i) Seed storage facilities are inadequate (ii) No seed orchards Use of Insectices and fungicides in nurseries is not scientific.	Need to develop good small planting stock to be planted with tall plants Silviculture spacing should be maintained per plant size Promote best management practices on silviculture thinning Initiate intensive training on nursery management Defined protocols for a nursery manual Introduction of raised platforms, root thinning, better compost production Seed storage should be at known temperature and humidity before distribution to seed nursery.
SPECIES SELECTION	Better systems for procurement of seeds is required- origin of the seed has to be recognized	Site specific species needs to be selected for specific sites. This can be done through better planning for the forest nurseries in terms of species selection.

	Quality of planting material needs to be enhanced Modernization of nurseries is needed High altitude MAPs still have low productivity, low survival Communities providing preference for fuel, fodder species	Zonation of species according to agro-climatic zones needs to be considered. Seed handling, collection, pre-sowing management capacity building is needed FD needs coordination for multiple projects to measure impacts Site selection of species can be prioritized where there is least development Species selection should be vetted by an expert and yearly requirement for seedlings should be made. Tall/ Sturdy plants have 90% survival rate in first year. If adopting root trainers, need enriched potting media with 60% organic matter [3:2:1] of FYM: Sand: Soil. Species such as deodar needs to be kept for 1.5-2 years in Root Trainers.
FOREST MANAGEMENT SYSTEMS	Need upgradation in technology FD is implementing and monitoring No silviculture management (challenges in clearing fire lines, no thinning carried out) Poor availability of data on silt load New Management plans need to be prepared in view of the new approach to PA management and biodiversity conservation	Need institutional assessment of the forest department and Forest development corporation to understand the roles in sustainable forest management. Geo-referencing of all forest management plans in FMIS Identification of interventions that have been implemented under NERIL CAT plan and pending measures, so project can prioritize hot- spots for future investments. Introduction of sustainable harvesting, processing, storage and marketing NTFP marketing can be explored through e-NAM if guaranteed stock is provided. Soil and water conservation works should be carried out before the planting takes place, not simultaneously. Research and documentation. Expansion of the data base of protected areas. Preparation of species inventories and vegetation maps for the PA Network in Himachal Pradesh. Participation of the local people and other stake holders in PA management planning, mainly eco development and benefit sharing. Integration of PA concerns into eco development and establish mechanisms to integrate PA concerns into regional development plans.

UNSCIENTIFIC EXTRACTION OF NTFPs, MAPs AND FOREST PRODUCE	Unscientific extraction /exploitation of minor forest resources beyond the point of regeneration Species of MAPs/ NTFPs becoming critical or endangered species	Regulatory control over privator sector harvesting NTFPs for comerical use Monitoring by Village committes at the time of harvesting of MAPs Promote biotechnology in propagating minor forest produce/ MAPs Promote Marketing, value addition, training, development of nurseries for quality planting material and inter linage with other departments Trainings on sustainable harvesting practices

Chapter 3 Relevant Laws, Regulations and Development Programmes

3.1. Introduction

This chapter summarizes the laws, regulations and safeguard policies relvant to the project.

3.2. Applicable World Bank Policies

To minimize and manage environmental and social impacts, the Bank's Operational Policies (OPs) and Bank Procedures (BPs) have to be complied with as part of due diligence. The WB safeguards policies require integrating environmental impacts and risks into the planning and implementation of financed projects such as the HP FFPP**.**

Additionally, HP FFPP will adhere to the World Bank Group Environmental, Health and Safety Standards as presented at www.ifc.org/ehsguidelines. The most relevant guidelines for this Project include the General Guidelines (which contain environmental, construction, occupational and community health and safety guidance relevant to small works and building refurbishment), and the Guidelines for Forest Harvesting Operations.

The Bank's safeguard policies, applicability and rationale have been given in Table below

Table 21 World Bank Safeguard policies

	Policy	***Applicability***	***Remarks on Applicability***
1	Environmental Assessment OP/ BP 4.01.	Applicable	Environmental Assessment (OP/BP 4.01) is triggered. Overall, the impacts of the project financed activities on forest cover and quality water and sediment regulation are positive. There are some potential impacts/risks which may be small-scale, and localized. The potential adverse impacts/risks of project financed activities which would be managed through the provisions in the EMF include (i) pest and disease control strategies in forest nurseries (ii) management of wastes from nursery operations (iii) tree survival rates (iv) siltation of check dams could lead to localized drainage problems and/or habitat disturbance (v) with project investment in value chain infrastructure and enterprise support to NTFPs, there could be unsustainable expansion/intensification of NTFP harvesting, and demand for feeder roads and (vi) ensure that all structures, storage facilities created under the project are maintained appropriately. An Environmental Management Framework (EMF) has been prepared to provide the basic criteria and procedures for screening all interventions, all risks/impacts have been identified as part of the safeguards preparation process, and mitigation plans/ actions have been formulated. The EMF has also identified measures for the strengthening of institutional capacity and capacity building such that the safeguards due diligence process can be implemented.
2	Natural Habitats OP/BP 4.04	Applicable	OP 4.04 is triggered as project area includes areas of rich biodiversity. Project financed activities to be supported in the selected ranges will be consistent with the approved CCAT plan activities and will lead to habitat improvement, and adoption of improved management practices by the department and at the community level, and not lead to any adverse impacts on natural habitats. The EMF has been prepared and ensures that no proposed activities under the project would have any adverse impact on natural habitats
3	Forests OP/BP 4.36.	Applicable	OP 4.36 is triggered as the project will have positive impact on forest cover and quality, improved management capacity and systems within the forest department, better fire management systems, and control of exotic weed infestation, increase native species populations will bring an overall improvement in quality and productivity of forests. Potential impacts such as propagation of exotic/non -native species will be avoided as plantation activities would be aligned with forest working plans and do not impact forest quality.
4	Pest Management OP/BP 4/.09	Applicable	The Project supports strengthening of forest nurseries, supplies and equipment which may include use of pesticides if there is pest/ disease outbreak. While a stand-alone Pest Management Plan (PMP) is not required for this Project, the EMF contains measures to avoid usage of restricted pesticides, promote use of personal protective equipment (PPE), use of bio-pesticides, and promote use of biological and mechanical control of pests and diseases.

5	Physical and Cultural Resources OP/BP 4.11	Applicable	The state has many important pilgrimage centers with prominent religious sites. OP 4.11 is triggered as a preventative measure in case any archeological or other culturally resource items are found or exist near a selected site during project implementation. Chance finds at work sites are a likely impact that would have to be managed. The EMF contains chance-find procedures detailing the plan of action in the event any article is discovered. The project areas are also rich in natural and cultural heritage, communities would recognize, sacred forest areas, water sources, individual sacred trees and bushes of local importance

3.3. Policy and Regulatory Framework of Government of India (GoI) and Government of Himachal Pradesh (GoHP)

Table 22 Analysis of National and State Level Regulation applicable under the project

Environment and Forests					
No.	***Acts and Regulations***	***Year***	***Objective***	***Applicability***	***Authority***
1	National Forest Policy	1988	Keeping the forest area intact in the Himalayan states- This policy implies to maintain the 66.7% of land under forest area in HP.	Applicable as project financed activities will be implemented/carried out on forest land. This policy needs to be complied with.	MoEFCC
2	Indian Forest Act	1927	Consolidates the law relating to forests, the transit of forest-produce and the duty livable on timber and other forest-produce.	Applicable if sub-projects involve felling of trees. The requisite permissions for tree felling will be taken prior to the activity taking place.	MoEFCC
3	Forest (Conservation) Act	1980	Any non-forest activity undertaken on forest land with the objective of providing benefits to individuals, communities, villages, Panchayats will require clearance under the Forest Conservation Act (1980). *GOI has also issued guidelines (F. No. 11-9/98-FC dated 03 January 2005) for diversion of forestland for non-forest purposes under the Forest (Conservation) Act, 1980 – General Approval under Section 2 of Forest (Conservation) Act, 1980 for diversion of forest land to Government Departments for certain developmental activities.*	Applicable as all project financed activities will be carried out in forest areas, and sustainability of project financed investments should not be impacted due to diversion of forest land. However, none of the project financed activities require diversion of forest land.	MoEFCC, and State Forest Dept

4	Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act	2006	The law concerns the rights of forest-dwelling communities to land and other resources, denied to them over decades as a result of the continuance of colonial forest laws in India. Right to hold and live in the forest land under the individual or common occupation for habitation or for self-cultivation for livelihood by a member or members of a forest dwelling Scheduled Tribe or other traditional forest dwellers	Right of ownership, access to collect, use, and dispose of minor forest produce (includes all non-timber forest produce of plant origin) which has been traditionally collected within or outside village boundaries.	Ministry of Tribal Affairs
5	The Biological Diversity Act	2002	The Act aims at the conservation of biological resources and associated knowledge as well as facilitating access to them in a sustainable manner. The Act was enacted to meet the obligations under Convention on Biological Diversity (CBD), to which India is a party	State Biodiversity Board should be consulted in the project preparation phase.	National Biodiversity Authority and State Biodiversity Boards
6	Wildlife (Protection) Act,	1972	The objective is to provide protection to the listed endangered flora and fauna and ecologically important protected areas. If the project extends to PA, then the relevant clearances under the Wildlife Protection Act (1972) will be needed. The project area involves two Protected Areas.	Not Applicable	MoEFCC
7	Eco-sensitive Zone Notifications 2015	2015	The activities in areas around Wildlife Sanctuaries and National Parks are regulated from the perspective of conservation of wildlife	Applicable.	Monitoring Committee for ESZ in the State
8	Himachal Pradesh Forest Produce Transit (Land Routes) Rules.	2013	To ensure that the forest produce/species are extracted from the prescribed area in the approved extraction cycle and that the extraction has been done in a sustainable manner and has not caused any ecological or environmental damage.	Applicable when designing NTFP value chain for registration.	HP Forest Department

			Transport of forest produce by land routes other than fuel wood, khair wood, bamboos, charcoal, medicinal plants and seeds shall register at the office of the Divisional Forest officer.		
9	State Compensatory Afforestation Fund Management and Planning Authority Forest (Conservation) Amendment Rules, 2014	2014	It seeks to establish the National Compensatory Afforestation Fund under the Public Account of India, and a State Compensatory Afforestation Fund under the Public Account of each state. The collected funds will be utilized for afforestation, regeneration of forest ecosystem, wildlife protection and infrastructure development.	Applicable to the project, as it can leverage CAMPA funds for afforestation activities.	HP Forest Department
10	Himachal Pradesh Forest (Timber Distribution to the Right Holders) Amendment Rules	2016	Sets in place rules and regulations for timber granted to rights holders.	Applicable.	HP Forest Department
11	Himachal Pradesh Participatory Forest Management Regulations	2001	They shall apply to such Government forests and such Government land including the common land, which shall be selected jointly for participatory forest management by the Society and the Department. The HP Govt. issued JFM Notification on 12.5.1993 for constitution of Village Forest Development Committees (VFDCs) and made HP Participatory Forest Management Rules 2001 for registration of VFDCs under Societies Registration Act, 1860.	Rules and guidelines applicable for all participatory forest management activities. Applicable for institutions set up for PFM activities under the project.	HP Forest Department
12	Rules Governing the felling of trees on various types of land in HP	2017	Felling of Trees of Private, non- Private and forest lands is governed by various acts and rules:	Applicable in the case any trees need to be felled for construction activities and approach roads.	HP Forest Department

13	HP Forest Fire Rules Transit Rules- Notifications MFP	1999	These rules may be called the Himachal Pradesh Forests (Protection from Fire) Rules, 1999. The objective is to set in place rules for precautionary measures to prevent fires, and also set forth prohibitions on activities which may lead to forest fires	Applicable to storing/ stacking of inflammable forest produce, kindling of fire within one hundred meters from a forest without permission of the Divisional Forest Officer, and Precautions to be taken in burning agriculture residue near forest.	HP Forest Department
14	Insecticide Act 1968; Insecticide Rules 1971; Insecticide (Control) Order 1985;	1968 1985	The GOI has notified various Acts for the control and prevention of pollution due to pesticides and fertilizers. The Act to regulate the import, manufacture, sale, transport, distribution and use of insecticides with a view to prevent risk to human beings or animal	The project investments are likely to involve use of pesticides (in nurseries and plantation activities). These activities will comply with the requirements of the Insecticide Act – especially with regard to non-use of banned pesticides, safe use of pesticides, etc.	Central Insecticides Board, GoI
15	APMB Department Notification agr F (150-26/2004 dated 11.3.2010. Amendment to The Schedule section 2 (a) of Himachal Pradesh Agricultural and Horticultural Produce Marketing (Development and Regulation) Act, 2005 (Amendment to the Schedule)	2010	HPSAMB to provide for improved regulation in marketing of agricultural produce, development of efficient marketing system, promotion of agri-processing and agricultural exports, establishment and proper administration of markets for agricultural produce in the State of Himachal Pradesh.	APMB provides marketing support o 37 Medicinal and Aromatic plants. APMB mandis can be used to auction this produce	Dept. of Agriculture (APMB)
16	Food Safety and Standards (Food Products Standards and Food Additives) Regulations, 2011 andsubsequent amendment.	2011	The Food Safety and Standards Authority of India (FSSAI) has been established under the Food Safety and Standards Act, 2006 as a statutory body for laying down science-based standards for articles of food and regulating manufacturing, processing, distribution, sale and import of food to ensure it is safe to consume.	FSSAI standards would apply if NTFPs supported under the project are processed for consumption.	FSSAI

Table 23 Regulations on Environment and Pollution Management

No.	*Acts and Regulations*	*Year*	*Objective*	*Applicability*	*Authority*
1	Environment (Protection) Act and amendments	1986	The Environment Protection Act, 1986 (the "Environment Act") provides for the protection and improvement of environment. The term "environment" is understood in a very wide term under s 2(a) of the Environment Act. It includes water, air and land as well as the interrelationship which exists between water, air and land, and human beings, other living creatures, plants, micro-organisms and property. Under the Environment Act, the Central Government issues notifications under the Environment Act for the protection of ecologically-sensitive areas or issues guidelines for matters under the Environment Act	The various environmental quality standards notified under this act are applicable to the project. These include: General standards for discharge of environmental pollutants Ambient air quality standards in respect of noise Vehicular exhaust norms Noise limits for vehicles Emission and noise limits for gensets	MoEFCC, CPCB
2	Water (Prevention and Control of Pollution) Act (and subsequent amendments)	1974	To provide for the prevention and control of water pollution and the maintaining or restoring of wholesomeness of water.	The project will have Investments on supply chain that may increase wastewater flow Proper measures as per the requirement of the Act have been incorporated in the EMP.	CPCB, and HPPCB
3	Air (Prevention and Control of Pollution) Act (and subsequent amendments)	1981	To provide for the prevention, control and abatement of air pollution, and for the establishment of Boards to carry out these purposes.	The project will involve construction of infrastructure and their clearance may be required by the Project. The project activities (especially construction and NTFP processing) will have to comply with the National Ambient Air Quality Standards.	CPCB, HPPCB, and Transport Department
4	The Municipal Solid Waste (Management and Handling) Rules,	2000	The rule facilitates and provides methods to manage the Municipal Solid Wastes in an efficient and reusable manner.	As project investments, will involve construction/up gradation of buildings/nurseries, supply chain infrastructure, generation and disposal of solid waste under different	MoEFCC, CPCB, and HPPCB

				components will need to be managed in line with the rules.	
5	The Noise Pollution (Regulation and Control) Rules, and amendments	2000	Work place noise is covered under Indian factories Act, 1948 but this rule provides safety against noise in ambient condition with generation of noise by certain point and area source.	Project activities may lead to generation of Noise due to construction activity, and operation of DG sets for power backup.	MoEFCC, CPCB, and HPPCB
6	Central Motor Vehicle Act Central Motor Vehicle Rules	1988 1989	To control vehicular air and noise pollution. To regulate development of the transport sector, check and control vehicular air and noise pollution.	Operation of vehicles in carriage and construction activities in the project. Also, applicable to vehicles used under forest fire control / patrol and management. All vehicles will comply with relevant emission control norms.	Motor Vehicle Department
7	Roof-top Rain Water Harvesting	1999	Rain water harvesting in the state	Any infrastructure facility more than 1000 m plinth area. However, infrastructure of this scale is unlikely to be supported under the project.	HP State Council for Science, Technology & Environment
8	Himachal Pradesh Non-Biodegradable Garbage (Control) Act, 1995	1995	Ban on non-biodegradable garbage including plastics	The project may use non-biodegradable material for nurseries, crates and packing material. However, biodegradable alternatives will be encouraged. Any plastic waste generated will be managed through proper storage and onward sale to recycling units.	HP State Council for Science, Technology & Environment
9	Construction and Demolition Waste Management Rules	2016	Every waste generator shall prima-facie be responsible for collection, segregation of concrete, soil, storage of construction/demolition waste generated and deposition to collection centre or handover to authorized processing facilities	Applicable as construction waste will be generated during the construction phase. Some of the projects involve dismantling / demolition of existing infrastructure such as intake wells, etc.)	HPPCB

Table 24 Labour Welfare & Occupational Health and Safety Regulations

No.	*Acts and Regulations*	*Year*	*Objective*	*Applicability*	*Authority*
1	Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996	1966	It regulates the employment and conditions of service of building and other construction workers and provides for their safety, health and welfare.	This will be applicable for all building or other constructions works under the project that employ 10 or more workers.	District Labour Commissioner and Buildings Inspector
2	Workmen Compensation Act, 1923	1923	It provides for payment of compensation by employers to their employees for injury by accident i.e. personal injury or occupational disease.	Construction workers will be involved in the sub-projects.	District Labour Commissioner
3	Inter-state Migrant Workers Act, 1979	1979	It protects workers whose services are requisitioned outside their native states in India. A contractor who employs or who employed five or more Inter-State migrant workmen need to obtain registration under this act	Construction workers will be involved in the sub-projects	District Labour Commissioner
4	The Child Labour (Prohibition & Regulation) Amendment Act, 2016	2016	It prohibits employment of children in specified hazardous occupations and processes and regulates the working conditions in others.	There should not be any child labour in any project activity.	District Labour Commissioner
5	Minimum Wages Act, 1948	1948	Payment of minimum rate of wages as fixed and periodically revised by the State Government	Construction/daily wage workers will be involved in the sub-projects	District Labour Commissioner
6	Building and Other Construction Workers Welfare Cess Act, 1996	1996	An Act to provide for the levy and collection of a Cess on the cost of construction incurred by employers.	Sub-projects will involve construction workers	District Labour Commissioner

3.4. List of Statutory Clearances and Authorizations

Table 25 List of Statutory Clearances and Authorizations which may be required

No.	*Activity*	*Relevant Act/Rules*	*Requirement*	*Competent Authority*	*Responsible Agency*
1	Tree cutting from Private land classified as 'Forests'	Forest Conservation Act 1980	Permission for tree cutting shall be processed under Forest Conservation Act 1980. Felling under this category will be granted by DFO after processing the case under FC Act and getting approval	DFO	HP Forest Department
2	Tree cutting from government land not classified as forests	GoHP leteer no FFE-(b) F 913)53/2 006-1 dated 20.08.2011	Felling of trees except for Ban/Oak from non-forest land in rural areas for development activities not forming compact wooded block of above 5 Ha and land is not classified as van, Bani, and Jungle etc. in revenue record.	Chief Conservator of Forests/ CCF of the circle will grant permission, DFO shall inspect the trees after obtaining approval from CCF. Felling to be done through HP SFDC	HP Forest Department
2	Tree cutting from Government Land classified as forests	Forest Conservation Act 1980	Felling of trees from diverted forests land where final approval has been granted by GoI u/s 2 of FCA, 1980	DFO, of the concerned circle Felling to be done through HP SFDC	HP Forest Department
3	Extraction of ground water	Ground Water Rules of 2002	Permission for extraction of ground water for use in road/other construction activities	State Ground Water Authority	HP Forest Department
4	Engagement of labour	Labour Act	Labour license	Labour Commissioner	HP-Forest Contractor
5	Establishment of processing units for NTFP		Consent for Establishment and Consent for Operation are to be obtained from the State Pollution Control Board prior to establishment and commencement of operations, repectively.	State Pollution Control Board	HP Forest Department

Chapter 4: Stakeholder Consultation

In accordance with the World Bank Safeguard policies, stakeholder consultations were conducted with the key project stakeholders during the Environmental Assessment and development of the Environmental Management Framework.

The objectives of the stakeholder consultations were:

i To create awareness and generate understanding about the project among stakeholders, and to collect their opinion, suggestions for planning and designing of the project

ii To find out whether the communities are likely to accept the measures suggested under the HPFPP

iii To understand the environmental issues associated with the project through discussions

iv To assess positive as well as adverse environmental impacts in the area through participatory methods

v To identify the needs and concerns of the stakeholders

vi To assess cultural patterns and behavior of local communities towards the project

vii To elicit suggestions and opinions of the community, line department officials and NGOs on mitigation measures to counter and check the adverse and negative impact

viii To assess the satisfaction level of people with proposed mitigation and management measures proposed for the project

The key elements of the stakeholder consultation process are:

1. Identification of the key stakeholders
2. Consultation meetings with the identified key stakeholders
    i Consultation meetings with key institutions
    ii Stakeholder consultation meetings at district level
    iii Stakeholder consultation meetings at village level
3. Disclosure Workshops, following disclosure of the Environmental Assessment and Management Framework to the key stakeholders

Stakeholder's views were invited through informal and formal public consultation meetings. The stakeholders were informed about the project components, the assessment process, likely environmental impacts and poposed management framework before seeking their views. An executive summary of consolidated EAMF report will be made available for public access in local language (Hindi) versions at HP Forest Department website. Copies will also be made available at the Division and Range offices of the HP Forest Department.

4.1 Identification of Key Stakeholders

The following table presents the key stakeholders in the project.

