Institutional Mechanism for the Implementation of The Environment Master Plan

Government of Himachal Pradesh

Department of Environment, Science & Technology

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Institutional Framework for Environment Management Under Environment Master Plan of Himachal Pradesh

1.0 Project Background of Environment Master Plan for Himachal Pradesh

In 2008, Government of Himachal Pradesh (GoHP) initiated the preparation of an Environment Master Plan (EMP) for the State. The goal of the plan is to provide direction and a framework in the area of environment management with the purpose of protecting and improving the environment within the State. It has been envisaged to link the EMP to the planning process of the State and other environmental standards and protocols already legislated within the State.

The preparation of such a plan involves integration of environmental safeguards at State level, sector level and project level. This involves collection of data and setting baseline, conducting spatial vulnerability assessment, developing public consultation and communication strategy for the Department of Environment, Science and Technology, developing sectoral guidelines, developing an institutional mechanism for implementation of the EMP, establishing need for training & capacity enhancement and developing monitoring & evaluation protocols supported by & Integrated Query based System. Development of environment and social guidelines is an important component of the EMP. The major sectors and activities covered under EMP can be broadly categorized under Infrastructure Development, Natural Resource Management (NRM), and Services as presented in Table 1.

Table 1: Sectors Covered under EMP for Himachal Pradesh

Infrastructure	Natural Resource Management (NRM)	Services
1. Roads, Highways, Rural Roads and Transport	10. Agriculture	15. Education & Vocational Training
2. Hydropower (generation transmission & distribution)	11. Horticulture	16. IT & Telecom
3. Tourism, Ecotourism + Art, Architecture and Cultural Heritage	12. Animal Husbandry & Livestock	17. Livelihoods
4. Industry	13. Forests, Wildlife & Wetlands	18. Waste Disposal
5. Mining and Geology	14. Fisheries	
6. Irrigation & Public Health		
7. Health		
8. Market Infrastructure (including horticulture & agriculture)		
9. Rural & Urban Planning		

2.0 Objectives of the EMP

The objectives of the EMP are:

1) To address the issues of ecological and environmental restoration and bring convergence with the developmental activities in the State.

2) To engage and ensure close coordination on environmental management issues with all the concerned departments, both at the State and National level.

3) To decide future financing of investments for development in a sustainable manner, and

4) To develop suitable institutional arrangements in order to implement the GoHP's policies and strategies.

The outputs of EMP are meant to provide along term perspective of the State on its environment and will imbibe achievement of environmentally sustainable development. The EMP is envisaged to be a guiding tool, which shall provide strategic direction and a unique means for engagement between implementing agencies, development departments and the local government to take action on priority environmental issues of both local and regional concern; developed in partnership with its stakeholders by integrating their feedback; and a tool to monitor environmental performance and progress. The EMP will also provide an operational mechanism for issue identification, preparation and implementation of management plans, accountability mechanisms, monitoring, and enforcement procedures, and assigning roles to various departments and their coordination by the state.

3.0 Objectives and Methodology for Development of an Institutional Mechanism for Implementation of the EMP

3.1 Objectives

The implementation of the Environment Master Plan to manage local environment requires undertaking certain tasks. However, implementation of such tasks requires aligned and coordinated efforts under government approved policies, acts, rules and standards. However, this can only be achieved by developing an operational institutional mechanism with the objective to undertake following major tasks:

a) Develop an operational mechanism for overall coordination.
b) Define roles and responsibilities of departments related to the sectors in the context of environment management.
c) Develop a mechanism for each department to enable issue identification, preparation and implementation of management plans, accountability mechanisms, monitoring, and enforcement procedures.
d) Develop mechanism to ensure that each sector has in-built monetary mechanisms to address environmental issues in their development plans.
e) Establish mechanism to integrate regional and local level plans at the area level to enable a decentralized planning process.

3.2 Methodology: Consultative and Participatory

To design the Institutional Mechanism for the EMP, a consultative approach was used. During consultation, major discussions were focused on the following:

- **Situational Analysis:** Existing institutional policies, structure, resources and their competency levels, issues in existing guidelines and regulatory approach to environmental issues and concerns;
- **Perception:** The current perception on the relevance of an EMP, issues and tasks to be addressed by the EMP; level of cognizance accorded to environmental concerns while planning or while developing programs, schemes and projects; &
- Operational issues and needs (redefining responsibilities, structural improvements, competency building, conflict resolution, grievance redressal etc.) of various entities for supporting implementation of EMP;

Data were collected from both secondary and primary sources. Secondary data sources included review of the available literature, including the annual reports of the departments, previous studies and reports made available to IRGSSA and information available on the state government website.

The World Bank Report titled Institutional Assessment – Environmental Sector, prepared by the Environmental Team, SASDI, of the World Bank, New Delhi was considered as a valuable source of information and analysis, which has been integrated in developing an Action Plan, as elaborated in this report later.

Primary data was collected mainly by using the interview method wherein Nodal Officers, Secretaries, Directors and Additional Directors of various line departments and the DEST were interviewed. The data collected was checked for consistency. This process helped arrive at an analysis of the current perception of environmental concerns, the functional gaps with respect to policy, organizational resources and activities and overlaps between departments. It also provided critical insight on the form and processes involved in developing an institutional mechanism for the EMP.