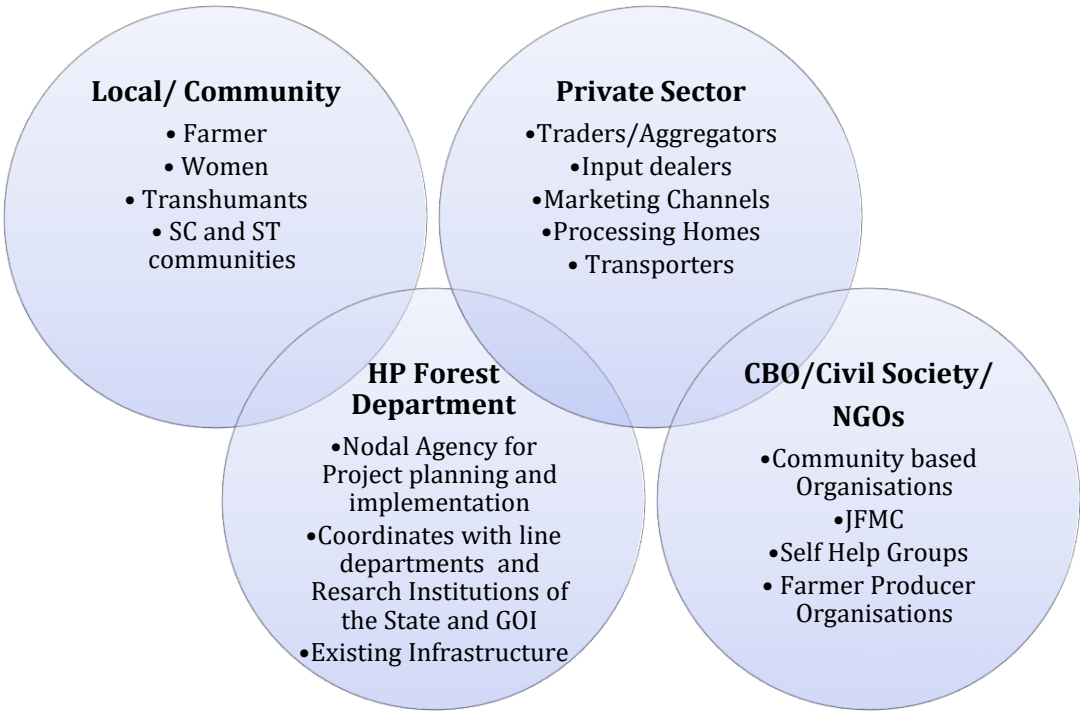
Table 26 Stakeholder Matrix

Type	*Stakeholder*	*Stake in the project*	*Importance*	*Project needs*	*Perceived attitude*
Nodal Implementing Agency	HP Forest Department, GoHP	Nodal Agency	High	Project Planning and Implementation	Interested
	Circle (Conservator of Forests)	Nodal Implementer	High	Existing channel for submission of APOs/ approval of APOs/ sanctioning power of works/ supervise performance of divisions / co-ordination with all Divisions/ grievance redressal / procurement of goods, works etc beyond competence of DFO	Interested
	Division (Divisional Forest Officer)	Nodal Implementer	High	Prepare APOs/ Sanction works within his competency/ supervise performance of staff up to range offices/ grievance redressal/ drawing and disbursing officer from government treasury/ co-ordination between all Range Officers and with other Departments/ procurement of goods, works etc within his competence	Interested
	Range (Range Officer) and frontline staff	Nodal Implementer	High	Implementing activities as per approved APOs/ Inputting data in FMIS/ Sub-disburser of government funds/ liaising with public/ Attending to Forest offences/ fires	Interested
Other Relevant Line Departments and Institutions	HP State Forest Development Corporation Ltd., GoHP	Line Department	High	NTFP harnessing and marketing	Interested

Type	*Stakeholder*	*Stake in the project*	*Importance*	*Project needs*	*Perceived attitude*
	Himachal Pradesh State Agriculture and Marketing Board, GoHP	Line Department	Medium	NTFP marketing	Moderate
	Himalayan Forest Research Institute, GOI	Line Department	Medium	Silviculture operations and Pest Management	Interested in participating in project planning and implementation
	Department of Energy, GoHP	Line Department	Medium	Technical support	Interested
	Department of Environment Science and Technology, GoHP	Line Department	Medium	Technical support	Interested
	ICAR-Indian Grassland and Fodder Research Institute, GOI	Line Department	Medium	Pasture Management technical support	Interested in participating in project planning and implementation
Community	Local Farmers	Direct dependency on forests	High	Responsible stakeholder in forest management and particularly NTFP management, extraction and marketing	Interested
	Transhumant communities	Direct dependency on forests	High	Important role in Pasture management and NTFP management	Interested
	Women	Direct dependency on forests	High	Responsible stakeholder in forest management and particularly NTFP management, extraction and marketing	Interested
	SC and ST communities	Direct dependency on forests	High	Responsible stakeholder in forest management and particularly NTFP management, extraction and marketing	Interested
	Joint Forest Management Committees (JFMC)	Direct Dependency on forests and NTFP's	High	Main body entrusted for preparing individual management plan and its implementation	Interested

Type	*Stakeholder*	*Stake in the project*	*Importance*	*Project needs*	*Perceived attitude*
	Forests Right Committees (FRC)	Constitutional body framed under Forests Right Act, 2006 for ensuring the rights of ST's and Other Traditional Forests Dwellers	Moderate	Existing structure of addressing forests right of locals inhabitants	Interested
	Self Help Groups (mahila mandals)	Dependency on forests, especially for NTFPs	Moderate	Important part in implementation of government schemes.	Interested
	Traders /Aggregators	Direct dependency on NTFP market value chain	High	Critical role in value chain, provide informal financing to small farmers and take working capital risk.	Like to keep the tricks of trade secret and not share the details for fear of losing the monopoly.
	Transporters	Direct dependency on NTFP market value chain	High	Critical for the fresh produce to reach market on time, for loss in transit and in providing market access.	Would be willing to co-operate subject to conflict with other perishable commodities like apple.
	Processing units	Direct dependency on NTFP market value chain	High	Processes NTFP produce to various forms for end-use	Would be willing to help if capacity unutilized.

Figure 13 Key Stakeholders in the Project



4.2 Consultation Meetings with Key Institutions

Several institutions were consulted during the preparation of the Environmental Assessment and Management Framework for seeking views and suggestions on the environmental issues, interventions, impacts and mitigation measures relevant to the project. A summary of the consulations is provided in Annex 4. And list of people met is included in Annex 3.

The key institutions consulted include the following:

i Himachal Pradesh Forest Department
ii Himachal Pradesh State Forest Development Corporation
iii Himalayan Forest Research Institute
iv Indian Grassland and Fodder Research Institute
v Himachal Pradesh State Agriculture and Marketing Board
vi Department of Environment Science and Technology

The key areas on which the inputs of the experts were sought are: nursery management, pest management, forest fire control, weed control, pasture management, NTFP value addition and marketing, waste management, capacity building, climate change, etc. The inputs and suggestions provided have been incorporated into the Environmental Management Plan.

4.3 Stakeholder Consultations at District and Village Levels

Stakeholder consultation meetings were organized at district and village levels to elicit stakeholder views on the key environmental issues, ascertain the environmental benefits and risks associated with the implementation of the various project activities, and to identify the required interventions and mitigation measures. The stakeholders consulted included NTFP collectors and sellers, Gram Pradhans and members from Gram Panchayats, members of JFMCs, farmers, village community members, NGOs, forest officers, research scholars and scientists.

The district level consultation meetings were held in 4 districts:

i Consultation meeting at Kinnaur on 24 April 2018, attended by 60 participants

ii Consultation meeting at Shimla and Kulla on 25 April 2018, attended by 120 participants

iii Consultation meeting at Solan on 29 May 2018, attended by 50 participants

iv Consultation meeting at Kinnaur on 30 May 2018, attended by 50 participants

The village level consultation meetings were held in 17 villages in the districts of Kullu, Shimla and Kinnaur.

District	*Villages*	*Dates of the Consultation*
Kullu	Poshna, Anni, Bayal, Chowai	25.04.2018
Shimla	Tacklesh, Sunni, Sakrodi, Jandrehad, Tattapani, Malgi	26.04.2018
Kinnaur	Khwangi, Kalpa, Rogi, Kilba, Ribba, Skibba, Moorang	24.04.2018

The detailed summary of the stakeholder consultation meetings at the district and village levels is presented in **Annex 5.**

4.4 Disclosure Workshop

Since the project area is large with distinct geographical, cultural and social features, two public disclosure workshops were held following dislcosure of the draft EMF on 16 June. The workshops were held at Reckong Peo (Schedule-V area), Kinnaur District on 23/08/2018 and the other at Rampur busher, Shimla District on 24/08/2018. A total of about 170 people participated in the meeting including village community representatives, women's groups, local government representatives, NGOs and staff of the Forest Department.

The purpose of the Disclosure Workshops was to (i) share the Environment Assessment and Management Framework final report with the representatives of Panchayats and Forest Officials at various levels; (ii) discuss, validate and finalize the issues and the proposed management measures. Detailed presentations were made on the Environmental Assessment and Management Framework. The participants expressed broad agreement with the issues, interventions, impacts and mitigation meausres. Further, they shared opinions on a range of issues including the need for post-plantation care, native species plantation, pest management operations, forest fire prevention, community institution strengthening, and sustainable extraction of forest resources.

Detailed proceedings of the disclosure workshops are provided in **Annex 6.**

Chapter 5 Environment Assessment

The process of scoping the environmental impacts of the FFP included consultation with a range of key stakeholders at the state level and in three districts of Sutlej basin (Kinnaur, Shimla & Solan). It also involved the collection and review of a range of background information and data. Details of individuals and organisations consulted are provided in Annex 3, and a list of reference materials is provided in Annex 1 and 2. The forests currently face challenges of degradation, including (i) irregular and diminished flow of natural springs, (ii) loss of soil fertility due to erosion, (iii) widening gap between demand and supply of fuel wood and fodder, (iv) increase incidences of forest fires and invasive weeds leading to deterioration in habitat quality and pastures. The project interventions themselves are designed to mitigate these issues as discussed in the table below:

Table 27 Assessment of current threats on Forests in HP

Forest Resources	***Threats***	***Potential negative impacts in the without project situation***	***Potential positive impacts due to project intervention***
DENSITY AND QUALITY OF FORESTS	No scientific/ silviculture management of forests	▪ Thinning of forests, reduction in dense forest, reduced capacity for holding soil water, changes in micro-climatic conditions, impact on biodiversity ▪ Low survival rates of small/ young species in first year ▪ Quality of planting stock is low	▪ Support forest sector reform process ▪ Implement scientific silviculture practices (nursery, for example plant size, spacing, maintenance techniques etc.) ▪ Implementation of innovative methods of planting and maintenance with new planting models ▪ The investments in seed and nursery development and planting and maintenance will incorporate specific features to ensure resilience to climatic change conditions.
WATER FLOW REGULATION	Road construction, lasting and various infrastcrture activities	Increased soil erosion, reduced land productivity, high runoff, increased silt load in streams	▪ Strengthening of integrated forest management system, design and implement water flow and sediment monitoring network. ▪ Afforestation and reforestation activities, with soil and water
	Additional increase in silt load of streams and water bodies	Increased incidences of flooding, stream bank erosion, reduced life of hydropower plants in downstream, reduced drinking water supply	

		Reduced potential of riverbanks to act as buffers against floods, implications on fisheries, damage to habitat	conservation works based on identification of key hotspots and intervention activities to maximize silt retention and surface water absorption.
	Increased evaporation / high run off	▪ Reduced the amount of water holding capacity of soils in root zone ▪ Steep slopes without adequate protection lead to high runoff and associated soil erosion leading to deteriorating water availability	
PASTURES	Proliferation of exotic and noxious weeds	Threats to indigenous species, reduced productivity of pastures, loss of grazing areas, fodder, forest cover, reduced production of NTFP	▪ Create enabling conditions for community participation in pasture management ▪ Introduction of rotational grazing ▪ Implementation of scientific interventions for invasive weed control ▪ Regulatory standards for management of pastures will be developed, including its piloting by women user groups and SHGs.
	Grazing and livestock pressure	Poor quality of pastures, depletion of ground flora, added pressures of nomadic communities and grazing rights.	
	Reduced fertility of soil in pastures	Allowing of overgrazing and not following rotational grazing, most pastures are facing depletion of soil phosphorus due to overgrazing, thus legumes are unable to form nodules and are depleting	
EXPANSION OF HORTICULTURE	Illegal encroachment on sensitive ecosystems	Forests converted into apple orchards, and there is increased debris, deposition of wastes.	Establishment and operationalization of the Forest Management Information System
FUEL WOOD AND FODDER	Demand and supply gap for fuel wood and fodder is increasing.	Thinning of forests, removal of deadwood from forests impacting detritus and other decomposers, reduced habitat quality, carrying of head loads of fuel wood by community members, especially women.	Community involvement a part of project design to check impacts Plan for controlled burning for regeneration of new fodder.
FOREST FIRE	Increasing rates of fires particularly in lower altitudes / Chil pine areas	Loss of biodiversity, increased soil Erosion, impacts on biodiversity, especially birds. Danger to communities living in the vicinity	Development of fire danger system, equipment and infrastructure for fire suppression. Reassessment of fire lines and development of new fires lines.

	No collection system for pine needles	Pine needles from Chir pine areas are cause spread of forest fires.	Training for communities on controlled burning and developing van-sarovars to douse fire and collection and use of pine-needles
NTFP AND MAP	Reduced natural regeneration / Loss of species	Reduction in natural regeneration of species, as some areas are harvested beyond carrying capacity	▪ The project will support a favourable eco-system for responsible and sustainable trade in high-value forest products with the aim to enhance the economic benefit to communities. ▪ The three key areas supported by the project will be the conservation and responsible collection of NTFP raw material, promotion of cultivation of NTFPs and improving processing facilities and market linkages to strengthen NTFP value chains in the state.
	Unsustainable harvesting of medicinal plants and herbs	Removal of medicinal herbs, reduced population sizes and restricted distribution, loss of forestland, exploitation of labour.	
	Habitat disruption	Habitat degradation, reduced productivity of habitats, low natural regeneration, changes in species community structure and composition, impacts on ecosystem processes	

5.1 Assessment of Environmental Impacts Associated with Project Activities

The potential environmental impacts (both positive and negative) of the various physical interventions, envisaged under the FFP are summarised in the Table below. Proposed environmental mitigation, and in some cases good practice/measures, to be incorporated within the EMF are discussed in the next section

Component	Activities	Positive impacts	Adverse impacts/ risks	Proposed Mitigations
Component 1. Institutional Reform and Capacity Building for Integrated Watershed Management (IWM) and Improved Forest Management	Facilitate a better alignment of institutional mandates for IWM and strengthen the HPFD's institutional structure and capacity for improved forest service delivery. It will be implemented through a combination of technical assistance (TA) and public investments such as Strengthening the training infrastructure at the State Forest Training Institute at Chail		Impacts relating to small civil works- impacts on air, water, noise, and site drainage. The potential environmental impacts (on drainage, water, aesthetics) of this activity will be minimal. It is expected that physical works will be small-scale however, any impacts should be avoided, if not minimized on the environment and surrounding sensitive ecosystems.	All construction activity in the vicinity of important temples, monasteries, local CPRs, sacred trees and water sources should be avoided to maintain the aesthetic and pristine quality of the area. For small works (rehabilitation of space for installation of planting or storage equipment), it is proposed to use an EMP checklist on an as needed basis. The checklist for specific project site will be prepared by SPMU in collaboration with the respective Range Office staff.
Component 2. Improved Investments in Participatory and Sustainable Land and Water Management	Development of high-quality seed stands. Establishment of a geo-referenced seed production system (linked to the Forest Management Information System [FMIS]); construction of a centralized seed center to process, treat, store, and test the seed in controlled conditions; design and implementation of a seed certification and distribution system; and construction of a climate-controlled seed bank.	This intervention will have positive impacts on afforestation and reforestation schemes. Selecting appropriate seed sources for the site will improve overall growth rate of the plantation since the trees are planted into an environment in which they are adapted. Appropriate seed certification and	Transportation of seedlings to planting site is dependent on-site accessibility Impacts relating to small civil works- impacts on air, water, noise, and site drainage (such as during construction of seed bank facility) The potential environmental impacts (on drainage, water, aesthetics) under nursery upgradation (raising of	All activities carried out in protected areas, wildlife sanctuaries, Eco sensitive zones, will be carried out consistent to the management plan of those areas. Only High-quality seeds will be selected from the forest and plantation sources for raising seedlings. Plus, trees should be demarcated so labour/community are able to

	Centralized seed center to process, treat, store and test the seed Nursery development. Provision of machinery and equipment and the production of approximately 200,000 additional seedlings in each of 19 nurseries (one per range) for subsequent planting in forest plantations. Nursery and species selection will incorporate JFMC inputs.	distribution to the nurseries will also reduce plantation losses due to maladapted genetic material/ incorrect species which may continue to thrive. Storage under controlled conditions of temperature and humidity will allow seeds to be stored over extended period, this will also allow nursery managers to have a reserve stock in case of additional plantation requirements (failure of seedlings due to pest and diseases)	seedlings, irrigation facility, storage area and staff quarters) this activity will be minimal. It is expected that physical works will be small-scale and – in some cases – will not require mitigation measures (for installation of water tank, compost pit etc.) In nurseries, use of pesticides against pests and diseases could impact human health, air quality, groundwater, surface water and soil.	decipher which tree is known plus tree the seeds selected from good plus trees identified for seed collection. The seeds collected should be tested for their germination ability and growth. Floating seeds in water is good method for separating quality from damaged or immature seeds. Sound, mature acorns sink in water. Defective acorns will generally float. Water flotation also facilitates the removal of leaves, and other debris making sowing of the seeds easier. For small works (on construction of green-houses or rehabilitation of space for installation of planting or storage equipment), it is proposed to use an EMP checklist on an as needed basis. The checklist for specific project site will be prepared by SPMU in collaboration with the respective staff participating in the activity. Project will utilize bio-pesticides, and strategy as prescribed under Annex 11. No procurement or use of banned pesticides or

				pesticides belonging to Class I and II as per WHO classification of pesticides (see Annex 11) The selection of species is based on the suitability for the altitude, slope or topography and site quality. Focus should be on native species or species that are highly adapted to the location. Further, among the suitable species, those with high to moderate growth rate of biomass and ability to provide multiple benefits to the community should be selected. All plastic root trainers and polybags will be properly disposed. The management steps include: Storage of plastic waste (bags, root trainers, etc.) on site at the nursery. Periodic clearance and collection of the plastic waste by identified collector. Onward delivery of plastic waste by collector to aggregator or to recycling facility.

				A clear register of the plastic waste generated and sent onward for recycling must be maintained at each nursery. No plastic will be burned in the open that impacts air quality. Use of biodegradable planting bags and root trainers will be piloted in at least one pilot site per district and will be evaluated for further scaling up during the project period. To ensure better survival of plants, nursery techniques to be used for production of healthy nursery stock include: (i) Root trainers to prevent coiling of seedling root system (ii) Better medium for growth of seedlings (iii) Use of organic manure / Vermi Compost in appropriate proportions Use of bio pesticides for pest and disease management Follow Annex 11 for guidance on pest management Follow Annex 8 for guidance on EMP and Annex 9 for standalone EMP for civil works

				Follow Annex 10 for guidelines on occupational health and safety for community labour. The project will also follow WBG EHS guidelines
	Plantation management. Planting and management of trees in open and medium density forests and slopes vulnerable to soil erosion and protection of plantations[10]. The locations and species will be selected based on JFMC inputs and ecological conditions	Plantation areas will increase and prolong the low flow because of the water retention function of forest soil and exchange with ground water. Rehabilitation of open forest areas will reduce soil erosion and global environmental benefits from carbon sequestration	Reforested areas could be at risk for grazing, and should be fenced and protected Low Survival of young plantations due to fire risk, natural disasters, wildlife conflict/grazing, steep slopes (low soil depth) Activities initiated by the project cease soon after it terminates, or the benefits from the project's activities are no longer available to the intended beneficiaries, because the resources needed to continue the project initiatives are not available. Use of exotic and non-native species for plantation/restoration of forests and protected areas should not be permitted	All activities carried out in protected areas, wildlife sanctuaries, Eco sensitive zones, will be carried out consistent to the management plan of those areas. Intensive site preparation is often necessary and follow up weed control is critical. Plantation maintenance with community should involve (i) Incentives. Without benefits to be gained by improving regeneration performance monitoring becomes inconsequential and inefficient. (ii) Records. Keep clear, concise, and current records. (iii) to deal with the risk of fire keep vegetative debris to a minimum and see that a ready supply of water for fire suppression is

[10] The project will pilot innovative methods using simple treatment replication trials and scale up successful methods.

			Activities / good practice developed in the project area are not adopted elsewhere, so that it fails to become more than a pilot exercise, because it was too narrowly focused or was located in a situation that was not representative of the population as a whole. There is a risk that seedlings will not be successful, though many of these cases can be attributed to improper planning. Losses of seeds and small seedlings can be high. There is a risk that Land selected for plantations is eroded and has shallow soils.	available (van sarovars). The presence of firebreaks and access roads will allow fire trucks to reach fires and will make it more difficult for flames to spread Only use indigenous and native species with multi-purpose benefits List available exotics and non-natives and issue notification disallowing their use in plantation/restoration New plantation sites need to be adequate fences and protected. Use of non-threatening measures to ward off wildlife (signs/sounds/barriers) Restoration of OF areas should be done through diverse set of local indigenous species If encountering archaeological findings during works, the community should stop operations and notify competent authorities If experienced planters are not available in JFMCs provisions for training and supervision

				should be made by forest department so that quality of the plantation is not compromised Factors that should be considered when selecting species include: growth rate, site requirements, climatic suitability, genetic variability, wood properties, aesthetics, wildlife value, biological diversity, erosion control and potential insect and disease problems. The use of tree species not native to HP should be contingent on credible evidence confirming that the species in question is not invasive, will not create significant risk to forest health, and is from appropriate provenances that are well adapted to the site and their ecological effects monitored. Sites to be avoided when considering seeding plantation are areas where seeding has already failed. Avoid sites prone to frost or frost heaving. Avoid sites where grazing could occur,

				and highly erodible soils or steep slopes where young plants could be washed away. Always use seed of appropriate seed sources that has been properly stored, stratified, and treated. Harmonization with measures proposed in EMP (accessibility, development planning, vegetation removal, construction practices, environmentally friendly construction materials, etc.) Discouraging monoculture and promoting mixed species plantations. All recognized natural habitats, wetlands and protected areas in the immediate vicinity of the activity will not be damaged or exploited, all staff will be strictly prohibited from damaging activities (see Code of Conduct for Workers in Annex 9). All mitigation measures should eventually be built into the working plan prescriptions of state forest departments

				Follow Annex 10 for guidelines on occupational health and safety for community labour. The project will also follow WBG EHS guidelines
	Soil and water conservation measures. Vegetative measures, such as grass seeding, grass turfs, brushwood, check dams, live hedge, and spurs, as well as mechanical measures, such as drop structures, crate wire spur structures, and drainage line treatments, like gully plugging.	The impacts of soil and water conservation works are mainly positive as they seek to recharge springs, prevent run off and erosion, and increase soil moisture levels for favorable raising of plantations. They also control silt load in streams. When soil erosion is controlled, water pollution is also controlled. Thereby reducing the main water pollution risk in forests - movement of fine soil particles /silt into water, causing turbidity-runoff where the fine particles of soil are suspended in water. turbid runoff can lead to silting up of drainage features. This reduces the quality of water for agriculture and domestic use and can harm aquatic life. S&W conservation activities couples with	Civil works (check dams, gully plugs etc.) may bring localized changes in soil structure, eliminate certain soil biota and may impact soil productivity. Enhanced water storage could modify flow peaks and affect downstream water availability, changes in slope and natural drainage pattern may further alter tertiary drainage line. Failure of structures due to poor construction techniques.	All activities carried out in protected areas, wildlife sanctuaries, Eco Sensitive Zones, will be carried out consistent to the management plan of those areas. The following suggestions will help with soil and water conservation measures and erosion control: ▪ Undertake all S&W activities as per the CCAT plan treatment prescriptions. ▪ Ensure strong apron, deep toe wall and sufficient foundations for safety of erosion control structures. Locate structures on stable sites. ▪ Spurs or other stream bank protection measures must not cause drainage congestion.

		forest vegetation can impact the total volume of the surface flow; reduce the peak flow discharge and increase the base flow and thus increase the availability of water use efficiency.		▪ In areas where high/steep slopes and poor and thin soil layer, soil erosion control is difficult. The design can consider bio-engineering methods for gully erosion control, sand filtering, and construction methods of multi-layer forest stands in stony mountain area. ▪ S&W activities should be carried out before plantation so that soil moisture conditions are optimal (especially in OF areas, steep slopes etc.) ▪ Leave buffer zones near streams to prevent siltation and Keep drainage pathways covered with grass
	▪ Pasture management. Introduction of rotational grazing, delineation of forest areas for the supply of fodder, and the introduction of voluntary systems to prevent livestock from grazing in nurseries and young forest	Enhanced fodder availability Increase in biodiversity Less loss of forest resources and wildlife due to forest fire	Increased grazing pressure in other areas due to displacement of cattle/livestock from pastures undergoing restoration/ rotation. Mechanical Methods adopted for exotic weed management such as 'cut	All activities carried out in protected areas, wildlife sanctuaries, Eco Sensitive Zones, will be carried out consistent to the management plan of those areas.

	plantations and avoid the loss of seedlings. ▪ Forest fire prevention and suppression. Organization of community fire protection groups; provision of locally appropriate firefighting equipment, including small vehicles, to the HPFD offices and participating communities; and training of communities on controlled burning, developing van-sarovars (small ponds) to douse fires, and the collection and use of pine needles.		root stock' may not be effective in the long term unless (i) comprehensive treatment and rehabilitation of the area is applied, else weeds will proliferate again (ii) labour/ communities are adequately trained in the method of cutting, depth of cutting and disposal of dead shrubs/ weeds. Loss of forestland by converting them to pastures. Livestock population may increase by assuring enhanced fodder availability, which may be a potential threat to natural areas. Shifting of grazing pressure in other areas after closing selected areas for grazing may speed up the degradation of remaining pastures nearby. Conflict with people when areas are closed for grazing. No incentives to collect pine needles which are the main causes for spread of ground fires.	Identify alternative areas before restoration of existing ones in use Form agreements on herd sizes with participating communities, and monitor livestock numbers Promote cultivation of Napier and elephant grasses on agriculture or wasteland, on-farm, along with stall feeding practices to reduce pressure on forests and pastures, sensitive areas. Efficiency in the use of fodder can be enhanced through a number of technological and management options like chopping, grinding, wetting and soaking of fodder, and enrichment of crop residues and dry fodder with mineral supplements. This will not only result in efficient use of available fodder but also improve its nutritional value. Similarly, there are large areas of common pastureland, which can be used for cultivation of fodder trees and grasses in Himachal Pradesh.

			Firefighting staff need to be adequately trained in use of equipment, else occupational hazards can occur. Construction of Van Sarovars could have construction related short-term impacts such as air and noise pollution, disposal of excess soil, accidental falls in borrow areas, etc. Van Sarovars may pose safety risk to humans and wildlife is not properly designed – for example, if there are steep slopes, inadequate fencing, etc. Fire management being community-based does not simply mean they carry out paid work / rewarded for fire-control. They will need to be incentives to participate and monitor fires. Towns/ villages/ Communities living in the vicinity of high hazard areas are often not directly protected	Eradication of invasive alien plant species need to be integrated with rehabilitation of cleared areas. Shift from the present methods of 'one time removal of weeds' to 'complete rehabilitation' of the treated areas. In view of their environmental/ ecological concerns, the rehabilitation measures will resort to chemicals methods of exotic weed control only as the last option. The natural regeneration of indigenous plant species on treated sites should be encouraged and facilitated to establish towards better environmental and ecological services, including fodder, fuel, water recharge, etc. No potentially invasive exotic species – (viz. Leucaena leucocephala, Prosopis juliflora, Teak, Darek, Silver Oak, Jatropha curcus, Tecoma stans, etc.) – will be used for plantations in the areas under weed management, because

				of their deleterious effect on the native flora. Controlled burning activities should keep in mind the key breeding and nesting grounds/seasons of birds and other important species (Schedule I). Organise community enterprise and zonation around collection of pine needles. Facilitate marketing linkages to industries that can utilize pine needles as raw material or as fuel. Communities need to be sensitized that involvement in fire management and associated activities will improve their livelihood, health and security Communities should monitor (i) burning of agriculture residue near forest areas and (ii) stacking of inflammable forest material outside the boundary of or in the forest (dried leaves and pine needles, firewood, timber, bamboo and resin, on a land adjoining a forest)

				Vehicles supported under this component should comply with PUC standards. Fire-fighting vehicles should be placed at designated parking lots or existing garages/sheds. Standard environmental safety requirements such as safe storage of fuel, other substances for fire fighting vehicles should be applied. The project can also consider vegetative firebreak to protect habitations- it is a management practice that is designed to create a fuel break (herbaceous and woody vegetation) are used to break up the flammable fuels. By using a combination of short grasses. Construction of Van Sarovars must be in accordance with approved design that incorporates safety elements such as appropriate fencing, side slope, etc. Follow Annex 8 for guidance on EMP checklist and Annex 9 for standalone EMP for civil works

				Follow Annex 10 for guidelines on occupational health and safety for community labour. The project will also follow WBG EHS guidelines
Strengthened and Inclusive Value Chains for NTFPs and Other Commodities	Activities include: ▪ Supporting collectors/producers to self-organize into viable, enterprise-oriented groups, including women's collectives, federate, and register as appropriate to achieve aggregation; ▪ Providing training on sustainable harvesting and processing techniques and basic business skills to the NTFP collector/producer groups for effective integration into value chains; ▪ Providing TA to help these groups identify private sector partners (for example, processors, retailers) and develop sustainable harvesting/production and business plans to supply these partners with primary or lightly processed commodities; and ▪ Financing eligible primary/secondary/tertiary value-addition investments identified in these business plans through a	Supply of NTFPs from project areas on a sustainable basis may create new processing industries these could be located outside the project area and create new jobs There are several bottlenecks for establishment of NTFP/forestry enterprises which the project will address through its design, these include (i) government control over profitable forest produce, (ii) constraining regulations, (iii) lack of credit availability, (iv) poor technologies and low value addition. And (v) Requirement of transit permits and felling regulations for nationalized species discourages private enterprise	With increased support to community enterprises, the threat of local extinction of metapopulations of some rare, vulnerable and endangered species or other important MAP species. Linkages with markets may increase number of JFMC involved in MAP trading and increase chances of illegal trade, and demand for rural feeder roads to support marketing. The project should begin with trainings and awareness on sustainable harvesting of NTFPs, if enterprise facilitation or value chain infrastructure is provided before there may be a risk of indiscriminate collection of MAP from wild in initial period (before nursery development) both for meeting demand and for planting in nursery.	Impart training to communities on how to collect harvest MAPs and NTFPs so its regeneration capacity is maintained HPFD needs to ensure steady supply of seeds to the NTFP and MAPs nurseries so that the pressure of harvesting from the wild is reduced. Minimize inventory storage time for raw materials to reduce losses from putrefaction; In case of cold storage, monitor and regulate refrigeration and cooling systems during storage and processing activities to minimize product loss, optimize energy consumption, and prevent odors; In case of cold storage and processing facilities, take Consent for Establishment and Consent for Operation from State Pollution Control Board, as required.

	two-round, sequential competitive matching grants scheme. ▪ Training to build the capacity of facilitators in e.g., CSA practices, FBS, certification schemes; ▪ Training and extension services to build the capacity of the producers to effectively adopt CSA practices, production planning to meet market demand, and certification requirements; ▪ Financing for eligible production-related investments as identified in the business plans developed through the first round of the competitive matching grants scheme described above.		The seasonal pattern of collection varies considerably with the bulk of collection concentrated between March and November. Premature and destructive extraction also takes place due to the open access to all collecting villages as also a competition for resources within the collectors of a village. Unscientific Extraction of non-timber plant parts may alter biological processes at many levels. For instance, harvest may affect the physiology and vital rates of individuals, change demographic and genetic patterns of populations, and alter community- and ecosystem-level processes NTFPs, MAP items have both commercial value as well as some home uses, some portions are kept for household purpose. In addition, Wild plants are an important source of edible fruits, leafy vegetables, and herbs, and are particularly important in ensuring food security and maintaining the	Consider use of enclosure techniques to minimize damage to raw materials stored/ dried outdoors; Monitor and optimize process yields, e.g. during manual grading or cutting activities, and encourage the most productive employees to train others in efficient processing. Clean, sort, and grade raw NTFPs, MAPs where possible at an early stage (e.g. at the harvest site), in order to reduce organic waste and at the processing facility Contain solid waste in dry form and consider disposal through composting and / or use for soil amendment; Organic and non-organic debris / soil, solid organic matter, and liquid effluents, should be recycled as a soil amendment (based on an assessment of potential impacts to soil and water resources) or other beneficial uses such as energy production;

			nutritional balance in peoples' diets Enhanced value of NTFPs may impact domestic use, and most would be made available for markets. If improperly handled, debris, muck, gravel, sand, and soil brought out due to construction activities might be disposed of nearby streams, agricultural fields, and low-lying areas. This can cause siltation and sedimentation in downslope regions further blocking natural water flows, degrading habitats and diminishing aquatic flora and fauna. Establishment of NTFP infrastruture (storages, marketing links, primary processing) will involve minor civil works, equipment and machinery. This may impact environment (air and water quality, noise, and local drainage) if not implemented properly. Similarly, in the operational phase, these facilities may generate waste, and wastewater	Prepare a Pollution Control Plan for Processing Units including the following details for each commodity being processed: Name of NTFP: Nature of processing: (for example, deseeding, powdering, pulping, etc.) Key solid wastes: Key liquid wastes: Any other environmental issue: (for example, particulate matter during powdering) Measures to reduce/reuse/manage wastes: (for example, use as soil amendment directly, conversion into compost, etc.) Provide leak-proof containers for storage of NTFPs/ MAPs. Segregating individual by-products from each other and from waste to maximize their use and minimize waste. For NTFP processing units that process food products, ensure FSSAI registration and licencing is taken, as required. Follow appropriate food codes relevant in India to prevent

			As some NTFPs are consumed as food items, maintaining hygienic processes in their collection, storage and processing is important to prevent contamination	impacts from contamination and adulteration. All NTFP processing, storage, grading facilities should have adequate hygiene and sanitation facilities for workers, required pest control (without any procurement of WHO class I & II pesticides) and safe water quality. Follow Annex 8 for guidance on EMP and Annex 9 for standalone EMP for civil works Follow Annex 10 for guidelines on occupational health and safety for community labour. The project will also follow WBG EHS guidelines

Component 4. Institutional Coordination and Project Management	This Component will finance the creation and maintenance of the project SLSC and its recurrent expenditures to ensure multisectoral coordination and participation across the HPFD to advise or implement activities related to watershed management and NTFPs/agribusiness. This component wil also finance operating costs of State Project Management Unit (SPMU)	Better multisectoral coordination and participation across the HPFD and other relevant line departments and institutions involved in the project and/or that have the institutional mandate to advise or implement activities related to watershed management and NTFPs/agribusiness.	No environmental impacts, institutional coordination will support effective management of project activities thereby improving the health and quality of pastures and forest areas. Throughout project implementation there is need to safeguard effective project management for budget and personnel to ensure that resources are not spread too thinly; and no new sub-projects/activities are started at the expense of completing or maintaining existing sub-projects/ activities.	The department should ensure continuity of officers in the PMU. The environment specialists/ nodal officers trained in the PMU, at DFO level should be provided continuity so that environment good practices/ management measures can be maintained beyond the lifetime of the project.

Chapter 6 Environment Management Framework

The chapters 6 and 7 set out the Environmental Management Framework (EMF) for the project and include:

i. Environmental Screening of project activities (discussed in chapter 6)

ii. Environmental Management Plans for project activities (discussed in chapter 6)

iii. Description of workflow for environmental management (discussed in chapter 6)

iv. Institutional arrangement for EMF implementation (discussed in chapter 7)

v. Environmental Monitoring and Reporting (discussed in chapter 7)

vi. Capacity building and training plan (discussed in chapter 7)

vii. Estimated incremental costs for EMF implementation (discussed in chapter 7)

Each of these elements will be incorporated in the Project Operational Manual.

6.1 Environmental Screening of Project Activities

Part 1 – Environmental Data Sheet (EDS):

An Environmental Data Sheet (EDS) is used to identify the activities in the management plan and gives details of the sites where they will be implemented in. The EDS includes details on extent and status of forest area, pasture land and NTFP. The EDS format is included in Annex 7, Part 1. Attachments for additional information can be supplemented when needed.

Part 2 – Eligibility Screening:

This includes a list of activities that are not eligible to be financed under the project as they are not consistent with safeguards requirements. This format is included in Annex 7, Part 2.

Part 3 – Legal and Regulatory Requirements Checklist:

This includes a list of legal and regulatory requirements and identification of their applicability to the project financed activities. This format is included in Annex 7, Part 3.

The Range Office Focal Point is responsible for undertaking the screening process. The Environment Specialist in the SPMU is responsible for monitoring and ensuring that every RMP and NTFP activity undergoes screening. The filled in screening checklist has to be attached to every RMP plan and NTFP activity plan.

6.2 Environmental Management Plan

A simple Environmental Management Plan (EMP) will be developed for the project activities to identify: the required mitigation measures, the individuals responsible for implementation of the measures, the timeframe for implementation, and the resources required for implementation.

For the activities to be financed under the RMP plan, the Annex 8 provides a standard checklist for identification of mitigation measures. All relevant mitigation measures should be taken to mitigate the potential negative impacts and enhance the postitive impacts of the proposed activities in the RMP plan. Activity-specific mitigation measures can also be added if appropriate.

For small scale civil works such as buildings, the EMP format in Annex 9 should be utilized.

For plantation and nursery activities involving pest management, the Pest Management Plan in Annex 11 should be utilized.

6.3 Workplan for Environmental Management

Phase	*EMF Activity*	*Objectives*	*Process*	*Responsibility*	*Outcome*
Pre-planning	Adequate dissemination of EMF awareness to DFO, RO JFMC and NTFP CUGs	To sensitize the various stakeholders about the possible negative impacts of the project activities and mitigation measures	Disseminate through website/copy with HPFD offices/JFMCs	SPMU, DPMU (Block, Range, Division & Circle Level), JFMCs	Increased awareness of the possible negative impacts of project activities and the ways to mitigate them.
	Capacity building and training programmes on EMF	To enhance capacity of field staff/ communities to understand the need of safeguards during identification and implementation of activities.	Identify key personnel/ community members and depute for capacity building programme and conduct the said programme.	SPMU (Environment Specialist), DPMU (Division & Circle Level) & FTI (Chail)	Target group better equipped to understand the need of safeguards during identification and implementation of sub project activities.
Planning	Screening of activities in Range Management Plan (RMP) and NTFP CUG plan using the Screening Checklists	To ensure that activities with potentially significant environmental issues are identified at an early stage and avoided.	DPMU (Division and Range level) / Village facilitators to support communities in incorporation of environment safeguards in activities.	SPMU (DPD-Operations and Environment Specialist), DPMU (Range, Division & Circle Level) & JFMCs	Activities selected/rejected based on screening. Activities requiring mitigation measures identified. Regulatory compliance requirements identified.
	Preparation of Environmental Management Plan (EMP) for RMP and NTFP plan	To ensure that relevant environmental issues have been identified and appropriate mitigation measures have been designed to address them.	RMPs and NTFP plans with environmental mitigation measures shall be approved by environment manager in SPMU	DPMU (Block, Range, Division & Circle Level) & JFMCs	Costs of EMF mitigation measures and monitoring incorporated into the Range Level Plan.
Implementation	Implementation of EMP for RMP. Implementation of Pest Management Plan for activities involving pest management.	To ensure that the prescribed environmental mitigation measures are implemented.	Environment: The prescribed environmental mitigation measures as identified through the EMF are adequately implemented, indicators are monitored.	DPMUs (Block, Range, Division & Circle Level) and JFMCs.	Semi-annual safeguards progress report will indicate progress of EMP implementation.
	Compliance with EMF provisions and monitoring measures	To monitor that the prescribed environmental mitigation measures are complied with.	Environment: The prescribed environmental mitigation measures suggested in EMF are compiled with and regularly are monitored	SPMU (Environment Specialist), Focal Points at Range Offices, DPMUs (Range, Division & Circle Level)	Semi-annual safeguards progress report will indicate monitoring as per list of indicators.
O&M	Environmental Supervision, Monitoring and Evaluation	To ensure that screening, EMP preparation and implementation are completed in an adequate and timely fashion.	Environment: Monitoring of indicators will be conducted as per project monitoring protocol.	SPMU (Environment Specialist), Focal Points at Range Offices, DPMUs (Division Level & Circle Level)	PMU will submit bi annual reports to The World Bank on Safeguards Implementation.

6.4 Pest Management Plan

Since each forest nursery can supply plants for planting to many geographic areas, keeping pests out of nurseries is especially important. Buying healthy stock and carefully monitoring the condition of seedlings and cuttings are important practices. The controlled environment of the nursery, such as planting density, species or clone choice, and monoculture, can be favorable to pest development. During baseline data collection, consultations with forest department and research institute it was identified that pest and disease outbreak in forest nurseries is an issue, though occurrences are few. There are several guidelines in place for pest control in nurseries that have been developed by ICFRE, HFRI, and Forest Department though, with the lack of trained forest nursery managers, the techniques adopted to control pests are ad-hoc and application is unscientific.

Given that project will be investing in up gradation of forest nurseries, and beginning state of the art infrastructure, it is essential that clear and easy to follow guidelines are put in place with regards to pest management in nurseries. An analysis of the key pests and diseases affecting seedling stock in nurseries was analyzed, and bio-control strategies were developed such that they can be easily adopted in the field. In some cases, chemical control[11] has been prescribed if biological methods are ineffective, these are chemicals which have negligible adverse human health and the environment (WHO class III), but at the same time shown to be effective against the target species. A training programme will also be implemented with Forest Rangers in the application of the prescribed practices.

The detailed Pest Management Plan is provided in **Annex 11**

[11] The procurement of any pesticide in a Bank financed project is contingent on an assessment of the nature and degree of associated risks, taking into account the proposed use and the intended users.

With respect to the classification of pesticides and their specific formulations, in reference to the World Health Organization's Recommended Classification of Pesticides by Hazard and Guidelines to Classification. It is required that any pesticides be manufactured, packaged, labeled, handled, stored, disposed of, and applied per standards acceptable to the WHO and health and safety standards [11]as prescribed in the WBG Environment Health and Safety Standards. The project will not promote, procure or utilize formulated products that fall in WHO classes IA and IB, or formulations of products in Class II.

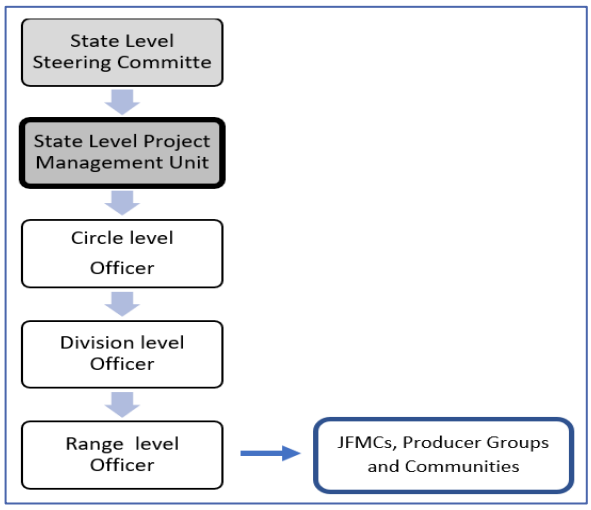
Chapter 7 Institutional and Implementation Arrangement

7.1 Project Implementation through HPFD

The Himachal Pradesh Forest Department (HPFD) operates through wing/ office formations and autonomous bodies within the umbrella of the HP State Government. HPFD is headed by the Principal Chief Conservator of Forest (Head of Forest Force) [PCCF(HoFF)] and comprises of the forest (territorial) wing, wildlife wing and direction (functional) offices. The Himachal Pradesh State Forest Development Corporation Limited (HPSFCDL) acts as the commercial wing of the Department and discharges the function of disposing various forest produces like timber, bamboo, resin, NTFPs etc.

The State has 9 forest circles and 37 territorial forest divisions under the PCCF (HoFF), and 3 forest circles and 7 wildlife divisions under the PCCF (Wildlife), also the chief wildlife warden. In total, 44 divisions (37 territorial divisions and 7 wildlife divisions), 197 ranges (167 territorial ranges and 30 wildlife ranges), 560 blocks (493 territorial blocks and 67 wildlife blocks) and 2,033 beats (1,840 Territorial Beats and 193 Wildlife Beats) exist within HPFD as of July 2017.

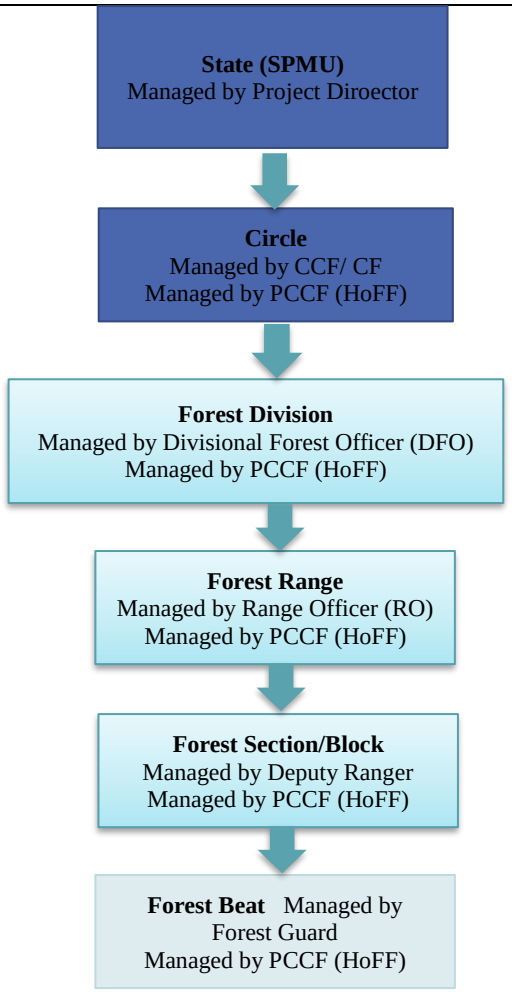
The project will be implemented by the HPFD through an SPMU (already created) headed by a chief project director (CPD). A SLSC (already created) will provide overall supervision and meet on a six-monthly basis to approve and review the work plans and budget. It will assess the physical and financial progress of the project and provide corrective measures and review and recommend measures to ensure project sustainability and coordination with the JICA forestry project in the Sutlej Basin.



The SPMU will be responsible for managing the technical aspects, fund flow mechanisms, procurement, reporting, and monitoring as defined by the project's Operational Manual. It will also provide infrastructure and institutional support to circle, division, and range levels to ensure project implementation. Administrative control of all forest divisions will rest with the respective circle offices headed by the conservator of forests. A nodal officer at DFO level will be appointed to coordinate and plan project activities at the circle level and supervise the performance of divisions in the respective circles and the project will have a designated procurement officer at the circle level.

At the division level, DFOs will plan and supervise project operations. The range will be the basic unit of planning and implementation, and all Component 2 activities will be planned through an SSMP. Each beat will have a female community facilitator hired from the local community to mobilize communities for project activities, with special emphasis on building the social capital to support female community members to participate in project activities, including the preparation and implementation of SSMPs. Project implementation will also involve the JFMCs and NTFP collector/producer groups through grant schemes, as well as related line departments (agriculture and allied sectors) through cooperation agreements.

Table 28 Break Up of Forest administration units



State Level:

- undertake overall planning and implementation of the project.
- implement the project's Operational Manual including Safeghuards, procurement and FM, reporting and monitoring, policy advocacy, and awareness generation.
- It will prepare guidelines and a technical manual for program activities, including the community operational manual. Moreover, it will provide infrastructural and institutional support to the HPFD organizational structure that will be working at the field level.

Circle Level:

- Administrative control of all forest divisions
- Headed by the conservator of forests who will execute the project at the field level.
- An Officer at the level of DFO will be appointed for project activities at the circle level and supervise performance of divisions with respective circles.
- The Officer will be supported by a superintendent junior engineer and an office assistant.
- Existing channel for submission and approval of Annual Plans of Operation (APOs)
- Sanctioning power of works
- Supervising performance of divisions
- Coordinating with all divisions
- Maintaining a grievance redressal mechanism
- Procuring goods, works, and services beyond the level of authority of the DFO

Division level:

- Preparing APOs
- Sanctioning works within his/her competency
- Supervising performance of staff up to range offices
- Maintaining a grievance redressal mechanism
- Drawing and disbursing officer from the Government treasury
- Coordination between all range officers and other departments
- Procuring goods, works, and so on within the procurement rules

Range Level:

- Basic unit of project planning and implementation, according to the approved APOs
- All activities of Components 1 and 2 will be planned through a SSMP.
- Range officers will be supported by their respective deputy rangers, office assistants, and beat managers (forest guards).
- Each beat will have a community facilitator, hired from the local community, to mobilize communities for project activities.
- Each project nursery supported under the project will be provided with nursery pick-up vans and drivers.
- Inputting data in FMIS
- Sub-disbursing Government funds
- In charge of liaising with public and attending to forest offences, fires etc

7.2 Project Level Institutional Structures

The Steering Committee (SLSC) will provide overall supervision to HPFD and will meet on a six-monthly basis to approve and review the work plans and budget. It will assess the physical and financial progress of the project and provide corrective measures. For some Project activities HPFD will coordinate with Industry, Rural Development, Environment, Energy and Pollution Control Board. The State Level Steering Committee (SLSC) has the mandate to coordinate all EAPs. The SLSC will meet on a six-monthly basis to approve and review the work plans and budget. It will assess the physical and financial progress of the project and provide corrective measures.

State Project Management Unit (SPMU) The project will be implemented by the State Project Management Unit headed by a Chief Project Director (CPD) who would have day-to-day executive control of the Project. The core personnel of the SPMU are 3 Deputy Project Directors one each for a) General Administration, b) Operations and c) Liaison, Coordination and Training (LCT); Project will have Subject Matter Specialists (SMS) one each for Social and Community Institution Development, Environment Management, Forest Based Livelihood, Communications and Knowledge Management, IT, Procurement, Monitoring and Evaluation)**.** These subject matter specialists will be hired from the market. Besides, activities such as Finance and Accounts, Administration and Staff Matters will be handled by the superintendent staff deputed from the HPFD to the project.

Technical Support Services: All the activities will be implemented through H.P. Forest Department with Technical support from institutions like Himalayan Forest Research Institute(HFRI), HP University of Horticulture and Forestry, Nauni, Indian Grassland and Fodder Research Institute, Palampur and Institute of Himalayan Bio Resource Technology, CSIR Palampur. Consultancy services will be hired as per the requirement/need of the project.

Technical cooperation with other entities. Some key entities in HP and India will be engaged exclusively as technical support for the project collaborating with the HPFD as main implementing entities but not charging fees or receiving funds. These engagements will be implemented through Memoranda of Understanding (MoU) or equivalent documents. Cooperation will be limited to specific technical topics and could also involve training activities.

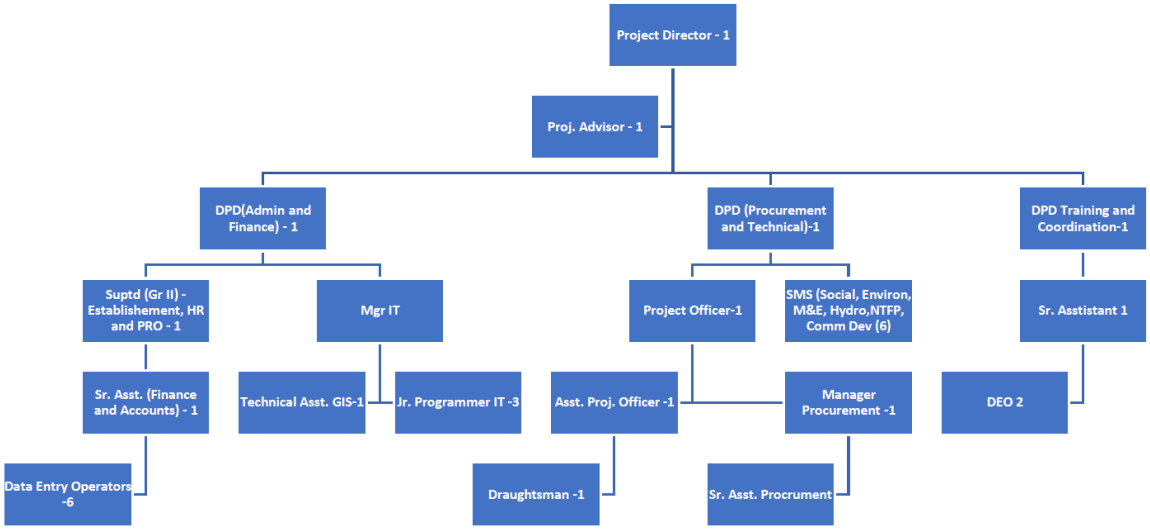


Figure 14 Organogram of SPMU

7.3 Environment management under HPFD

The SPMU, specifically the Environment Specialist will serve as the lead for safeguards implementation through the Forest Department and ensure linkages and coordination with other ranges/ divisions under the project. The Environment Specialist will oversee the implementation of all actions at the field level and oversee the implementation of mitigation actions for adverse environmental impacts, within FFP operational areas to the community level.

Roles and Responsibilities of Environment Specialist in SPMU

The State PMU will have an Environmental Specialist as a core team member in the PMU who will be supported, as required, by technical consultants. The responsibilities of the Environment Specialist are outlined below.

Supervision of Project Activities: The Environmental Specialist will have the following responsibilities: Provide inputs relating to EMF activities for all project plans.

i. Review and Approve Range Management Plan, NTFP Value Chain Plans, associated Environmental Screening Checklists, associated Envionmental Management Plans (EMPs).

ii. Prepare EMPs for all civil works undertaken in the project.

iii. Organise and provide orientation, training to concerned personnel at the division and beat level on EMF.

iv. Ensure that environment management activities are mainstreamed into the activity design and work plan. The Environment Specialist will review and endorse all activity documents to ensure the incorporation of environmental issues.

v. The Environment Specialist is responsible for the dissemination of project information at various stages, including good practices and lessons learned from the field to all implementing partners of the project.

vi. Support the project staff to implement surveys/trainings/plan according to the EMF/EMP requirements and monitor the incorporation of community inputs into activity designs.

vii. Assist the state to identify and address implementation challenges (environment safeguards management) of all activities and advise on appropriate solutions and/or preventive mitigation measures.

Monitoring and Reporting*:* The Environmental Specialist will have the following responsibilities:

i. Undertake field visits to the selected activity sites, hold discussions with the village institutions, NGOs, Project Staff, and contractors and guide them in addressing safeguards issues with particular reference to environmental issues.

ii. Prepare progress reports, briefs, and periodical reports and produce data as required.

iii. Participate as team member in all preparation/technical support or supervision missions of the World Bank; maintaining regular dialog with the Bank on compliance with on environmental policies.

iv. Participate in the progress review meetings of the project and GoHP and provide update on environmental aspects, documents of the respective sub-projects/schemes.

v. Coordinate all environmental safeguards activities within and between the PMU, share information with Project Director and Task Team Leader of the World Bank, and project team members.

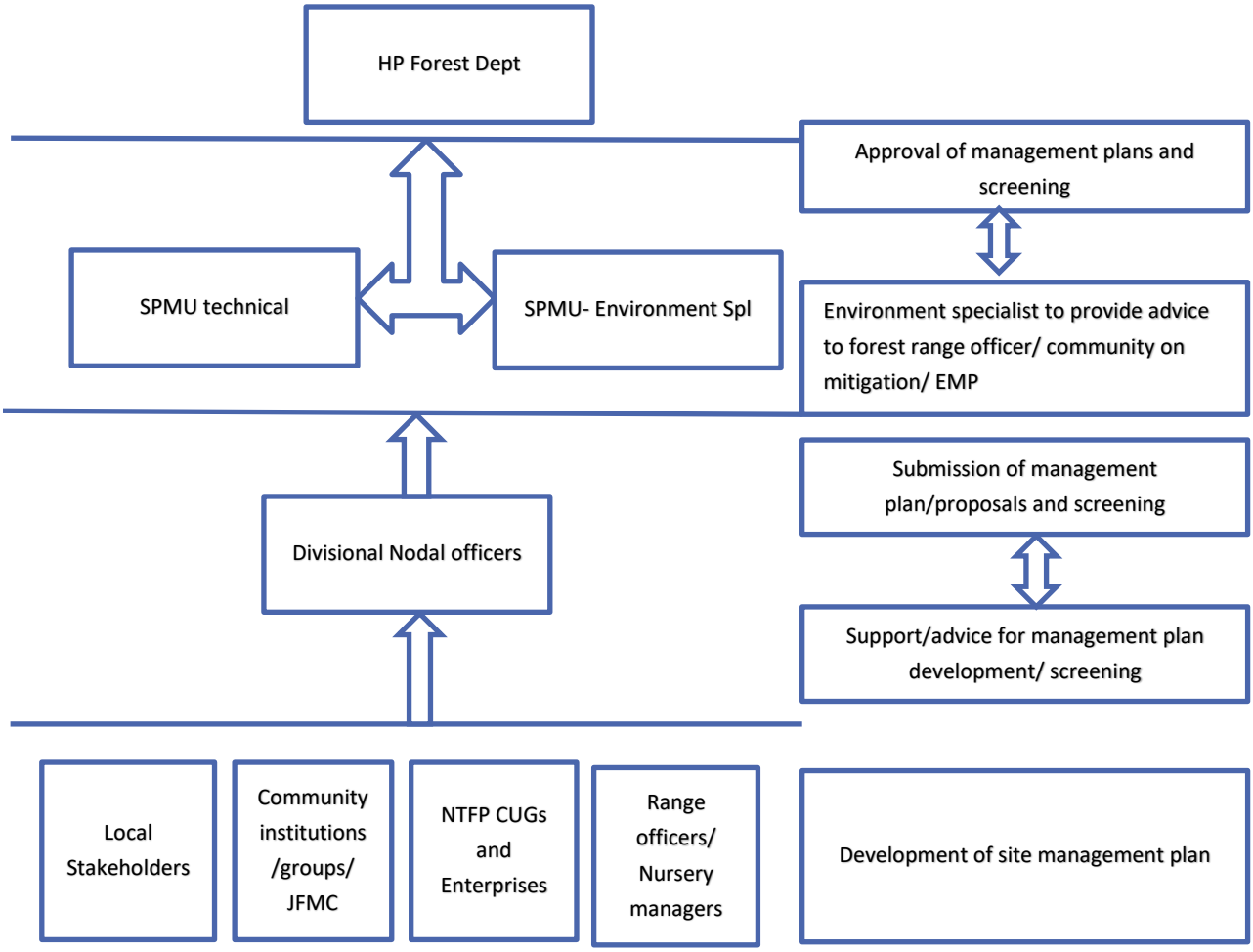


Figure 15 reporting framework for environmental management

7.4 Monitoring and Reporting

The Environment Specialist based in the SPMU will prepare monitoring plans to assist in determining the progress of implementation of the safeguard provisions, and overall outcome of implementing the EMF. Monitoring and supervision of the EMF would include bi-annual monitoring reports by the PMU.

The project will be monitoring a variety of indicators linked to the area brought under afforestation, regeneration of pastures, adoption of soil and water conservation and improved fire management practices. However, specifically for EMF, the following paraments should be monitored, as these pertain to the adoption of the environmental mitigation measures. This will be linked to the overall project monitoring and evaluation systems.

Institutional indicator

- Number of trainings organized by type of training (6 monthly basis)

Indicators on application of EMF

- Number of range management plans prepared following environmental screening checklists, and environmental management plans
- Survival of plantations (%) – and highlight causes of low survival rates
- Any instances where archeological chance finds have been identified, and the procedure followed.
- Pest and disease attacks in nurseries and application of bio-pesticides as per the prescribed PMP
- Number of communities taking up conservation activities – such as setting up of nurseries for rare, endemic/ medicinal plants;
- Community training and participation in sustainable extraction of NTFPs, and application of OHS guidelines.
- Any induced impacts/activities arising from undertaking the project financed investments such as demand for (a) rural/feeder roads, (b) tourism infrastcrture (c) change in agriculture crops, due to increase availability of water.

In addition, Environment Specialist may undertake inspection field visits to the community sites to check on implementation of the range management plans. Having screened the activities in the preparation phase, the specialist will check the effectiveness/adoption of mitigation measures, any other issues in implementing the mitigation measures, and cases where there are residual environmental impacts. This reporting format should cover (i) Environmental Impacts which were identified at screening and (ii) Environmental Impacts observed during the field visit against the predicted impacts and level of undertaking mitigations. In addition, focal points may be identified at the range level for site-based monitoring of project interventions and facilitating and reviewing the implementation of EMPs.

7.5 Capacity Building under Environment Management

The training and awareness creation will be annual/ bi annual events and the primary participants will be the technical staff at SPMU, DFOs, and Range officers. The first step in pursuing capacity building will be to identify the capacity needs of the various project functionaries. The capacity building will include training workshops and production of guidance reports and tools. The following training programmes are planned:

Training programme 1:
Content: World Bank Safeguard Policies and WBG Environmental Health and Safety Guidelines for Forestry Operations
Participants: Environment Specialist (SPMU), Divisional Forest Officers, Nodal Environmental Officers and Range Officers, Forest Guards, Nursery Managers.

Training programme 2
Content: Filling out Screening Checklists, Preparation of Environment Management Plans
Participants: Environment Specialist (SPMU), Divisional Forest Officers, Nodal Environmental Officers and Range Officers, Forest Guards/ Nursery Managers

Training programme 3
Content: EMP checklists for civil works
Participants: Environment Specialist (SPMU), Divisional Forest Officers, Nodal Environmental Officers, Junior Engineer at Circle Office, NTFP enterprises (under the project)

Training programme 4
Content: Pest and Disease Management in Nurseries
Participants: Environment Specialist (SPMU), Forest Guards/ Nursery Managers

Training programme 5
Content: Occupational Health and Safety in Forest Operations
Participants: Environment Specialist (SPMU), Forest Guards/ Nursery Managers and select NTFP groups.

7.6 Budgetary Provisions for EMF Implementation

Under the Project Implementation Plan (PIP), the cost for EMF implementation comprises of staffing arrangements at SPMU level, and associated trainings. The EMF will also support application of environmental best practices in preparation and implementation of the range management plans, trainings, capacity building workshops, action/innovation research, monitoring, tools etc. Most of the mitigation actions are already mainstreamed into the project design and do not require activities such as special constructions. The cost of mitigation actions that are identified during preparation of the EMPs will be integrated into the RMP budgets. The cost of implementing some of the provisions of the EMF, over 5 years of the project, is up to 1% of the total project cost, for ensuring implementation of all activities proposed under the EMF.

Annexure 1: List of References and Sources of Secondary Data

Sr. No.	Data	Source of Data
1.	**Socioeconomic Environment**	
	Human settlements (Occupational pattern, demographic profile, economic profile, agricultural practices and others)	Directorate of Economics and Statistics Revenue Department Himachal Pradesh Public Works Department State Agricultural Department State Horticulture Department State Agricultural University State Horticulture University
	Public Health	Irrigation and Public Health Department
	Tourism	District/State Tourism Department Directorate of Tourism, Shimla HP Forest Department
	Dependence on water system	Irrigation and Public Health Department Directorate of Agriculture Directorate of Horticulture
	Sources of water pollution	Irrigation and Public Health Department State Pollution Control Board Central Water Commission Central Ground Water Board
	Archaeological, cultural and religious locations and places of worship	State Archaeological Department Directorate of Archaeology Archaeological Survey of India Department of Language, Art and Culture
	Ward, Villages, Taluka and Districts and Watershed boundaries	Survey of India Directorate of Economics and Statistics Revenue Department Urban Development Department Town and Country Planning Department District Rural Development Authority HP Forest Department
2.	**Air Environment**	
	Climatology and rain fall for hydrological consideration	State Meteorological Department State Pollution Control Board State Energy Department Department of Environment, Science and Technology Himachal Pradesh Council for Science, Technology and Environment
	Meteorology for dispersion of air pollutant during construction activities	State Meteorological Department State Pollution Control Board
	Air Quality	State Pollution Control Board
	Noise	State Pollution Control Board
3.	**Water Environment**	
	Hydro-geological aspect (siltation)	State Energy Department Central Water Commission Central Ground Water Board BBMB HP Power Producers Forum

	Hydrological cycle	State Energy Department Central Water Commission Central Ground Water Board State Meteorological Department
	Surface Water Quality and Quantity including nutrient levels	State Energy Department Irrigation and Public Health Department Central Water Commission State Pollution Control Board
	Ground water regime (ground water table, aquifers)	Central Ground Water Board
	Ground water quality	Central Ground Water Board Irrigation and Public Health Department
4	**Land Environment**	
	Land use and land cover	Survey of India National Bureau of Soil Survey and Land Use Planning State Forest Department Revenue Department Department of Environment, Science and Technology Himachal Pradesh Council for Science, Technology and Environment
	Mineral resources	Geological Survey of India
	Water use	Irrigation and Public Health Department State Agricultural Department Directorate of Horticulture
	Water logging	Irrigation and Public Health Department Urban Development Department Town and Country Planning Department
	Developmental Projects	Urban Development Department Directorate of Industries HP Power Producers Forum Himurja Irrigation and Public Health Department State Energy Department HP Public Works Department District Rural Development Authority Town and Country Planning Department
	Solid Waste generation	State Pollution Control Board Municipal Council Nagar Panchayats
	Soil	National Bureau of Soil Survey and Land Use Planning
	Agriculture System	Directorate of Agriculture HPSAMB Directorate of Horticulture State Agricultural University State Horticulture University
	Economic activities such as, agriculture, tourism, horticulture, hydropower, industries, etc.	Department of Tourism & Civil Aviation State Department of Horticulture & Agriculture Himachal Pradesh Energy Development Agency Department of Industries
5	**Biological Environment**	
	a. Forest cover and Type	Survey of India

		State Forest Department
	b. Rare and endangered species	State Forest Department State Biodiversity Board Ministry of Environment, Forests and Climate Change
	c. Species which require management	State Forest Department State Biodiversity Board State Medicinal Plant Board Ministry of Environment, Forests and Climate Change
	d. Species of economic significance including NTFPs	State Forest Department State Biodiversity Board State Medicinal Plant Board
	e. Species of special interest to local population or tourists	State Forest Department State Biodiversity Board State Tourism Department
	f. Aquatic fauna of commercial/recreational value and migratory fish species along with their spawning ground	State Biodiversity Board State Fisheries Department Zoological Survey of India CEIA for Sutlej Basin
	g. All Natural habitat including protected – unprotected including important breeding and nesting grounds and areas where schedule 1 species are present.	State Forest Department Ministry of Environment, Forests and Climate Change
	g. Habitat including breeding ground and access corridor for food and shelter	State Forest Department Ministry of Environment, Forests and Climate Change
	h. Biodiversity	State Biodiversity Board State Forest Department Ministry of Environment, Forests and Climate Change
6	**Policy Environment**	
	a. State Policies (Policies on Forest, Water and Air, Social welfare schemes and others)	All concern State Departments/Directorate
	b. Centre Policies (Policies on Forest, Water and Air, Social welfare schemes and others)	All concern Central Govt. Departments/Ministries

* Additionally Reports/publication/Previous CAT plans/Academic and R & D Institutes' records and other materials will be referred for datasets.

Annexure 2: Baseline Data Questionnaire for Field Survey

Name of village:	Latitude:	Date:
Altitude(m):	Longitude:	Aspect:

Details of the Respondents:

Name:	Age:
Address:	

Resident of the village:

Family members:

Members	< 15 years	16 to 30 years	31 to 60 years	>60 years
Male				
Female				

Education:

Members	Illiterate	10^{th} Pass	12^{th} Pass	Graduate	Post-Graduate
Male					
Female					

Occupation of the family members:

Gender	Government	Agriculture	Business
Male			
Female			

Main income sources:

Occupation	Products	Rate/Unit	Annual income

Land Use Pattern

Land use	Current Status (bigha/ha/ %)	Change in land use pattern (increase/decrease)	Factors affecting the change in land use pattern
Agriculture land			

Forest			
Area under settlements			
Area under paths & roads			
Fallow land a) Current fallow (upto 1 yr) b) Other fallow (above 1 yr)			
Grassland			
Barren land /Waste land			
Orchards			
Others			

Agriculture/ Horticulture

Crops and Area under cultivation

Name of the Crop	**Area under cultivation (Bigha /ha) Category (Kharif/Rabi)**	**Total production (Quintal /year)**	**Income generation (Rs/yr)**	Factors affecting the crops	**Doses of Pesticides/ insecticides and other chemicals (kg/Bigha)**

Water Resource

Source	Availability Status	Change in volume (increase/decrease)	Factors responsible for the loss of water resource
Glacier			
Water bodies			
Rivers/ Lakes/ Ponds			
Ground water (Hand pump or well)			
Potable Water (Streams, springs, hand pumps, Tap water, etc.)			
Irrigation facilities (Channel, Rain fed, Hydram, Tank etc.)			

Risks and disasters/hazards management

Disaster/hazards types: -	Mitigation measures
Net annual water available	
Floods and drainage	
Cloud burst	
Cold wave	
Snow avalanches	
Droughts	
Erosion due to road construction and other activities	
Wastewater discharges	
A. Water and climate disasters	
Floods and drainage	
Cloud burst	
Cold wave	
Snow avalanches	
Droughts	
6.Erosion	
B. Geological disasters	
Landslides	
Mudflows	
Earthquakes	
Dam bursts	
Mining/squaring	
C. Accidental disasters	
Forest fires	
Village fire	
Building collapse	
Electrical disasters and fires	
Road accidents	

D. Biological disasters	
Epidemics	
Pest attacks	
Cattle epidemics and food poisoning	
Man-made	
E. Natural disasters	
Flood	
Droughts	
Earthquakes	
Landslides	
Avalanches	
Man-made	
F. Solid waste management	
Collection	
Segregation	
Disposal	
G. Climate Change	
Temperature	
Precipitation	

Tourism

Type of tourists	**No. of Tourists Visited (in last 10 years)**	**Impacts on forest Resources (Positive/ Negative)**	**Mitigation Measures**
Eco-tourism			
Cultural tourism (Religious and Spiritual)			
Adventure tourism			
Rural tourism			
Wildlife tourism			
Sports tourism			
Medical tourism			

Forest Resources

Questions	**Yes**	**No**	**Can't say**
Is forest resources have increased over the year?			
Have you noticed any change in the health and quality of forests?			
Has felling of trees increased over the year?			
If yes, number? Rough value			
Have you noticed any change in the richness of plant and animals?			
If Yes, please specify?			
Is there any impact of climate change on forests?			
If yes, in what ways do you think the climate change and other factors have impacted the forests?			

Is there any impact of developmental activities (Hydropower, mining, road construction, urbanization, etc.) on forests?			
If yes, please specify the impacts and magnitude?			
Did you find any change in forest area?			
Is there any forest diseases and pest infection?			
Is there any shifting of forest types?			
Is there any change in species composition?			
Are you aware of forest management policies / rights in your area?			
Are you deriving direct benefits from the forest areas and other ecosystem services?			
If yes, to what extent you are dependent on the forest areas like food, building material, nutrition, medicinal plants, etc.			
Is the Livelihood pattern in the village has affected natural resources?			
If yes, please specify the changes?			
Is there any interest in building value added to the Non-Timber Forest Products (NTFP) product locally?			
If yes, what are these products?			
Do you think community participation in forest management is essential?			
Do you participate in the management of the forests?			
If Yes / No, why?			
Do you have any traditional management practices for forests?			
If yes, what are these practices?			
Are there any conflicts between management and the communities?			
If yes, what types of conflicts exist?			
Are there any conflicts between Human and wildlife?			
If yes, what types of conflicts exist?			
Is there any step taken by Government for creating mass awareness among the local people about the biodiversity components?			
Is there any network of relevant departments/ organizations for information sharing?			
If yes, please indicate the departments/ organizations involved.			

Mobile/Telephone No.	**Signature**

Annexure 3: Key Findings from Baseline Field Surveys

Description of sample GPs

Baseline surveys were conducted in13 Gram Panchayat (255 households) in the study area during 19-30th April 2018. The questionnaire for Environmental Management Framework for Forest for Prosperity Project was covered both 'qualitative' as well as 'quantitative' data in relation to their present conditions. The panchayats selected were close to the forest area or respective village boundary touches with the forest boundary. During field survey, it was observed that various forest produce plants were collected by local people i.e. Gucchi *(Morchella esculenta)* Apricot *(Prunus armeniaca, Prunus* sp.*),* Banko Akhrot (*Juglans regia),* Gallu (*Taxus wallichiana) Chilgoza* (*Pinus gerardiana*) Dhoop, Bankakri (*Podophyllum hexandrum*), Kala zira (*Bunium persicum*), Karu (*Picrorhiza kurrooa*), Cedar cone (*Cedrus deodara*), Kashmal (*Berberis* spp.), oak (*Quercus* spp.), Shishm (*Dalbergia sissoo*), etc.

Table 29 Details of the sampled Gram Panchayats in the Satluj Basin.

Sr. No	Panchayat	Respondents	Latitude	Longitude	Altitude(m)	District
1	Kalpa	29	31.532	78.250	2777	Kinnaur
2	Kilba	29	31.513	78.148	1889	Kinnaur
3	Moorang	43	31.598	78.449	2593	Kinnaur
4	Ribba	13	31.582	78.367	2543	Kinnaur
5	Roghi	14	31.514	78.231	2756	Kinnaur
6	Khwangi	16	31.543	78.273	2245	Kinnaur
7	Bandali	14	31.331	77.026	1786	Mandi
8	Koel	16	31.480	77.500	985	Kullu
9	Chowai	20	31.446	77.443	1860	Kullu
10	Ogli	12	31.264	77.294	720	Shimla
11	Shakrori	14	31.226	77.145	706	Shimla
12	Juini	15	31.248	77.069	953	Shimla
13	Taklech	20	31.376	77.732	960	Shimla

Key issues highlighted with land, water and forest management:

- Status of water resources

Majority of respondents believe that natural water sources drying up over the year due to decrease in precipitation, construction works, landslide and growing demand with increase population (Fig. 10).

- Status of Forest Resources

Majority of respondents believe that forest area decreased and forest resources over the year due to over-exploitation, habitat destruction, landslides, invasion of exotic species and forest fires incidences (Fig. 11 A-C).

- Land use pattern

Majority of people responded that their 'cropping pattern' has changed because of the changing rain & snowfall pattern. Over the year peoples moved towards cash crops because of high earnings, changing pattern of precipitation, invasion of exotic species, lack of irrigation system.

- Climate change perception

From the perception survey, it is made clear that majority of respondents were aware of the climate change and its impacts on their surrounding environment, that 'weather pattern' is changing in terms of rainfall, temperature, snowfall, etc. Respondents were of the view that 'rainfall pattern' has changed. The rainfall variability has been at a great pace for quite some years. The variable nature of rain has its adverse impacts on crop, thus risks to drought were perceived by the interviewees. Majority of the respondents also felt that rainfall has declined in amount and they could no longer rely on timely onset of the monsoon. According to the villagers, snowfall is found to be reduced but precipitation increased which has its direct adverse impacts on apple orchard cultivation. During group discussion with the households of the panchayat stated that the rainfall was found to be increased in sub-temperate region of the Sutlej basin. However, the snowed areas have been converting into rainfed areas.

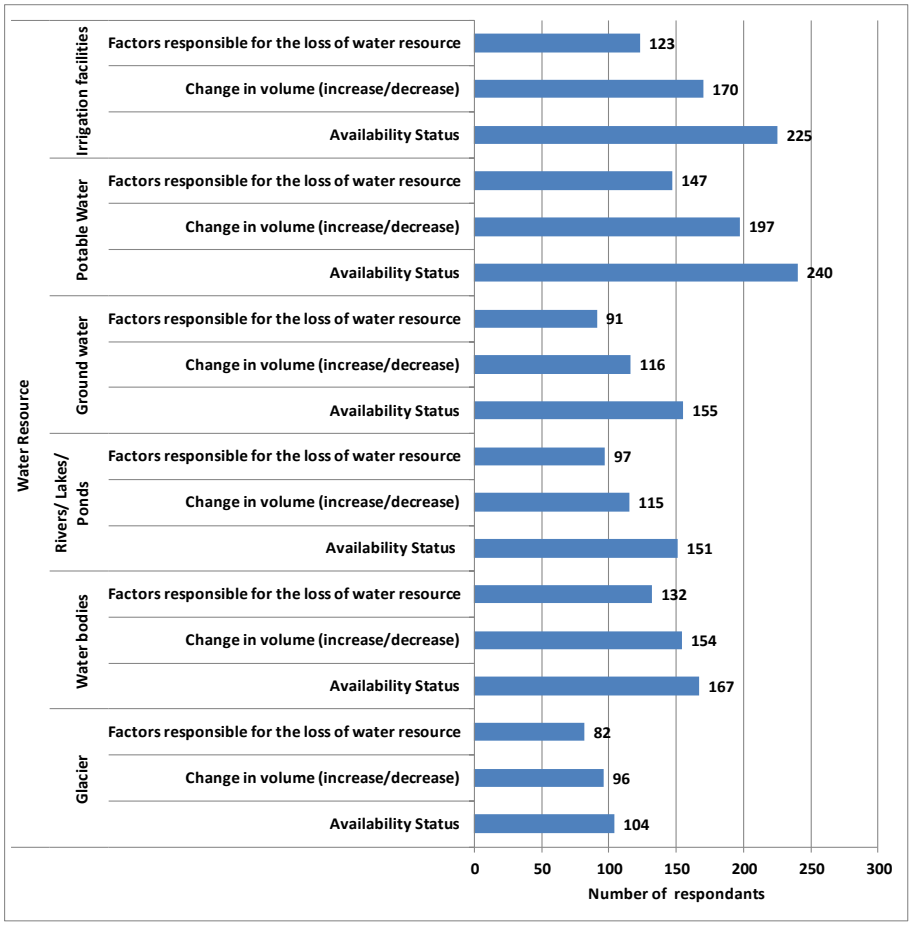


Figure 16 Respondent's response on Status of water resources

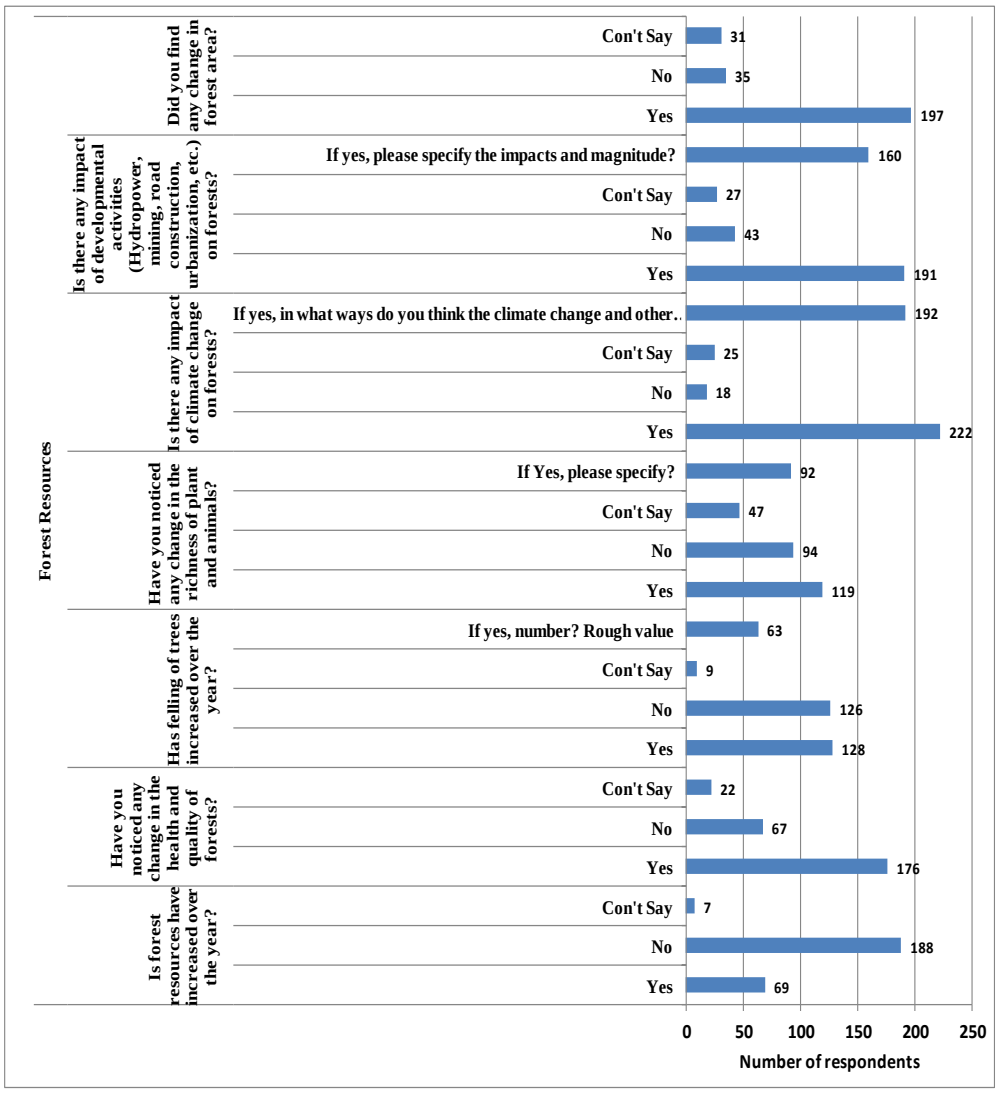


Figure 17 Respondent's response on Status of Forest resources (part A)

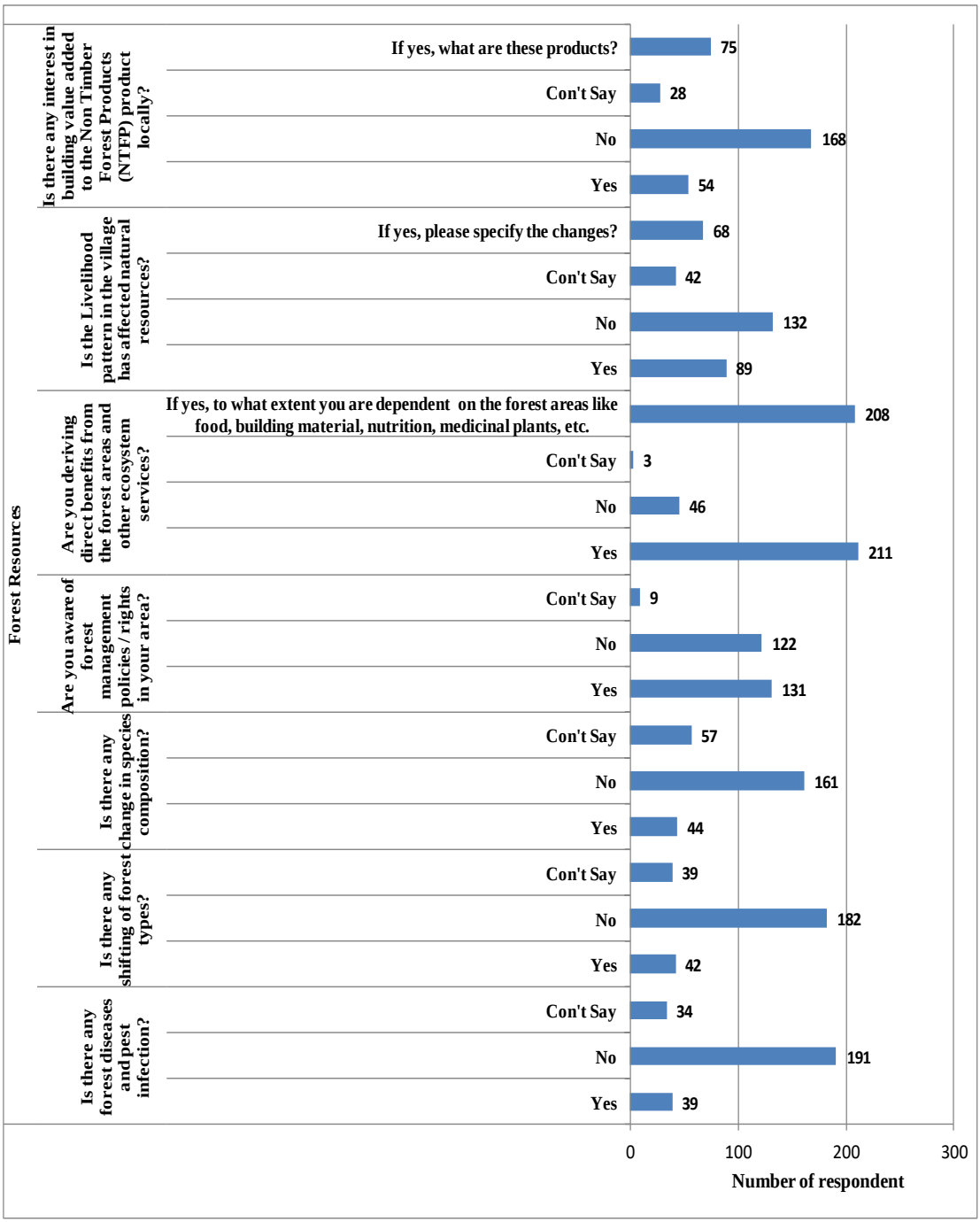


Figure 18 Respondent's response on Status of Forest resources (part B)

Annexure 4: List of Stakeholders Met

Key points: (I) introduce the project, and (ii) seek stakeholder views on the project, (iii) understand Stake or interest in the project, and the stakeholders' potential support or opposition to the project and (iv) facilitate their cooperation and seek their inputs on the following:

1. Views, feedback on project design, whether the proposed project is aligned with the interests of the concerned stakeholders
2. How can the project be designed as to target key benefits to the stakeholder (being consulted)?
3. Kinds of issues (technical, admin etc.) seen from other externally aided forest projects in the state, and lessons learned.
4. Priority environment issues impacting health and quality of forests
5. What are the key vulnerability factors affecting forests- pests, diseases, soils etc.
6. How and which stakeholder concerns and recommendations be addressed in project decision-making.
7. Seeks inputs on (i) identifying appropriate forest quality management measures, managing protected areas and other natural habitats, and (ii) monitoring and evaluating specific plans prepared under the project.

	Key Departments/ organisations	**Role/ responsibility and linkage to the project**
1	HP Forest Department Subject matter Specialists Wildlife ACF (Majathal Sanctuary)	Responsible for afforestation, timber distribution, grazing, fuel wood production, watershed management, forest harvesting, supporting community needs and conservation of protected areas.
2	HP Forest Development Corporation Ltd.	The Corporation deals mainly with marketing of timber, fuel wood, pulpwood, bamboo, khair and resin.
3	Forest Training Institute	FTI conducts training induction as well as In-service training of Forest officers. The Institute is currently conducting regular Induction training courses for Range Forest Officers and Forest Guards. Besides this the Institute also conducts refresher courses for the Front-Line Staff of the HP Forest Department. Tailor made training courses for

		other Departments/ Projects/ HPSFDC/ Agencies/ Community Members/ Eco-Tourism are also conducted in this Institute.
4	Department of Environment and Science and Technology (includes the State Pollution Control Board)	Responsibility is to improve effectiveness of environmental management, protect vulnerable ecosystems and enhance sustainable development
5	Department of Agriculture- HPSAMB	APSAMB provides mandis for marketing of NTFP products
6	Himalayan Forest Research Institute	Provides technical support to forest department for nursery and silviculture practices.
7	Indian Institute of Grassland and Fodder Research	Provides technical support to forest department for pasture management practices.

Annexure 4: Summary of Institutional Consultations

Table 30: Summary of Institutional Consultations

No.	Name and Designation	Field of Expertise	Institution	Time and Date	Suggestions/ Key input
1	Sh. Rahul Sharma, Silviculture Subject Matter Specialist	Silviculture Subject Matter Specialist	HP Forest Department (HPFD)	24/04/2018, 11.00 am	• Seed Storage (controlled temperature environment) is required at each nursery. • Proper collection of seeds required. • Trained and dedicated nursery staff required. • Seed orchard management required. • Schedule of Rates prescribed by department does not match up with present scenario/market rates. • Plus trees not marked for seed orchards. • Seed testing, processing and treatment lab required (centralized or as per agro climatic zones of HP). • Fire control equipment insufficient. • Budget allocation for fire control is insufficient. • Awareness and training of staff required. • Reassessment of fire lines. • Long term planning required for seed orchard management with sufficient funds. • Counter fire management is not done due to lack of training and insufficient staff. • For lantana eradication, the cut root stock method is not implemented as per the guidelines. • Solid waste management for nursery waste is not done.
2	Mrs. Anita Bhardwaj, Assistant Conservator of Forests (Wild Life), O/o DFO(W/L), Shimla	Wildlife and Silviculture	HP Forest Department	24/04/2018, 11.45 pm	• Public participation is minimal due to Supreme Court of India orders on no extraction from Protected Area (PA). • Illegal extraction and poaching of mammals and pheasants is a cause of concern. • Eco tourism can be promoted as each PA has its own USP. But synergy between the two has to be maintained.

No.	Name and Designation	Field of Expertise	Institution	Time and Date	Suggestions/ Key input
					• PA has very small geographical area with pressure from human population residing in the vicinity of the PA. • Fire management is a cause of concern as its endanger the wildlife in PA. • Staff mobility for fire prevention/control/illegal extraction and poaching is required. • Control burning in forest is advisable but is not done due to lack of trained field staff and insufficient funds. • The cut root stock method for lantana eradication should be implemented as per guidelines. The example of proper implementation is at Rajaji, Jim Corbet and Kanha National Parks. • Fire prevention and suppression should be taken up on priority. • Grading of plants has to be done at nursery level.
3	S. Hitender Sharma, Joint Director, Forest Training Institute Chail (HP)	Training, Community participation and Silviculture	HPFD	24/04/2018, 12.30 pm	• Forest Training is provided by the institute in Chail, and branch in Sundernagar. Typical courses include 6-month training to forest guard (provided bi-annually). Refresher training courses in fire management and GIS. • Forest Fire management is a major challenge. • Dumping of debris and solid waste in forest areas from human settlements and construction activities is a major concern. • Wildlife conflict due to construction activities in the forest area, in many cases wildlife habitats have been fragmented by roads and accessibility to water sources in a problem. • PWD used to reuse polybags in road construction activities but the practice has been abandoned • Bioengineering on hill slopes needs to be scale dup • Regular training of forest staff on FMIS, GIS,IFMS,GPS,HRD etc. is required. • Trained and dedicated staff for nurseries is required for plants to be graded, identification of healthiest plants. Good programme for nursery supervision should be supported • There is an infrastructure up gradation of training schools (hostel facility, exposure visits, equipment's such as laptops, LED screens conference halls etc.) is required.

No.	Name and Designation	Field of Expertise	Institution	Time and Date	Suggestions/ Key input
					• Faculty shortage at training schools. Some key environmental challenges include (i) Depletion of bio diversity due to invasive alien species and forest fires (ii) Weed management within nurseries, and (iii) management of stray cattle
4	i. Sh. Raghav Sood, Secretary APMB (Bilaspur & Shimla) and ii. Mr. Solanki, State Coordinator , E National Agriculture Market (eNAM)	Agriculture, Medicinal and Aromatic produce marketing (NTFP & MAP)	Himachal Pradesh State Agriculture and Marketing Board, GoHP	25/04/2018, 3.30 pm	• There is a network of 60 markets across the state. However, these markets are dealing with agriculture and horticulture produce mainly. • The window for NTFP's is only from November to April where the mandis are not fully operational/busy • Kullu, Chamba, kangra, Shimla are major APMB mandis • No dedicated platforms or storage areas for NTFP. Rented area for whole sale traders is provided. • Out of 131 schedules items 37 are NTFP's/MAPs as notified by the GoHP which can be marketed/sold through APMB • The framers and traders negotiate directly with no role of APMB. • 1% of market fee is charged from trader (i.e. 1% of total value of stock). • No dedicated check on under value of product stock. • Farmer interest groups can be mobilized with access to financial resources. The Govt of India has started eNAM (http://www.enam.gov.in), wherein grading, sorting and auction is being done online as per Directorate of Marketing Inspection (DMI),GOI guidelines. 19 markets of Himachal have been enrolled at the portal. • Till date 90 commodities have been added. • NTFP can be added to e-NAM subject to its availability and quantity. eNAM can be later expanded to logistics and warehousing • the project can support with a single market earmarked for NTFP/MAPs The said market should be at main NTFP production area or at state exit point. • Sector is 'organic' by nature and its value needs to capture this aspect.

No.	Name and Designation	Field of Expertise	Institution	Time and Date	Suggestions/ Key input
					• Before going for expansion, a strong buyer base to be created. • NTFP/MAPs need support for sorting, grading and storage facilities. Currently there are no major private players in this space. • NTFP transit rule may be liberalized.
4	Dr. Suresh C Atri, Principal Scientific Officer (Environment),	Environment, Natural Resource Management and Climate Change	Department of Environment Science and Technology (DST), GoHP	26/04/2018 10.30 am	• DST has developed Environment Master Plan of State. • The DST is main coordinating department with every other sector department of the State for natural resource management. • DST gives policy input to other line departments. • DST is the nodal office for climate change action plan of the state. • DST gives sectorial guidelines for all departments regarding environment. • The reason for climate change is due to rise in temperature. • The change in forest dependence of people is due to options available for alternate fuel. • Due to green felling ban in the state the forests are not being used as resource and are just being conserved. • Planning process to be reformed for forest being used as resources. • Pine needle clearance from forest is not planned as there is no online monitoring system. • No awareness in people and low capacity of forest department about pine needle collection. • Wherever there is forest fire incidence the invasive species/weed problem is more due to sprouting of seeds. • Community is not oriented about livelihood practices from forests. • Lack of awareness about bio diversity conservation. • Rise in temperature and less rainy days has led to shifting of plant species towards N/W direction. • The spring sources are drying due to extraction of ground water, storage in water tanks, high temperature and less rainy days. • HP water table is going down due to excessive harnessing of water especially in low lying area.

No.	Name and Designation	Field of Expertise	Institution	Time and Date	Suggestions/ Key input
					• Check on ground water extraction is a necessity. • Application of knowledge and capacity of nodal agencies (key stake holders) is missing. • No subject specific trainers in concerned sector. • Cadre of different field in HPFD. Dedicated cadre is required. • Limitation of resources, manpower. • To build the capacity of the manpower its domain should be fixed. • Assign some economic value to the weed and then only people will take interest in its eradication. • Install two industries for re-use of weed residue/ demonstration for weed management.
5	i. Dr. Sandeep Sharma, Scientist G ii. Dr. P.S.Negi, Scientist C iii. Sh. Sanjeev Kumar, DCF iv. Dr. Ashwani v. Dr. Ranjeet Singh, Scientist E	i.Nursery and Medicinal Plants. ii.Seed and Nursery Technology iii.Silviculture iv.Pathologist v.Entomology	Himalayan Forest Research Institute , HFRI (body of Indian Council for Forest Research and Education, ICFRE under Ministry of Environment, Forests and Climate Change, GOI)	26/04/2018 3.00pm	• Most of the Joint Forest Management committees (JFMC) are nonfunctional. • Forest productivity in HP is less. • Better collection of seeds through seed orchards is required. • Model nurseries to be constructed so that good saplings can be grown and planted. • Skill up gradation of line staff for seed collection is required e.g. choice of species as per agro climatic zones of state, seed quality, seed handling, processing, nursery management, site selection for plantation etc. • Low productivity of forest due to low survival of species which are not from same agro climatic zone. • Local community input should be taken for selection of species. • The selected specie has to be vetted from some research institute or university to technical aspect. • Too many projects in a single zone leads to difficulty in assessment of impacts. • Area to be selected where least activities has been undertaken. • A fringe forest i.e. around the vicinity of the village area where dependency of community is high has to be taken up on priority. • Afforestation has to be done on properly marked sites.

No.	Name and Designation	Field of Expertise	Institution	Time and Date	Suggestions/ Key input
					• GPS coordinates of the area where interventions are planned has to be taken and maps be taken before hand. • FSI, DST is good tool for site selection. • In nurseries civil works to be completed by 1st year. Plantations to be done by 2nd or 3rd year. • Tall and sturdy (root shoot ratio, diameter, height) plants to be planted. • Root trainers can be used as per the species. • Vermi-compost or organic media should be used in nurseries instead of soil mixture. • Nursery selection has to be done by expert technically and administratively. Then inception plan as how to improve the individual nursery has to be prepared. • The staff to be trained and be retained at same nursery for at least 5 years. • Provision of consultancy has to be there in the project. • 19 nurseries selected in the project should have 19 individual plans for up gradation. • Planning of activities with expert has to be done. • Culling in nurseries has to be done periodically i.e. inferior stock should be disposed. • Damping of disease, cut worms, white grubs, and aphid attacks are common in nurseries. • Solar sterilization unit is a must in every nursery. • Bio pesticide/ fungicide should be prescribed in nursery plan. • Hardening of stock should be done in nursery i.e. restriction of water 2-3 months before plantation in field. • In district Kinnaur months of May to June should be selected for plantation and soil should be transported from outside. • Planning and sequencing of activities in nurseries and plantation is lacking. • Nauni Panchayat in District Solan is an example of water and moisture conservation.

No.	Name and Designation	Field of Expertise	Institution	Time and Date	Suggestions/ Key input
					• Success stories of community driven activities of similar nature or project be replicated in Satluj Basin. • NGO's in the Satluj basin should be taken on board for community participation. • 20-25% area should be era marked for NTFP plantations. • Value addition of community resources of NTFP to increase income should be undertaken. • Chilgoza harvesting training is being imparted by the institute with the necessary tools. • Good practices from agriculture and horticulture nurseries should be replicated in forest nurseries. • Microriza fungi in soil are used in nurseries instead artificial microriza fungi can be used which act as fertilizer and also for bio control. This will lead to more sturdy plants. • Till date adhoc method are used in nurseries for pest attack. • Depending on pest the control measures should be recommended. • The nurseries should have ornamental shrubs, trees etc. which act as natural biological barrier against pest attack. • Due to change in temperature the insect's species in nurseries are also evolving and new species are proliferating. • Trichoderma can be used for root rot or collar rot. • Neem cake can be used to reduce the use of pesticide or fungicide. • Modern method should be used for pest management. • Trap crop or inter cropping can act as pest control. • Excess watering of plants in nurseries. • Seed stands identified by HFRI and converted in seed production area. Deodar seed stand in Cheog. • Seed stands are for only two species i.e. deodar and Chid in HP. • Seed stands converted to seed production area will be of great benefit. • Identifying new seed stands will require 5-6 years.

No.	Name and Designation	Field of Expertise	Institution	Time and Date	Suggestions/ Key input
					• Modern techniques can be used in nurseries for germination of seeds, raising of saplings, sprinklers, mixing media, drill marker, bed marker etc.
6	Sh. Jamaldin, Astt. Manager (Una & Amb) , O/o District Manager, HPFDC (Hamirpur)	Timber salvage, auction and Resin collection	HP State Forest Development Corporation Ltd. (HPFDC)	01/05/2018 2.30pm	• HPFDC is working on Timber salvage and Resin collection only. • Other major NTFP in forest and private land in low lying area of HP is Kher (***Senegalia catechu).*** It is used for extraction of catechu which is extensively used in India as food product and medicine. • The Kher are extensively planted by persons in their private land holding and sold directly to private contractors to fetch good money. • HPFDC has no arrangement to buy these trees as private contractors give cash whereas there is no provision of such in HPFDC. • Local people are engaged for resin collection as it saves money as they know the forest and doesn't require lodging • There is scope of market if the resin collection is opened for private contractors. • Rate of resin per quintal or Kilogram should be notified before giving the contract to private party. This will fetch more income to the state. • Schedule of Rates for hiring labour is very less with respect to prevailing market rates. • Acute shortage of staff. • Pine needle collection is being done by private contractors and is used for fuel only. • Earlier HPFDC had paper pulp factory near Baijnath for processing pine needle. The same is closed. • The pine needle collection is very labour intensive and is prone to termite attacks as there is no storage facility available. • NTFP's in state are harnessed across a wide area and in small quantity. • Getting the NTFP to a single market will be un- economical for the community.

No.	Name and Designation	Field of Expertise	Institution	Time and Date	Suggestions/ Key input
					• There are no such NTFP in low lying areas of the state. Few NTFP's are harnessed in small quantity. • Earlier the forest cover around the village or habitation was dense thus labour cost was less. However, due to change in density of forest cover around the habitation the resin collection has to be done in far flung forest which is costing more. • Economic value to be assigned to lantana for its eradication from forest e.g. fire wood, furniture making etc. • The forest productivity is getting lower in state.
7	Dr. Sudesh Randotra , Principal Scientist & In charge	Himachal Pasturelands	ICAR-Indian Grassland and Fodder Research Institute, Palampur	03/05/2018, 10.30am	• The institute is part of Eco system climate proofing project in HP being funded by kfw. • There is lack of communication between research institutes and HP Forest Department. • Quality of pastures i.e. yield/biomass is low in HP due to lack of management, people interest and weed infestation. • The good pastures are being used but the low-quality pastures are not being treated to enhance their quality. • The treatment of pastures by HPFD is not very useful as to eradicate weed infestation the pastures have to be cleared for 3-4 years. • New improved varieties of local seeds or other seeds can be grown in pastures. • Pastures treated to be properly marked and closed. • Community should be trained and mobilized for pastures management and protection as they are the direct beneficiaries. • Private sector participation in pastures is very difficult as the revenue generation is very low, and the areas are remote. • Lantana is proliferating to higher pastures i.e. Alpine with evidence are being found in Keylong in Lahaul&Spiti. • Field Staff for pasture management to be properly trained. • Community participation can yield maximum benefit in pasture management.

No.	Name and Designation	Field of Expertise	Institution	Time and Date	Suggestions/ Key input
					• Wasteland increasing due to climate change with earlier small pasture being turning to waste lands. • Forest fire mainly due to burning of pasture with people's perception that by burning pasture the next year yield will increase. • Due to HPFD main focus on planting pine species the biodiversity of forests has fallen. • Pine needle collection should be done to prepare brickets which can be used as alternate source for fuel. • Private sector to be involved in pine needle collection as HPFD does not have the resources and also HPFD is not too keen on competitive market. • HPFD field staff has less technical knowledge in pasture management which has further led to degradation of pastures. • Long term planning for pasture management is a must. • Technical assistance of research institutes to be taken. • Recommendations of experts to be implemented. • HPFD gave permanent pastures to transhumant instead of rotation of pastures leading to degradation. • Low lying area pastures need more treatment.

Annexure 5: Proceedings of District Level Stakeholder Consultation

Table 31: Details of Stakeholder Consultation Meetings at District Level

No.	District	Date	Location	Stakeholders participated in meetings	Stakeholder's Views/ Concerns	How these issues are planned to be addressed
1	Kinnaur	24/04/2018	Forest Rest house, Reckong Peo	Total number of participants were 60 including • Concerned Forest Range Officers, Deputy Ragers and Forest Gaurds of Three Ranges of Kinnaur. • Sh. R.S Negi President Him lok Jagriti Manch • Gram Praddhans and members of villages Moorang, Kalpa, Kilba, Ribba, Rispa & Lippa	• The locals are dependent on forests for Fuel, fodder, Timber, NTFP collection (Chilgoza, Guchii etc.) • There has been substantial decrease in natural resources mainly around the areas where large construction projects like hydropower projects, road construction are being implemented. • Traditionally the forest area in and around the sacred groves are protected by locals. • The area prone to forest fires should be properly marked and cut off from the adjacent forest to prevent forest fire from spreading to nearby areas. • Soil instead of water to be used for extinguishing forest fires. • The forest resources have decreased due to forest fires, deforestation, lopping of cilgoza pines, increased population pressure, over grazing. • Cutting of Cedrus deodara trees for funeral and other purposes has decreased Cedrus deodara species in the region.	• Forest Fire lines reassessment is being done under the project. • Proper management of Chilgoza pines will be undertaken in the project. • The Forest rights are being settled by the concerned Deputy Commissioner/ Divisional Commissioner of the area. • Eco tourism sites are being selected on pilot basis by GoHP and in future when this component is taken up by the project the community views will be taken. • JFMCs will be constituted if not already done and will be consulted for preparation of range level plans and its implementation and monitoring. • Pasture management plans will also be prepared in consultation with concerned JFMCs. • Awareness programmes, trainings, field visits will be conducted for capacity building of community of the project area. • The plant species will be raised in nurseries in consultation with JFMC

No.	District	Date	Location	Stakeholders participated in meetings	Stakeholder's Views/ Concerns	How these issues are planned to be addressed
					• Fuelwood depot should be there at Panchayat level and they should provide the woods to locals in case of emergencies • Forest fires in the region is hampering the regeneration processes of different tree species • Harvesting of chilgoza has been commercialized in Kinnaur region. • Participants from the Ribba and Rispa Panchayat stated that the lopping of chilgoza has been reduced in their area by Panchayat • During forest fires community do participate in extinguishing fire. • People's participation in the Forest Right Act should be encouraged in the region • Eco tourism should be taken up but firstly on pilot basis as it will be good source of income generation however, can lead to pollution, plastic waster generation etc. • The pastures have decreased due to over grazing and no particular rotation mechanism for grazing. • JFM Committees should be constituted at Panchayat level and	• The project will encourage conservation of natural resources through participatory management practices. • The project will Involve local users in monitoring of natural resources • Will ensure sufficient area for grazing to avoid excess biotic pressure. • Will take on board research institutes for improving the yield of pastures. • Will take community in confidence before closing areas and include these arrangements in the range level plans • Develop and maintain marketing tieups for NTFP's • Regular monitoring of construction companies for proper muck dumping during the developmental activities, if they don't follow the environment protection rules, take action against them by the concerned DFO's. • For the success of conservation programmes, Forest Department can provide the incentive to local inhabitatnts • Regular monitoring of over harvesting of forest resources.

No.	District	Date	Location	Stakeholders participated in meetings	Stakeholder's Views/ Concerns	How these issues are planned to be addressed
					should be involved in plantation and selection of planting species.	• Inhabitants promote agroforestry system to fulfill the demand of fuel and fodder.

Stakeholder Consultation meeting at forest rest house Reckong Peo, Kinnaur

2	Shimla & Kullu	25/04/2018	Forest Rest house, Nogli, Rampur	Total number of participants were 120 including • Chief Conservator of Forests (Rampur Circle-includes District Kinnaur) • Shri Ashok Negi (DFO Rampur) • Shri V. K. Agarwal (DFO Luhri) • Concerned ACF, Forest Range Officers, Deputy Ragers and Forest Gaurds from Bahli, Rampur, Nankhari, Sarahan, Nithar, Nirmand, Chauwi, Kotgarh. • Gram Sabha , JFMC members from Rampur, Nogli, Taklech	• There has been substantial decrease in natural resources due to drought, deforestion road construction, landslides, unscientific muck dumping during road construction • The locals are dependent on forests for Fuel, fodder, Timber, NTFP collection (Chilgoza, Guchii etc.) • Demarcation around the fire prone area to prevent the spread of fire • The forest resources decreased due to overexploitation of forest resources to fulfill the demand for increasing population in the area, forest fire and encroachment of forest lands by local inhabitants • Wastage of forest woods/timber in the area as dried and fallen trees are not collected and managed properly by forest department • Forest nurseries should be increased in the area and locals should get plants for free of cost • Community do participate in plantation through MANREGA and forest department, forest fire prevention • Joint committees should be constituted involving the local inhabitants for the management and monitoring of plants	• muck will be utilized on site for project activities • Forest Fire lines reassessment will be done under the project. • JFMC's will be constituted if not already done and will be consulted for preparation of range level plans and its implementation and monitoring. • Pasture management plans will also be prepared in consultation with concerned JFMC's. • Awareness programs, trainings, field visits will be conducted for capacity building of community of the project area. • The plant species will be raised in nurseries in consultation with JFMC's • The timber collection of HPFDC will be strengthened • Regular monitoring of construction companies for proper muck dumping during the developmental activities, if they don't follow the environment protection rules, take action against them by the concerned DFO's. • For the success of conservation programmes, Forest Department can provide the incentive to local inhabitatnts

					• Conflicts on choices of plant species during plantation (Like Deodar, Populus instead of Pine) • Awarerness programms are being conducted at panchayat and school level and at public places by forest department during different occasions • awareness programmes should be conducted at villege/ Panchayat levels more frequently • The pasture ***land has*** decreased due to overgrazing, increasing demand for fodder • Only one JFMC is active from last 22 years while, rest are non fonctional and the majority of the Panchayat members arenot aware about the existance of such committees	• Regular monitoring of over harvesting of forest resources. • Inhabitants promote agroforestry system to fulfill the demand of fuel and fodder. • Will implement proper monitoring plan for performance of assets by involving local people • Will ensure sufficient area for grazing to avoid excess biotic pressure. • Will take community in confidence before closing areas and will include these arrangements in the range level plans

	
Stakeholder Consultation meeting at forest rest house Nogli, Rampur, Shimla	

3	Solan	29/05/2018	Forest Rest House Chandi, Chandi Wildlife Range	Total number of participants were 50 including • Concerned, Forest Range Officers, Deputy Ragers and Forest Gaurds from Chandi WLS. • NTFPs collecters and sellers, • Gram Pradhans • and Villagers	• The locals are dependent on forests for Fuel, fodder, Timber, NTFP collection • Due to WLS restriction are more as compared to open areas. • The project is going to address the fuelwood & fodder availability in the area which will be very helpful. • Also, it will help in increasing the income from NTFPs which nice step by the govt is • The activities should be planned and implemented with our consultation instead of the planning being done	• The restriction in WLS area is as per Hon'ble Supreme Court of India directions. This project has to follow the directions. • The proposed activities under the project will be prepared and implemented after consultation with locals. • A range level plan will be prepared in consultation with concerned JFMC's under Range area. • Since the forest fires are major concern in WLS area forest fire lines

					elsewhere. This way our needs will be addressed better • In past projects our participation in work plan formulation was not much. Also, not much focuses on our needs. • Forest fires/ land degradation/ construction of roads/ encroachments are the main issues impacting health and quality of forests • Erratic rainfall, flash floods, forest fires, spread of lantana and weeds, Use of pesticides/chemical fertilizers in agriculture /horticulture fields are the key vulnerability factors affecting forests- pests, diseases, soils etc • Convergence with other government departments should be there to supplement the efforts and not work against each other • Increase awareness of community to the harmful effects adversely affecting the health of forests, their causes and remedial measures that are locally acceptable/ feasible • Our association in all aspects right from planning to implementation should be taken only, then the \sense of ownership will increase, and locals will take interest in monitoring and evaluation.	reassessment and fire rating index will be implemented through this project. • Regular monitoring of construction companies for proper muck dumping during the developmental activities, if they don't follow the environment protection rules, take action against them by the concerned DFO's. • For the success of conservation programmes, Forest Department can provide the incentive to local inhabitatnts • Regular monitoring of over harvesting of forest resources. • Inhabitants promote agroforestry system to fulfill the demand of fuel and fodder. • Eradication of invasive alien species mainly lantana is a part of the project component and will be taken up either by cut root method or by using Class-III chemical (Glyphosate) • It will be ensured that the project components and schemes from other government department are in convergence with each other • Awareness programs, trainings, field visits will be conducted for capacity building of community of the project area.

	
Stakeholder Consultation meeting at forest rest house Chandi, Chandi WL Range, Solan	

4	*Kinnaur*	*30.05.2018*	*Forest Rest House Chotakamba, Rupi Wildlife Range*	*Total number of participants were 50 including* • Concerned, Forest Range Officers, Deputy Ragers and Forest Gaurds from Chandi WLS. • NTFPs collecters and sellers, • Gram Pradhans • and Villagers • Selfhelp gorups members	• There has been substantial decrease in natural resources due to drought, deforestion road construction, landslides, unscientific muck dumping during road construction • Due to development of hydropower projects water level in satluj river has reduced and affecting the catchment area and nearby villages which is directly and indirectly affecting these resources. • Decrease in natural resources, Water scarcity Landslides etc due to developmental activities. • Use of soil to blow out forest fire. • Forest resources decreased due overexploitation of forest resources to fulfill the demand for increasing population in the area. • Forest fire and encroachment of forest lands by local inhabitants is prevelant. • Increased demand of forest products such as timber, fuel, fodder, etc. • Lack of monitoring of planted plantlets • Locals are dependent on forests for fuel, fodder, Timber, medicinal plants, etc.	• The restriction in WLS area is as per Hon'ble Supreme Court of India directions. This project has to follow the directions. • Eco tourism sites are being selected on pilot basis by GoHP and in future when this component is taken up by the project the community views will be taken. • JFMCs will be constituted if not already done and will be consulted for preparation of range level plans and its implementation and monitoring. • Pasture management plans will also be prepared in consultation with concerned JFMCs. • Awareness programmes, trainings, field visits will be conducted for capacity building of community of the project area. • Regular monitoring of construction companies for proper muck dumping during the developmental activities, if they don't follow the environment protection rules, take action against them by the concerned DFOs. • For the success of conservation programmes, Forest Department can provide the incentive to local inhabitatnts • Regular monitoring of over harvesting of forest resources.

					• After the formation of Wildlife Sanctuary dependency decreased due to stringent laws. • Locals participate in forest acitivities mainly Plantation and blow out forest fire. • Local peoples demands some rights to use the forest resources. • There is lack of awarerness programms. • No tourism activities in this area. • Pasture have decreased due to overgrazing. • Maximum JFM committees are non functional and the majority of the Panchayat members were not aware about the existence of such committees	• Inhabitants promote agroforestry system to fulfill the demand of fuel and fodder.

Stakeholder Consultation meeting at Forest rest house Chotta Kamba, Rupi WL Range, Kinnaur

Table 32 Details of Stakeholder Consultation Meetings at Village Level

No.	District	Villages	Date	Stakeholders participated in meetings	Stakeholder's Views/ Concerns	How these issued are planned to be addressed
1	Kullu	Poshna, Anni, Bayal, Chowai	25.04.2018	Gram Pradhan & Panchayat members Self Help Group (Chowai)	• The locals are dependent on forests for fuelwood, fodder, Timber, NTFP collection (Chilgoza, Guchii etc.) • Decrease in forest resources due to drought, deforestion, road construction, landslides, unscientific muck dumping during road construction, hydropower projects construction activities, overexploitation of forest resources to fulfill the demand for increasing population in the area, forest fire and encroachment of forest lands by local inhabitants • Joint committees should be constituted involving the local inhabitants for plantation and selection of planting species , management and monitoring of planting sites • Joint committees should be constituted involving the local inhabitants for forest fire prevention and control • Conflicts on choices of plant species during plantation (Like Deodar, Populus instead of Pine) • Awarerness programms are being conducted at panchayat and school level and at public places by forest department during different occasions • The pasture has decreased due to overgrazing, increasing demand for fodder	• The components of the projects have been designed to increase the forest resources and help the locals for getting maximum benefits from the forests. • The proposed activities under the project will be prepared and implemented after consultation with locals. • JFMCs will be constituted if not already done and will be consulted for preparation of range level plans and its implementation and monitoring. • Pasture management plans will also be prepared in consultation with concerned JFMCs. • Awareness programmes, trainings, field visits will be conducted for capacity building of community of the project area. • The plant species will be raised in nurseries in consultation with JFMC. • The project will encourage conservation of natural resources through participatory management practices. • The project will involve local users in monitoring of natural resources.
2	Shimla	Tacklesh, Sunni, Sakrodi Jandrehad Tattapani Malgi	26.04.2018	Gram Pradhan & Panchayat members Mahila Mandal (Malgi)		
3	Kinnaur	Khwangi Kalpa Rogi Kilba, Ribba Skibba Moorang	24.04.2018	Gram Pradhan & Panchayat members Self Help Group (Khawangi) Mahila Mandal (Moorang)		

No.	District	Villages	Date	Stakeholders participated in meetings	Stakeholder's Views/ Concerns	How these issued are planned to be addressed
					• Eco tourism should be taken up but firstly on pilot basis as it will be good source of income generation however, can lead to pollution, plastic waste generation, etc.	• Eco tourism sites are being selected on pilot basis by GoHP and in future when this component is taken up by the project the community views will be taken. • Will ensure sufficient area for grazing to avoid excess biotic pressure. • Will take on board research institutes for improving the yield of pastures. • Will take community in confidence before closing areas and include these arrangements in the range level plans.

Meeting with Mahila Mandal Group at Malgi village,

Meeting with SHG and Panchayat members at Chowai,

Meeting with Pradhan and Panchayat embers at Sakrodi, Shimla

Meeting with Farmers at Jandehard village, Shimla

Meeting with Mahila Mandal Group at Moorang village, Kinnaur

Meeting with SHG at Khawangi village, Kinnaur

Annexure 6: Proceedings of Disclosure Workshops

Since the project area is large with distinct geographical, cultural and social features, two public disclosure workshops were held one at Reckong Peo (Schedule-V area), Kinnaur District and the other at Rampur busher, Shimla District.

A) Disclosure Workshop at Reckong Peo (Schedule-V area), Kinnaur District

One day Disclosure Workshop on Environment Assessment and Management Framework was organised on 23/08/2018 by G. B. Pant National Institute of Himalayan Environment & Sustainable Development, Himachal Regional Centre, Mohal – Kullu, Himachal Pradesh at Forest Rest House, Reckong Peo, District - Kinnaur, Himachal Pradesh. The aim of the Disclosure Workshop was to (i) share the Environment Assessment and Management Framework final report with the representatives of Panchayats and Forest Officers and Officials of the concerned Forest Ranges; (ii) discuss, validate and finalize the issues related to the Panchayats falling under the selected Forest Ranges.

Shri Angel Chauhan, DFO, Kinnaur graced the occasion as Chief Guest and Shri Anil Soni, ACF as Guest of Honour. Total 104 participants representing Forest Officers and Officials (DFO, ACF, ROs, BOs and Forests Guards) of the selected Forest Ranges, Pradhans of different Panchayats and Mahila Mandals, JFMC Members and farmers from the selected panchayats namely, Kalpa, Kilba and Moorang actively participated in the Disclosure Workshop. The proceedings of the Disclosure Workshop are as follows.

The Disclosure Workshop was started with the registration of all the participants. After that Dr. Renu Lata, Scientist 'C' welcomed all guests and participants. Dr. S.S. Samant, Scientist In-charge, GBPNIHESD, HRC and Convener felicitated to the Chief Guest and Guest of Honor.

Dr. S. S. Samant, SIC, GBPNIHESD, HRC, Mohal – Kullu, H.P. & Convener of the workshop formally welcomed all the guests, dignitaries and participants. After that he briefly appraised the participants about the Institute and its R&D activities. He also briefed about the programme of the Disclosure Workshop. He said that the objective of the workshop is to share the outcomes of the Environment Assessment and Management Framework project with the participants, which was based on study and consultations conducted in Kinnaur district from April to July 2018. He gave the comprehensive presentation and highlighted the issues raised by the people and mitigation measures suggested during the study. During his presentation, he covered different components of the project e.g., background, study area, approach, institutional reforms for integrated watershed management with a focus on HPFD, improved investments in Participatory Forest Management (PFM), outcomes of the perception-based study e.g., survey of households, views of respondents on various issues i.e., water resources, forest resources, environmental risks, etc. Further, he briefed about the stakeholder consultation meetings organized at Kinnaur, Shimla and Solan districts. He also explained the issues (i.e., status of forest resources, dependency of inhabitance on forest resources, impacts of developmental activities on forests resources, community participation in conservation of forests and steps taken by government for creating mass awareness among local people, etc.) discussed in the consultation meetings and told them that these issues are to be incorporated in the project. After that he explained about the stakeholder's views and implications regarding the issues addressed by the people during study, he also briefed about the environmental issues and mitigation measure i.e., pest control strategies in forest nurseries, integration of species selection, nursery planning with the planting site to ensure good survival rates, construction and repair of check dams, value chain infrastructure and enterprise support to NTFPs. Further he added that the main purpose of the Environmental Management Framework (EMF) is to provide a transparent framework with clear

accountability for managing environmental impacts and risks associated with the project. He also briefed about the institutional arrangement of the project at state, circle, division, range and block/beat levels. He emphasized that people should know the importance of forests to mankind and made an appeal to the participants for the conservation of forests, and to maintain the forests prosperity by their sustainable use.

Mr. Angel Chauhan, DFO, Reckong Peo, Kinnaur in his address highly appreciated the efforts and presentation made by GBPNIHESD, HRC, Mohal – Kullu, Himachal Pradesh. He also appreciated the World Bank as a funding agency for the Himachal Pradesh Forests for Prosperity Project. He added that the project duration is for 5 years with a total budget of 6.50 crores and wished for active participation of people for the successful implementation and further extension of the project.

Mr. Anil Soni, ACF, Reckong Peo, Kinnaur in his address said that according to Satellite data, there is 4% increase in the forest cover of Himachal Pradesh but this increase in forest cover is due to plantations alongside the roads, orchards, etc., so need to pay attention on this. He also added that there should be focus on native species for plantation and the selection of the right area for plantation is important for the maximum survival of planted species. He further added that the forest fire in Kinnaur is different as compared to other areas of H.P. Due to dense layer of humus the fire burning is slow and long lasting viz., it increases with the course of time. It is not frequent as in other places. He said that there should be awareness about the forest fire.

After the above presentation and addresses, the participants were invited for the comments, suggestions and validation of the outcomes of the project. All the participants actively involved in discussion. They fully agreed that all the issues presented and discussed were based on the interactions with the inhabitants during the surveys and interaction meeting. The further said that implementation of the identified issues will definitely help for the development of the panchayats falling under the selected Forest Ranges. They assured for their full cooperation during the implementation of the project in their respective panchayats.

A few of them gave location specific suggestions which are as follows.

Suggestions of participants

	Name of Participant	**Suggestion**
1	Priya Negi, Pradhan Pangi:	Proper managemnt of post plantation process i.e., proper watering/irrigation facilities, protection from forest fire and regular evaluation and monitoring of planted species is required for ensuring the maximum survival rate.
2	Rama Nand Negi:	Plantation of native species should be done in respective areas. Some suggested species are chulli (*Prunus ameniaca*) and Behami.
3	Parmeshwar Negi , Village Member:	Control on parasites, responsible for degradation of trees. Non-functional JFMCs should be made functional. Regular monitoring of saplings after plantation with the help of local people.

		Awareness programmes on forest fire, importance of forest, etc. should be coorganized at panchayat level. There should be transprancy among Government Institutions, Research Organizations and local communities.
4	Gram Panchayat Chagaon:	Local peoples' participation is necessary in the implementation of any project. Steps should be taken to prevent the ill effects of forest fire.
5	Ram Prakash, Kuarin:	Plantation should be done in barren land and landslide prone areas. Plantation should be based on water availabilty and soil types. Check walls should be erected first on the landslide prone areas, then in other sensitive areas.
6	Bhupinder Singh Negi Pradhan Brua:	Steps should be taken by the Govt. to prevent the severe loss during any natural disaster. There should be proper plans and management for pre-disaster and preparedness to face the disaster and post-disaster preventive measures

The Disclosure Workshop ended with the vote of thanks by Dr. Kishor Kumar Kothari.

Glimpses of the Disclosure Workshop at Forest Rest House, Reckong Peo, Kinnaur






B) ***Summary of Disclosure Workshop at Rampur busher, Shimla District***

One Day Disclosure Workshop on Environment Assessment and Management Framework was organised on 24/08/2018 by G. B. Pant National Institute of Himalayan Environment & Sustainable Development, Himachal Regional Centre, Mohal – Kullu, Himachal Pradesh at Forest Rest House, Nogli, Rampur, District - Shimla, Himachal Pradesh.

The aim of the Disclosure Workshop was to; (i) share the Environment Assessment and Management Framework final report with the participants representing Panchayats and Forest Officers; (ii) discuss, validate and finalize the issues related to the Panchayats falling under the selected Forest Ranges.
Shri Anil Thakur, IFS, CCF, Rampur Circle graced the occasion as Chief Guest, Shri Ashok Negi, DFO, Rampur as Guest of Honor, Shri K.B. Negi, DM, Forest Corporation, Rampur as Special Guest and Shri V. K. Agarwal,DFO, Anni as Guest. In addition, ACFs, ROs, DROs and Forest Guards from Bahli, Rampur, Nankhari, Sarahan, Nithar, Nirmand, Chauwi, Kotgarh ranges, Pradhans of different panchayats and Mahila Mandal, JFMC Members and farmers from different areas actively participated in the Workshop. Total 64 participants participated. The proceedings of the Disclosure Workshop are as follows.

The Disclosure Workshop was started with the registration of all the participants. After that Dr. Renu Lata, Scientist 'C' welcomed all guests and participants. Dr. S.S. Samant, Scientist In-charge, GBPNIHESD, HRC and Convener felicitated the Chief Guest and Guest of Honor.

Dr. S. S. Samant, SIC, GBPNIHESD, HRC, Mohal – Kullu, H.P. & Convener of the workshop formally welcomed all the guests, dignitaries and participants. After that he briefly appraised the participants about the Institute and its R&D activities. He also briefed about the programme of the Disclosure Workshop. He said that the objective of the workshop is to share the outcomes of the Environment Assessment and Management Framework project with the participants, which was conducted in Kinnaur district from April to July 2018. He gave the comprehensive Power Point presentation and highlighted a detailed account of information on the issues raised by the people and mitigation measures suggested during the study. During his presentation, he covered different components of the project e.g., background, study area, approach, institutional reforms for integrated watershed management with a focus on HPFD, improved investments in Participatory Forest Management (PFM), outcomes of the perception based study e.g., survey of households, views of respondents on various issues i.e., water resources, forest resources, environmental risks. Further, he briefed about the stakeholder's consultation meetings organized at Kinnaur, Shimla and Solan districts. He also explained the issues (i.e., status of forest resources, dependency of inhabitance on forest resources, impacts of developmental activities on forests resources, community participation in conservation of forests and steps taken by government for creating mass awareness among local people, etc.) discussed in the consultation meetings and told them that these issues are to be incorporated in the project. After that he explained about the stakeholder's views and implications regarding the issues addressed by the people during study, he also briefed about the environmental issues and mitigation measure i.e., pest control strategies in forest nurseries, integration of species selection, nursery planning with the planting site to ensure good survival rates, construction and repair of check dams, value chain infrastructure and enterprise support to NTFPs. Further he added that the main purpose of the Environmental Management Framework (EMF) is to provide a transparent framework with clear accountability for managing environmental impacts and risks associated with the project. He also briefed about the institutional arrangement of the project at state, circle, division, range and block/beat levels. He emphasized that people should know the importance of forests to mankind and made an appeal to the participants for the conservation of forests, and to maintain the forests prosperity by their sustainable use.

Mr. Anil Kumar, CCF, Rampur Circle welcomed all the participants and explained that the problem of soil erosion is due to over collection of litter from the forest floor. Due to this, the soil is exposed to frequent erosion and said that there is need of collective efforts for the conservation of forests. He highly appreciated the efforts and presentation made by GBPNIHESD, HRC, Mohal – Kullu, Himachal Pradesh. He also appreciated the World Bank as a funding agency for the Himachal Pradesh Forests for Prosperity Project. He wished for the kind cooperation, support and active participation of all the stakeholders during the implementation of the project.

Mr. Ashok Kumar Negi, DFO, Rampur, briefed about the project and its main objectives. He said that there is a need of collective efforts to conserve the forests and its resources.
Mr. K. B. Negi, DM, Forest Corporation, Rampur said that public participation is necessary for the implementation of the project.

After the above presentation and addresses, the participants were invited for the comments, suggestions and validation of the outcomes of the project. All the participants actively involved in discussion. They fully agreed that all the issues presented and discussed were based on the interactions with the inhabitants during the surveys and interaction meeting. The further said that implementation of the identified issues will definitely help for the development of the panchayats falling under the selected Forest Ranges. They assured for their full cooperation during the implementation of the project in their respective panchayats.

A few of them gave location specific suggestions which are as follows.

Table 33 Suggestions of participants from Disclosure Workshop- Rampur

	Participant	**Suggestions**
1	Lalit kumar, Deputy Ranger, Nankhari, Srahan Block:	Pipes should be provided for the preparation of stacks of grass to store. The villagers are using trunk of Deodar (*Cedrus deodara*) and Rai (*Picea smithiana*) to support the stacks of grass. Caretaker should be appointed for taking care of planted species
2	Indubala, Pradhan, Deothi Panchaya:	Over collection of litter should be prohibited. Steps should be taken to stop the over exploitation of forest resources.
3	Manish, Youth Club Member, Bhali:	Mixed plant species should be planted to reduce the severe impact of forest fire. Nurseries should be developed at beat level and seedlings should be provided to the local people for plantation. Plantaion of native species should be done. New JFMCs should be constituted and inactive JFMCs should be made fuctional. Awareness programmes on forest fire, importance of forests etc. should be organized at panchayat level.
4	Mr. O.P. Negi :	Proper management of post plantation process *e.g.*, Proper watering facilities, protection from forest fire, etc. are essentially required for the maximum survival of plants. The Disclosure Workshop was ended with the vote of thanks by Dr. Kishor Kumar Kothari.

Figure 19 Glimpses of the Disclosure Workshop at Forest Rest House, Nogli, Rampur

Annex 7: Screening Checklists

Part 1: Environmental Data Sheet

	Date of Screening:	
	Name of Range:	
1	List of activities to be supported under the plan:	
2	Range area (ha)	
3	Forest Area Status Key Tree Species selected for afforestation Current use of forest for any livelihood activity Area infested by exotic/noxious weeds	_____ Ha ☐ Degraded ☐ VDF ☐ MDF ☐ Scrub _____: _____ _____ Ha
4	Pasture Land Season when fodder is available Livestock numbers	_____ Ha _____ No # _____ No #
5	Forest Fire Vulnerability Forest fire incidences	_____ _____ No #/ year
6	Availability of NTFPs, MAPs and minor forest produce Key NTFP species: Quantity harvested each season (species-wise):	
7	Presence of Forest nursery, or nearest nursery site	_____ No # and area (ha) Annual production capacity (saplings/year):
8	Existing management plan for the selected range	_____ (name of working plans/ management plans etc.)
9	Are any civil works proposed as part of the project in this plan?	☐ Yes, civil works are part of the activities ☐ No, civil works are not part of the activities If yes, give details of the civil works:
10	Are there any religious sites, culturally important sites in the project activity area? If yes, please give details (name, distance from project site).	☐ Yes, there are culturally important sites in project area ☐ No, there are no culturally important sites in project area If yes, give details of the culturally important sites:

Part 2: Eligibility Screening

Sl. No	Activities listed below will NOT be eligible for support under the proposed project	Confirmation that the activity is NOT part of the project (please tick)
1	Activities that are not consistent with the Forest Working plans/ CAT plans of the area	☐ Activity is not part of project ☐ Activity is part of project
2	Activity that involves construction of check dam >3m height.	☐ Activity is not part of project ☐ Activity is part of project
3	Activities that promote or involve procurement of pesticides that falls in WHO classes IA, IB, or II.	☐ Activity is not part of project ☐ Activity is part of project
4	Activities that involve large-scale clearing of land, dredging of water bodies, undercutting of slopes, replacement of natural vegetation, habitat destruction, etc., that may cause permanent, irreversible impacts.	☐ Activity is not part of project ☐ Activity is part of project
5	Any activity that has a significant potential of causing forest fires.	☐ Activity is not part of project ☐ Activity is part of project
6	Any activity that involves child labour (persons under 18 years of age).	☐ Activity is not part of project ☐ Activity is part of project
7	Activities that would adversely affect places of cultural significance and protected historical/archeological assets (both natural and human-made).	☐ Activity is not part of project ☐ Activity is part of project
8	Activities that involve felling of trees without a permit.	☐ Activity is not part of project ☐ Activity is part of project
9	Activities that involve NTFP/MAP harvesting without approvals/permits.	☐ Activity is not part of project ☐ Activity is part of project
10	Any activity that is not consistent with the project description at time of project negotiations, unless subsequently agreed to with the Bank along with the appropriate level of environmental safeguards management.	☐ Activity is not part of project ☐ Activity is part of project

Part 3: Legal and Regulatory Requirements Checklist

Legal and Regulatory Requirement	**Applicability to the project**	**Compliance (in case it is applicable)**
Consent for Establishment and Consent for Operation from the HP Pollution Control Board in case of NTFP/MAP processing activities	☐ Applicable to activities under the project ☐ Not Applicable to activities under the project	If Applicable, ☐ Consent taken ☐ Consent not taken ☐ Consent will be taken by _____ (date)
Permit for transit of NTFP/MAP in case of NTFP/MAP marketing and processing activities	☐ Applicable to activities under the project ☐ Not Applicable to activities under the project	If Applicable, ☐ Permit taken ☐ Permit not taken ☐ Permit will be taken by _____ (date)
Permit for tree felling from the HP Forest Department in case any activity involves felling of trees	☐ Applicable to activities under the project ☐ Not Applicable to activities under the project	If Applicable, ☐ Permit taken ☐ Permit not taken ☐ Permit will be taken by _____ (date)
Permit for ground water extraction from the HP Ground Water Authority in case any activity requires groundwater extraction (if required)	☐ Applicable to activities under the project ☐ Not Applicable to activities under the project	If Applicable, ☐ Permit taken ☐ Permit not taken ☐ Permit will be taken by _____ (date)

Screening checklists filled by:
Name: _____
Designation: _____
Date: _____

Screening checklists verified by:
Name: _____
Designation: _____
Date: _____

Annex 8: Format for Environmental Management Plan

Part 1: List of Activities Involved

Activity	***Is the activity part of the project? (please tick)***	***Triggered Mitigation Measures***
Seed Collection and Management	[ ] Yes [ ] No	See Section A below
Nursery Upgradation	[ ] Yes [ ] No	See Section B below
Soil and water conservation activities	[ ] Yes [ ] No	See Section C below
Afforestation/reforestation and Plantation trials	[ ] Yes [ ] No	See Section D below
Building rehabilitation / General construction/ small scale civil works	[ ] Yes [ ] No	See Section 0 and E below
Activities in Natural Habitats / Protected areas / Eco sensitive zones	[ ] Yes [ ] No	See Section F below
Pasture Regeneration/fodder cultivation	[ ] Yes [ ] No	See Section 0 and G below
Forest Fire control	[ ] Yes [ ] No	See Section H below
NTFP Collection and Harvesting	[ ] Yes [ ] No	See Section I below
NTFP value chain set-up	[ ] Yes [ ] No	See Section 0 and J below

Part 2: Selection of Mitigation Measures

Activity	***Parameter***	***Mitigation Measures Checklist (Tick All Selected Measures)***	***Who is Responsibile for Implementation Of the Mitigation Measure?***	***When is the Mitigation Measure to be Implemented?***	***What is the Budget Required for Implementaation of the Mitigation Measure? (integrate cost into the RMP or NTFP plan budget)***

General Conditions	Community worker / Labour Safety	☐ World Bank EHS guidelines will be applicable ☐ Project will also follow OHS management practices listed in Annex 10. ☐ All legally required permits have been acquired for construction and/or rehabilitation ☐ Community Workers' PPE will comply with international good practice (always hardhats, as needed masks and safety glasses, harnesses and safety boots) ☐ Appropriate signposting of the sites will inform workers of key rules and regulations to follow. ☐ Measures for public safety will be ensured ☐ Code of Conduct for Workers will be adopted			
	Protection of natural environment and biodiversity	☐ Undertaking all activities in protected areas as per the management plans ☐ Minimizing staff presence and vehicle traffic			

		☐ Sticking to existing roads and tracks as much as possible ☐ Protecting surface and groundwater resources ☐ Preventing any harvesting of plants or poaching of wildlife by site personnel ☐ Restoring surface and vegetation where it has been significantly disturbed ☐ Taking out all waste after completion of the assignment ☐ Adjacent wetlands and streams shall be protected from construction site run-off with appropriate erosion and sediment control features.			
	PCR Chance Finds	☐ Ensure that provisions are put in place so that any cultural artifacts or other possible "chance finds" encountered during field works are noted and registered, secured, responsible officials contacted, and further activities delayed or modified to account for such finds.			
Seed Collection and Management		☐ Only high quality seeds will be selected from the forest and plantation sources for raising seedlings. Plus, trees should be demarcated so labour/community			

		are able to decipher which tree is known plus tree. ☐ The seeds collected should be tested for their germination ability and growth. Floating seeds in water is good method for separating quality from damaged or immature seeds. Sound, mature acorns sink in water. Defective acorns will generally float. Water flotation also facilitates the removal of leaves, and other debris making sowing of the seeds easier. ☐ Keep appropriate records that permit identification of sources of production material, and where it is grown and planted out ☐ Sowing of seeds in sterilized/fumigated and clean beds ☐ Locate the nursery producing the seedlings away from commercial stands to prevent contamination and the subsequent spread of pests			
Nursery Upgradation		☐ For small works (on construction of green-houses or rehabilitation of space for installation of planting or storage equipment), it is proposed to use an EMP checklist on an as needed basis. The checklist for specific project site will be prepared by SPMU in collaboration with the respective staff			

		of the participating in the activity. Project will utilize bio-pesticides, and strategy as prescribed under Annex 11 ☐ No procurement/use or use of banned pesticides and pesticides belonging to WHO Classes I and II ☐ The selection of species is based on the suitability for the altitude, slope or topography and site quality. Focus should be on native species or species that are highly adapted to the location. ☐ Within selected suitable species, those with high to moderate growth rate of biomass and ability to provide multiple benefits to the community should be selected. ☐ Use of biodegradable nursery bags and root trainers (e.g., those made with coir). ☐ Proper arrangement for segregation and temporary storage of all plastic waste at the nursery site. ☐ Arrangement for periodic collection of plastic waste for recycling by waste aggregators or recycling facilities.			

		☐ No plastic will be burned. ☐ To ensure better survival of plants, nursery techniques to be used for production of healthy nursery stock include: ☐ Root trainers to prevent coiling of seedling root system ☐ Better medium for growth of seedlings (FYM, soil and sand mix) ☐ Use of organic manure / Vermi Compost in appropriate proportions ☐ Temperature in compost pit should not exceed 50 deg to guard against thermophilic bacteria ☐ Solarization of soil to kill pests/ bacteria before planting pathogens. ☐ Application of Mycorrhiza for root rot diseases ☐ Application of Neem cake in the soil is also a good bio control method ☐ Follow Annex 11 for guidance on pest management and nursery good practices.			

		☐ Follow Annex 8 and 9 for guidance on EMP and standalone EMP for civil works ☐ Follow Annex 10 for guidelines on occupational health and safety for community labour. The project will also follow WBG EHS guidelines			
Soil and water conservation activities		☐ All activities carried out in protected areas, wildlife sanctuaries, Eco sensitive zones, will be carried out consistent to the management plan of those areas. ☐ Undertake all S&W activities as per the CCAT plan treatment prescriptions. ☐ Ensure strong apron, deep toe wall and sufficient foundations for safety of erosion control structures. Locate structures on stable sites. ☐ Spurs or other stream bank protection measures must not cause drainage congestion. ☐ Avoid construction activity in streams during time periods critical for fish breeding, migration, etc. ☐ In areas where high/steep slopes and poor and thin soil layer, soil erosion control is difficult. The design can			

		consider bio-engineering methods for gully erosion control, sand filtering, and construction methods of multi-layer forest stands in stony mountain area. ☐ S&W activities should be carried out before plantation so that soil moisture conditions are optimal (especially in OF areas, steep slopes etc.) ☐ leave buffer zones near streams to prevent siltation ☐ don't use site preparation techniques that might increase erosion ☐ concentrate trees in trouble areas ☐ keep drainage pathways covered with grass			
Afforestation/reforestation and Plantation trials		☐ For fire control keep vegetative debris to a minimum and see that a ready supply of water for fire suppression is available (van sarovars) ☐ Only use indigenous and native species with multi-purpose benefits ☐ List available exotics and non-natives and issue notification disallowing their use in plantation/restoration			

		☐ New plantation sites need to be adequately fenced and protected. Natural barriers of scrubs should be used. Use of non-threatening measures to ward off wildlife (sounds/barriers) ☐ JFMC experience in plantation - If experienced planters are not available provisions for training and supervision should be made by forest department so that quality of the plantation is not compromised ☐ Factors that should be considered when selecting species include: growth rate, site requirements, climatic suitability, genetic variability, wood properties, aesthetics, wildlife value, biological diversity, erosion control and potential insect and disease problems. ☐ Sites to be avoided when considering seeding plantation are areas where seeding has already failed. Avoid sites prone to frost or frost heaving. Avoid sites where grazing could occur, and highly erodible soils or steep slopes where young plants could be washed away.			

		☐ Always use seed of appropriate seed sources that has been properly stored, stratified, and treated. ☐ Follow Annex 10 for guidelines on occupational health and safety for community labour. The project will also follow WBG EHS guidelines ☐ Follow Annex 11 on Pest Management Plan for all pest control activities			
Building rehabilitation / General construction/ small scale civil works	Standalone EMP	☐ Case by case Environmental Assessment by ES, PMU- use of EMP checklist, and where required preparation of Standalone EMP for construction and operation. (format provided in Annex 8 and 9)			
	Air Quality	☐ Any dust, shall be suppressed by ongoing water spraying and/or installing dust screen enclosures at site ☐ The surrounding environment shall be kept free of garbage and solid waste to minimize dust. ☐ There will be no open burning of construction / waste material at the site			

	Noise	☐ Ensure compliance with prescribed noise standards ☐ Any drilling noise will be limited to restricted times agreed to in the permit ☐ Noise generating construction activity will not be undertaken during night ☐ Engine covers of generators, air compressors and other powered mechanical equipment shall be closed, and equipment placed as far away from any sensitive natural habitat or nesting/ breeding sites areas.			
	Water Quality	☐ The site will establish appropriate erosion and sediment control measures such as e.g. hay bales and / or silt fences to prevent sediment from moving off site and causing excessive turbidity in nearby water runoffs ☐ Site vehicles/vans will be washed only in designated areas where runoff will not pollute natural surface water bodies.			
	Waste management	☐ Ensure compliance with prescribed Construction and Demolition Waste Management Rules			

		☐ Waste collection and disposal pathways and sites will be identified for all major waste types expected from all activities. ☐ Solid waste will be collected and disposed properly in accordance with Solid Waste Management Rules ☐ The records of waste disposal will be maintained as proof for proper management as designed. ☐ Whenever feasible reuse and recycle appropriate and viable materials.			
Activities in Natural Habitats / Protected areas / Eco sensitive zones		☐ All activities carried out in protected areas, wildlife sanctuaries, Eco sensitive zones, will be carried out consistent to the management plan of those areas.			
Pasture Regeneration/fodder cultivation		☐ Identify alternative pasture areas before restoration of existing pastures in use is carried out. ☐ Promote cultivation of Napier and elephant grasses on agriculture or wasteland, on-farm, along with stall feeding practices to reduce pressure on forests and pastures, sensitive areas. ☐ Efficiency in the use of fodder can be enhanced through a number of			

		technological and management options like chopping, grinding, wetting and soaking of fodder and enrichment of crop residues mineral supplements to dry fodder. This will not only result in efficient use of available fodder but also improve its nutritional value. ☐ Similarly, there are large areas of common pastureland, which can be used for cultivation of fodder trees and grasses in Himachal Pradesh. ☐ Shift from the present methods of 'one time removal of weeds' to 'complete rehabilitation' of the treated areas. ☐ In view of their environmental/ ecological concerns, the rehabilitation measures will not employ any chemicals methods of exotic weed control. ☐ The natural regeneration of indigenous plant species on treated sites should be encouraged and facilitated to establish towards better environmental and ecological services, including fodder, fuel, water recharge, etc.			
Forest Fire control		☐ Controlled burning activities should keep in mind the key breeding and			

		nesting grounds/ seasons of birds and other important species. ☐ Improved cook stoves which save fuel wood should be promoted. The promotion of clean fuels will not only reduce pressure on forests but will provide health related benefits as well. ☐ Organise community enterprise and zonation around collection of pine needles and facilitate market linkages to industries that utilize pine needles as raw material or fuel. ☐ Communities need to be sensitized that involvement fire management and associated activities will improve their livelihood, health and security ☐ Integrating all activities and actors related to fire management, such as prevention, preparedness, suppression and restoration, into one coordinated process of fire management, planning and implementation ☐ Communities should monitor (i) burning of agriculture residue near forest areas and (ii) stacking of inflammable forest material outside the boundary of or in the forest (dried leaves and pine needles, firewood,			

		timber, bamboo and resin, on a land adjoining a forest) ☐ Vehicles supported under this component should comply with PUC standards. fire-fighting vehicles should be placed at designated parking lots or existing garages/sheds. Standard environmental safety requirements such as safe storage of fuel, other substances for fire fighting vehicles should be applied. ☐ The project can also consider vegetative firebreak to protect habitations- it is a management practice that is designed to create a fuel break (herbaceous and woody vegetation) are used to break up the flammable fuels. By using a combination of short grasses ☐ Ensure that construction of Van Sarovars is per approved design that integrates all safety considerations (such as fencing, appropriate side slope, etc.) ☐ Follow Annex 8 for guidance on EMP checklist and standalone EMP for civil works ☐ Follow Annex 10 for guidelines on occupational health and safety for			

		community labour. The project will also follow WBG EHS guidelines			
NTFP Collection and Harvesting		☐ Impart training to communities on how to collect harvest MAPs and NTFPs so its regeneration capacity is maintained ☐ HPFD needs to ensure steady supply of seeds to the NTFP and MAPs nurseries so that the pressure of harvesting from the wild is reduced. ☐ A two-pronged strategy needs to be adopted with the conservation of wild gene pool and promoting agro techniques of cultivable medicinal plants.			
NTFP value chain set-up		☐ Ensure that processing and cold storage facilities have Consent for Establishment and Consenet for Operation from the State Pollution Control Board, as required ☐ Minimize inventory storage time for raw materials to reduce losses from putrefication. ☐ Consider use of enclosure techniques to minimize damage to raw materials stored/ dried outdoors; ☐ Monitor and optimize process yields, e.g. during manual grading or cutting			

		activities, and encourage the most productive employees to train others in efficient processing. ☐ Clean, sort, and grade raw NTFPs, MAPs where possible at an early stage (e.g. at the harvest site), to reduce organic waste and at the processing facility ☐ Contain solid waste in dry form and consider disposal through composting and / or use for soil amendment ☐ Organic and non-organic debris / soil, solid organic matter, and liquid effluents, should be recycled as a soil amendment (based on an assessment of potential impacts to soil and water resources) or other beneficial uses such as energy production; ☐ Provide leak-proof containers for storage of NTFPs/ MAPs ☐ Segregating individual by-products from each other and from waste to maximize their use and minimize waste ☐ Organic and non-organic debris / soil, solid organic matter, and liquid effluents, should be recycled as a soil amendment (based on an assessment			

		of potential impacts to soil and water resources) or other beneficial uses such as energy production; ☐ Follow appropriate food codes relevant in India to prevent impacts from contamination and adulteration. ☐ In case of NTFP based food products ensure that FSSAI registration and licence are obtained. ☐ All NTFP processing, storage grading facilities should have adequate sanitation facilities for workers, appropriate pest control (no procurement of banned pesticides and WHO class I & II pesticides and safe water quality. ☐ Follow Annex 8 for guidance on EMP checklist and standalone EMP for civil works ☐ Follow Annex 10 for guidelines on occupational health and safety for community labour. The project will also follow WBG EHS guidelines			

EMP prepared covering all project supported activities by:
Name: _____
Designation: _____
Date: _____

EMP checked for adequacy in removing/minimizing negative environmental impacts of project activities by:
Name: _____
Designation: _____
Date: _____

Annexure 9: Environmental Management Plan for Small Civil Works – A Model Format

A model format to be used for activities involving Buildings and Value Chain infrastructure

Part 1: EMP for Construction Phase of Civil Works

Environmental Aspect	***Impact***	***Mitigation Measure***	***Responsibility for Implementation***	***Applicability***
Site Selection	Improper location can have multiple impacts on sustainability, biodiversity, disaster proofing, etc.	The site selected for the activity will not be in areas that are: wildlife conflict areas, waste dumpsites, highly polluted/ contaminated land or water areas, natural drainage courses, areas prone to floods. The site selected for the activity will not be in high conservation value sites (fish spawning sites, bird nesting and roosting sites, etc.) or culturally significant sites (sacred groves, monuments, etc.).	HP FD Oversight by Junior Engineer and Forest Ranger of the circle	☐ Applicable ☐ Not Applicable If Applicable, include in Construction Design Document and Contract Clauses
Legal and Regulatory Compliance	Activities that do not comply with the relevant laws and regulations cannot be supported under the project.	Refer to the Screening Checklist and confirm the following: The proposed construction is not on the 'list of ineligible activities' given in Part 2 of the Screening Checklist. The proposed construction complies with the legal and regulatory requirements including those listed in Part 3 of the Screening Checklist.	HP FD Oversight by District Technical Specialist and Forest Ranger of the circle	☐ Applicable ☐ Not Applicable If Applicable, include in Construction Contract Clauses
Felling of trees and clearing of vegetation	Loss of green cover including trees	Compensatory plantation will be undertaken in accordance with the conditions prescribed in the tree felling permission. Not less than 5 trees of diverse, local species will be	HP FD Oversight by District Technical Specialist and Forest Ranger of the circle	☐ Applicable ☐ Not Applicable If Applicable, include in

		planted for every tree that is felled. Provision for tree guard and not less than 5 years of plantation aftercare will be provisioned.		Construction Contract Clauses
Construction materials	Unregulated quarrying can result in over-extraction, impact on natural drainage, soil erosion, loss of aesthetic appeal of the land scape, etc.	All construction material including sand, stone, brick, timber, etc., will be sourced from authorized quarries/sources. All borrow pits will be suitably rehabilitated.	HP FD Oversight by District Technical Specialist and Forest Ranger of the circle	☐ Applicable ☐ Not Applicable If Applicable, include in Construction Contract Clauses
Pits and boreholes	Risk of falls into unsecured pits, boreholes, etc.	All boreholes will be properly secured in accordance with the Supreme Court guidelines[12]. All pits (including borrow pits) will be properly secured and will not exceed 2 meters in depth.	HP FD Oversight by District Technical Specialist and Forest Ranger of the circle	☐ Applicable ☐ Not Applicable If Applicable, include in Construction Contract Clauses
Health & Safety	Risk of accidents at worksite.	Cautionary signage and protective barriers will be used to warn public and prevent unauthorized access. All workers will be provided adequate PPE. The use of PPE at the construction site will be mandatory. A fully-provisioned first-aid box will be available at the construction site. An accident register will be maintained at the construction site.	HP FD Oversight by District Technical Specialist and Forest Ranger of the circle	☐ Applicable ☐ Not Applicable If Applicable, include in Construction Contract Clauses
Air Quality	Dust emissions from excavation. Emissions from vehicles and	All vehicles will have a valid Pollution Under Control certification.	HP FD Oversight by District Technical Specialist and	☐ Applicable ☐ Not Applicable

[12] Refer to: http://www.cgwb.gov.in/CGWA/Documents/Guidelines%20Supreme%20Court%20fatal%20Accident.pdf

	machinery, dust, etc., may lead to air pollution. High noise levels from construction activities may lead to noise pollution.	All generator sets (diesel, petrol, kerosene, LPG, CNG) will meet the 'CPCB noise and emission control standards for Generator Sets'. Noise generating activities and machinery will meet the CPCB prescribed 'Ambient Air Quality Standards in Respect of Noise'. Construction activity will be restricted to daylight hours.	Forest Ranger of the circle	If Applicable, include in Construction Contract Clauses
Water Quality	Runoff and release of untreated wastewater may pollute nearby water bodies.	Release of waste water into water bodies, streams, etc., without any treatment will be avoided. All waste water will meet the 'CPCB General Standards' prior to disposal.	HP FD Oversight by District Technical Specialist and Forest Ranger of the circle	☐ Applicable ☐ Not Applicable If Applicable, include in Construction Contract Clauses
Waste Management	Pollution and health impacts due to improper disposal of wastes such as open dumping, burning, unauthorized recycling, etc.	Dispose biodegradable and non-biodegradable wastes, including wastes from construction activity and labour camp, in a manner and at locations specified by the local government body. All construction and demolition waste will be cleared from the site and disposed at authorized locations in accordance with the Construction and Demolition Waste Management Rules, 2016[13]. Any hazardous waste generated during construction/demolition activity will be handled in accordance with the Hazardous Waste Management Rules, 2016[14].	HP FD Oversight by District Technical Specialist and Forest Ranger of the circle	☐ Applicable ☐ Not Applicable If Applicable, include in Construction Contract Clauses

[13] Refer to: http://www.moef.gov.in/sites/default/files/C%20&D%20rules%202016.pdf

[14] Refer to: http://www.moef.gov.in/sites/default/files/Final%20HWM%20Rules%202016%20(English)_0.pdf

Physical Cultural Resources	Loss of cultural artifacts.	In case of chance finds of archaeological significance (such as coins, utensils, artefacts, structures, etc.) are found during the excavation works, the Department of Archeology will be notified immediatly and further work will be stopped until directions are issued by the Department of Archeology.	HP FD Oversight by District Technical Specialist and Forest Ranger of the circle	☐ Applicable ☐ Not Applicable If Applicable, include in Construction Contract Clauses
Human Resource Capacity of contractor/ labour	Poor capacity for environmental management.	Capacity building activities through orientation, training and use of IEC (information, education, communication) for construction contractors, labour, etc. Development and implementation of 'Code of Conduct for Workers' (refer to Part 3 of EMP)	HP FD Oversight by District Technical Specialist and Forest Ranger of the circle	Applicable, include in Construction Contract Clauses
Compliance Monitoring	Weak compliance of the environmental management plan will lead to aggravated impacts and undermine sustainability.	Periodic monitoring and reporting (quarterly) on implementation of the EMP.	HP FD Environment Specialist In accordance with the M&E system of the project.	Applicable.

Note: Ensure that the activity budget provides adequate finances for implementation of the mitigation measures identified in the EMP.

Part 2: EMP for Operation Phase of Civil Works			
Environmental Aspect	***Impact***	***Mitigation Measure***	***Responsibility for Implementation***
Air and Water Pollution	Air and water pollution from NTFP/MAP processing units	All equipment installed will comply with Air quality standards prescribed by CPCB. In case waste water is being discharged from the processing units, it will comply with CPCB General Standards for Discahrge fo Environmental Pollutants.	Environment Specialist in the PMU. Division Level Nodal Officer
Health & Safety	Equipment, machinery, vehicles, etc., that do not comply with relevant safety and environmental standards may pose risk to human and environmental health and safety.	All procured equipment and machinery will comply with relevant BIS standards. All vehicles (carriers, reefer vans, etc.) will comply with the relevant Bharat Stage (BS) emission norms.	Environment Specialist in the PMU. Division Level nodal officer
	Risk of accidents (use of agri-machinery in the processing unit, etc.). .	Safety instructions will be provided to users of agri-machinery in the local language. Adequate PPE will be provided to users of agri-machinery and workers in processing units. The use of PPE will be mandatory. A fully-provisioned first-aid box will be available at the processing unit. Adequate number of functional fire extinguishers will be available at the processing units and warehouses. An accident register will be maintained at the processing unit.	
	Risk of use of hazardous chemicals.	Un-authorized chemical ripening agents (e.g., calcium carbide) will not be used.	
Pest Management	Risk to human and environmental health from use of hazardous pesticides, and from improper use of pesticides.	Pest management in godowns, warehouses, etc., will be as per the Pest Management Plan (Refer to 'Annexure 6: Pest Management Plan').	Environment Specialist in the PMU. Division Level nodal officer

Waste Management	Pollution and health impacts due to improper disposal of organic wastes such as open dumping, burning, etc.	All organic/biodegradable wastes (from sorting-grading units, from processing units, from godowns, etc.) will be segregated and disposed through reuse as animal feed, composting, etc., as appropriate. Any residual waste material will be disposed in a manner and at locations specified by the local government body. All work sites will have adequate sanitation facilities.	Environment Specialist in the PMU. Division Level nodal officer
Energy Consumption	Equipment and machinery that is not efficient will lead to energy wastage and higher operating costs.	All procured equipment and machinery (e.g., pump sets, refrigeration units) will be BEE 4 or 5 star rated. Use of solar energy based equipment/machinery will be considered.	Environment Specialist in the PMU. Division Level nodal officer
Water Consumption	Processes that are not water efficient will lead to over-consumption and impact other water users.	Processing and storage centers will optimize water use. Waste water will be recycled or used for recharge after appropriate treatment (filtration, sedimentation).	Environment Specialist in the PMU. Division Level nodal officer
Human Resource Capacity	Poor capacity for environmental management.	Capacity building activities through orientation, training and use of IEC (information, education, communication) for NTFP groups, , etc.	Environment Specialist in the PMU. Division Level nodal officer
Compliance Monitoring	Weak compliance of the environmental management plan will lead to aggravated impacts and undermine sustainability.	Periodic monitoring and reporting (quarterly) on implementation of the EMP.	Environment Specialist in the PMU. Division Level nodal officer

Note: Ensure that the activity budget provides adequate finances for implementation of the mitigation measures identified in the EMP.

Part 3: Code of Conduct for Workers/Staff involved in Civil Works

All workers and staff will comply with the following:

Workers/staff shall not indulge in the following activities:

- Kindling of fire in the forest.
- Unauthorized storage of inflammable substances in labour camp or work site.
- Harm or disturbance to any wild animal or plant.
- Harm or disturbance to any culturally significant site.
- Unauthorized digging, removal of stones, removal of timber, etc., in the forest.
- Unauthorized use of pesticides or other chemcials in labour camp or work site.
- Unauthorized disposal of solid or liquid wastes in or near forests, water bodies, streams, etc.

Illicit or criminal activities including sexual harassment of women or children.

Workers/staff shall implement the following activities:

- Use of all prescribed personal protective equipment while working.
- Compliance with the measures specified in the Environmental Management Plan.

Annexure 10: Occupational Health and Safety Guidelines for Forestry Operations

Risk	*Target Group*	*Guidelines*
Pesticide Application	Nursery Managers Forest Guards	If pesticide application is warranted, forest nursery managers should follow PMP in Annex 6, and take the following precautions to reduce the likelihood of environmental impacts. Apply pesticides based on criteria such as field observations of the target pest, weather data, time of treatment, and dosage, and maintain a pesticide logbook to record such information. Avoid the use of pesticides that fall under the World Health Organization Recommended Classification of Pesticides by Hazard Classes 1a and 1b and 2.
Forest staff Quarters/ Accommodation and Welfare	Forest Guards Forest Rangers Nursery Managers	Forest workers may live in camps in remote areas, which should meet certain minimum standards of sanitation, comfort and services, and an adequate supply of safe drinking water. Biological hazards include allergic reactions to plants, pollen, wood products and insect bites, as well as snakebite and diseases that can be contracted from, for example, mosquitos and ticks. The risks posed by many biological hazards can be reduced through adequate training, effective management (e.g. by reducing mosquito breeding grounds near accommodation and the use of mosquito nets and first aid kits)
Machinery and vehicles	Nursery Van Drivers Forest guards/ rangers (fire management. NTFP groups	Machinery and Vehicles Accidents may occur about the use of machines and vehicles, including tractors and harvesting machinery, and during the transport of workers along poorly maintained roads. Occupational safety and health impacts and controls relating to equipment and vehicle operation and repair are discussed in the WBG General EHS Guidelines. All vehicles used should follow provisions in Central Motor Vehicles Act. All drivers should be suitably trained
Isolated workers	Forest Guards Forest Rangers NTFP collectors/ SHG groups	The collection of the herbs from the alpine pastures and distant forests is a specialized task undertaken by physically stronger and young members. It is a tough journey home with the heavy load of the collected herbs. Collection of forest products in remote locations may expose individuals to range of biological hazards as well as to extreme weather and accidents in hilly and remote terrain. Forestry operations may necessitate that workers are isolated and out of communication with a other workers, or other persons capable of providing aid and assistance. The worker is therefore at increased risk should an accident or injury occur. Recommendations to manage situations where workers are isolated are discussed in the WBG General EHS Guidelines which are referred to as part of the project framework and will be followed.
Exposure to extreme temperatures	Forest Guards Forest Rangers Range officers DFOs JFMCs NTFP collectors/ SHG groups	Workers may be subject to extreme heat and cold. Extreme temperatures reduce work capacity and may lead to stress. The risk can be reduced by, for example, the provision of sun shelters, the regular intake of water and the judicious use of rest periods, and by undertaking the heaviest work in the coolest work hours.

		Regular food intake, adequate clothing and sufficient facilities for drying clothes can reduce the risk to human health posed by cold weather
Terrain and Site factors	Forest Guards Forest Rangers Range officers DFOs JFMCs NTFP collectors/ SHG groups Community Labour engaged in plantation activity	Terrain and site factors, such as slope and soil type, influence work safety. Forestry activities often occur on steep slopes, with a consequent high risk of machinery accidents and rock falls. Finely textured soils (e.g. clays) are slippery when wet, increasing the risk of accidents involving heavy machinery. Workers should be provided with adequate PPE, training on safety and accident management.
Forest Fire Management	Forest Guards Forest Rangers Range officers DFOs JFMCs	Risks include exposure to excessive heat from the fire, the inhalation of toxic fumes (e.g. carbon monoxide), eye irritation from particulates, and burning. Factors that can increase the risks posed by fire include poor visibility, difficult terrain, difficult logistics, night work, changes in wind direction, stress and fatigue. All controlled burning operations should be planned, burning operations should not be undertaken when people and property are within the burn area without adequate protection. An effective organizational structure, equipment, vehicles, PPE for fire suppression can help avoid fatalities and the loss of property.
NTFP and MAP Harvesting operations	NTFP/ MAP collectors Community Labour	For community workers, potential for allergic reactions to plants, pollen and insect bites could be an occupational hazard. A wide range of personal protective equipment is available to help minimize the risk of injury to these workers. Boots and shoes should also be designed to reduce the risk of slipping and falling.
Community Health and Safety	Communities residing within and in the vicinity of forest areas.	Fire response and management plans should be prepared with the participation of local authorities and potentially affected communities Forest officials need to ensure that all pesticide containers used should be cleaned and disposes of through crushing, disposal at sites identified by the local authority, or return to suppliers- pesticide packaging and containers to ensure that they are not subsequently used as containers for food or drinking water.

Annexure 11: Pest Management Plan for Forest Nurseries

Table 34 Typical Pests found in HP forests and Bio Control Methods

Pest	***Control Methods***
White grub	Metarhyzium anisopliae - (Bio Pesticide)
Cutworms	Metarhyzium anisopliae (Bio Pesticide)
Termites	Metarhyzium anisopliae, Beauveria bassiana (Bio Pesticide)
Crickets and Grasshoppers	Beauveria bassiana, Trichogramma chilonis (Bio Pesticide) Application of Malathion (0.25%) water emulsion spray is also effective in controlling the pests.
Defoliators	Trichogramma chilonis (Bio Pesticide)

Table 35 Typical Diseases and their Control

Diseases	***Control Methods***	***Application***
Damping-off (pre- and post-emergence)	Improve soil drainage by leveling soil, by installing subsurface drainage tiles, and by adjusting the frequency of irrigation. Irrigation must also be carefully controlled in container nurseries. Minimize exposure of seeds to soil pathogens by delaying sowing until the soil temperature has risen to near optimum for rapid seed germination.	*Trichoderma Viride or Trichoderma harzianum* (bio fungicide -It is used for seed and soil treatment for suppression of various diseases caused by fungal pathogens) Systemic infection can be controlled by dip treatment of seeds in 0.1% water solution of Emisan (bio-pesticide) for 15 minutes and keeping the seeds for 24 hours before sowing. Pre-emergence damping off can be controlled by treatment of seeds with slurry of 140 gm of Captan in one liter of water.
Collar rot	Fungi which cause damping-off can also be responsible for root and collar rot.	*Application of Trichoderma Viride* (bio fungicide). The options available for the control of root and collar rot are the same as those described for "Damping-off".
Root rot	Root rot differs from damping-off in that it attacks the root tips of older seedlings.	*Trichoderma Viride* (bio- fungicide) The options available for the control of root and collar rot are the same as those described for "Damping-off". *Fusarium* root rot diseases are controlled by drenching the soil with 0.2 % water suspension of Captan. *Rhizoctonia* root rot is controlled by drenching the soil with 0.2% solution of Brassicol.
Foliage diseases		Foliage pathogens are controlled by spray of 0.2% water solution of Bavistin.

Table __: Pest Control Strategies for Key Forest Species

Species	***Key pests/ diseases and prescribed chemical treatment***	***Bio Control and Chemical Agents to be used in HPFD***

Pinus roxburghii (Chir Pine / Chil)	Mostly cut worms and grubs do considerable damage to the growth of nursery seedlings Mostly species of *Pythium, Phytophthora, Fusarium* and *Rhizoctonia* cause damping off in the nursery seedlings before or after emergence from the soil. *Cryptothelia crameri* a defoliator of *Pinus roxburghii*	*Metarhyzium anisopliae (Bio Pesticide) & Trichoderma Viride* (biofungicide) Nursery fumigation with 5 per cent Formalin/Methyl bromide, 15 to 20 days prior to sowing and soil drenching with Carbendazin (0.1%) should be done when initial disease symptoms appears.
Cedrus deodara (Deodar / Himalayan cedar)	Damping off due to poor drainage in nursery often results in huge mortality of deodar seedlings.	*Metarhyzium anisopliae (Bio Pesticide) & Trichoderma Viride* (biofungicide) For damping off drenching with Indofil[15] M-45 (0.25%) or Bavistin[16] (0.1%) is recommended.
Pinus gerardiana (Neoza / Chilgoza)	Damping off of young seedlings in nursery	*Use of Trichoderma Viride* (bio fungicide) In nursery bed. Application of neem cake and FYM before treatment increases the efficacy of treatment. Damping off of young seedlings in nursery can be avoided by drenching the polybag soil with Bavistin (0.1%).
Quercus leucotrichophora (Ban oak)	Caterpillars of Indian gypsy moth (*Lymantria obfuscata*) defoliate the trees.	*Beauveria bassiana, Trichogramma chilonis (Bio Pesticides)*

Table 36 Good Nursery Management Practices Effective for Control of Pests

Phase/ Frequency	***Practices/ Guidelines***
Seed Selection and Sowing	➢ Nursery sites should be on south and south west in the higher hills (beyond 1500 m) and in the eastern and south eastern aspects in the lower hills. ➢ Local collection of seeds should be verified from selected plus trees. ➢ Provide the best possible growth conditions (e.g. nutrients, water, light, appropriate spacing and weed control) to raise healthy, vigorous and resistant plants ➢ Collect or obtain seed from good quality genetically superior trees; use multiple sources of planting material to increase genetic diversity; use certified seed if possible and store seed in conditions that limit pest attack; test seed prior to planting to ensure good germination and seed health; and apply seed treatments, if needed. ➢ Locate the nursery producing the seedlings away from commercial stands to prevent contamination and the subsequent spread of pests
Infrastructure Requirements	➢ Vermi-compost/ compost pit(Bio-fertilizer)

[15] Indofil (Mancozeb)- Technical grade active ingredients of pesticides unlikely to present acute hazard in normal use.
[16] Bavistin contains 500 g/kg carbendazim in the form of a water dispersible granule. Carbendazim- Technical grade active ingredients of pesticides unlikely to present acute hazard in normal use.

	➢ Root trainer/Poly bags – preferably biodegradable ➢ Water supply, Water tank, Pipes, sprinkles. ➢ Nursery Sheds-Agro Net, Bamboo Net, Poly Sheds. ➢ Hardening Shed- Green House. ➢ Soil Testing equipment ➢ Make available selective bio-pesticides, as per nursery requirements.
Treatments	➢ Surround the nurseries with shrubs, ornamental trees and associated bushes as natural/biological barriers for pests ➢ Treating seeds with water drowning softens seed coat ➢ Infected pine cones should be discarded ➢ Seed storage should be in controlled environment ➢ Seed dressing with 0.2% Carbendazim/Methyl Carbendazim ➢ Planting in poly bags in 3:2:1 ratio of FYM, sand and Soil ➢ Temperature in compost pit should not exceed 50 deg to guard against thermophilic bacteria ➢ Solarization of soil to kill pests/ bacteria before planting pathogens. ➢ Application of mycorrhiza for root rot diseases ➢ Application of neem cake in the soil is also a good bio control method
Nursery management techniques	➢ Keep appropriate records that permit identification of sources of production material, and where it is grown and planted out, so that any source of any infestation/infection may be traced. ➢ Sowing of seeds in sterilized/fumigated and clean beds ➢ Using sterilized budding knife, secateurs, and scissors during budding and grafting ➢ Transplanting seedling after root dip for 3-5 min in 0.02% Carbendazim solution ➢ Ensure irrigation water is free of pathogens and other contaminants such as pesticides, particularly if the water source is a pond where water accumulates from infected or treated fields or is suspected to be contaminated. ➢ Avoid leaving leaves wet, especially when watering at night, as this can allow pathogens to infect plants. ➢ Install screens or nets in plant production facilities to prevent insect entry or spread.
Control of Pests and Diseases	➢ Frequent examination of seedling health and removal of diseased stock

	➢ Foliar spray of 0.2% Carbendazim/ M-45 at regular interval ➢ Nursery managers should notify the Forest Department or other appropriate officials if an unknown, important or regulated pest is found ➢ In affected areas, entry of animals and birds, which may spread pests, should be prevented ➢ Clean (thoroughly remove all soil and plant materials from all surfaces, disinfect all tools, footwear and equipment before entering and before leaving the nursery area, especially if a pest is present. ➢ Dispose of infested soil or growing media carefully so as not to contaminate new plants or soil ➢ Collect and remove dead plants and debris every week to decrease the probability of infestation ➢ Destroy or sanitize infested plant waste by composting or treating with heat to kill the pest. If composting, make sure that a high enough temperature is reached to kill the pest. ➢ Use deep burial (2 m) to dispose of plant waste that cannot be destroyed or sanitized.
Reduce mortality	➢ To reduce the mortality one of the nursery methods adopted is to harden the seedlings before lifting them. Hardening consists gradual reduction of watering (say, to once in 4 days) for the last two months of the seedlings life in the nursery and shoot and or side branch pruning, keeping one-third of crown intact. ➢ Grading and Culling before transfer to the field so less developed ones can be given extra attention through larger dose of fertilizer to bring them up to the desired specification. ➢ Seedlings that do not come up to the acceptable standard and should be rejected/culled at the nursery stage.

List of Pesticides Banned by the Government of India

http://www.cish.res.in/Technologies/LIST%20OF%20BANNED%20PESTICIDES.pdf

WHO Classification of Pesticides by Hazard: https://www.who.int/ipcs/publications/pesticides_hazard_2009.pdf