3.3 Expected Outcomes of the Institutional Mechanism

The outcomes expected from an effective institutional mechanism can be summarized under;

- Increased environmental awareness (including that of Environment Master Plan) among the various government departments, stakeholders and even the public Himachal Pradesh State Environment Master Plan
- Streamlined state wide and area wise environmental actions in line with existing policy framework and sectoral guidelines
- Integration of environmental perspectives (and concerns) into various development programs/projects from conceptualization to planning, implementation, monitoring & evaluation.
- Evolving a funding mechanism for sustainability of such actions

4.0 Issues to be addressed in Developing Institutional Mechanism

Based on the analysis of data/information collected, following issues need to be addressed while developing an institutional mechanism:

a) Well defined Roles and Responsibilities of various stakeholders: There are some overlaps in responsibilities of some departments/stakeholders. This may result in

increased stress on environment besides gaining economies of scale. For example, development of roads and improved accessibility are crucial priorities for both the PWD and the Tourism department. However, Department of Forest has to be an important stakeholder (if forest land is required). Their perceptions on environment could differ in several instances. Department of Industries permit individual industries to come out with their EIA and the same are evaluated and approved. However, some stakeholder are of the view that EIA should be conducted by state.

b) Improving the existing gaps in convergence of planning, implementation and monitoring

c) Sustainable funding mechanism

d) Evolve way and means for proactive and regular communication between senior functionaries of various departments to address environmental issues and improve environmental management in the state

e) Develop a coordination mechanism to reduce conflict of interests between stakeholders of the EMP. For example, conflicts of development of Hydro-power sector, Forest and Agriculture sectors.

f) Improved functioning of existing regulations, particularly the monitoring functions

g) Developing sense of concern for other departments (Departments should be more consultative and mindful of the roles and expectations of other departments) on EM issues.

h) Need for a coordinating mechanism at different levels of the administrative structure.

i) Strong ownership of EMP is imperative within and across departments.

j) Fostering ownership of EMP by all stakeholders by increased empowerment of various departments/stakeholders. Increased operational autonomy could be institutionalized for making the EMP a dynamic, self-propelling management tool.

k) Development of improved management monitoring for obtaining an over arching view of all EMP related initiatives for data collection, analysis, feedback, enforcement etc.

l) Monitoring and evaluation tools, techniques and systems need to be strengthened to keep the focus on integrating the EMP into ongoing development activities.

5.0 Stakeholder Analysis: Identification of Stakeholders and Understanding their Present Mandate and Capacities for involving them in Implementation of EMP

To develop an institutional mechanism, it is very essential to identify and understand the mandate of various key agencies/stakeholders associated with the project. To better understand the multiple agencies/stakeholders concerned with this project, an attempt has been made to identify and describe the agencies at the Central Level, State Level and the Local Level. These stakeholders function at sector level as well as in a particular geographical unit based on central and state level regulations described for each sector in the sector guidelines. However, the major stake-holding organizations for the project activities in relation to Himachal Pradesh are:

5.1 Central Level Agencies

5.1.1 Ministry of Environment and Forests (MoEF), Government of India

The Minsitry of Environment & Forest is the nodal agency for the planning, promotion, coordination and oversecing the implementation of Indias environmental & forest polices and programmes. The ministry also serves as nodal agency in the country for the UNEP, SACEP, ICIMOD, UNCED along with issues relating to multilateral bodys such as commission on Sustainable Development, Global Environment facility and of regional bodys like ESCAP and SAARC on matters relating to environment. These objective are supported be a set of legistative and regulatry measures, aimed at preservation, conservation & protection of the environment. The principal objective by MoEF, are conservation survey of flora and fauna, prevention & control of pollution, afforestation & regeneration of degraded areas protection of environment & ensuring welfare of animals. Therefore, it plays a major role in project implementation through regulation and control of the activities. Accordingly, major / Critical projects require alignment with national policies and the Environment / Forests clearance by the MoEF. Through its various divisions, the Ministry achieves the above objectives by controlling pollution, supporting research and development in related areas, collection and dissemination of environmental data/information etc. besides supporting creation of environmental awareness among target groups, stakeholders and general public.

5.1.2 Central Pollution Control Board

The Central Pollution Control Board is a statutory orgainsation constituted under the water (Prevention & Contorl of Pollution) Act, 1974 to serve as field formation & also provide technical
services to the MOEF on the provisions of the Environment (Protection) Act, 1986. It lays down, modify or annul national standards on permissible pollution levels so as to monitor abatement of pollution. These standards are normally adopted and enforced by the respective State Pollution Control Board (HPPCB in this case). To support maintenance of guiding standards, there is a provision to set them for pollution discharge / disposal from related sectors (e.g. for water quality in rivers/lakes, standards are also needed for effluent disposal from industries and other sectors).

Further, the Central Pollution Control Board plays important role in providing technical assistance and guidance to State level Pollution Control Board to carry out and sponsor

investigations and research relating to problems of water & air pollution and for their prevention, control or abatement, collecting, compiling and publishing technical and statistical data etc.

5.1.3 National River Conservation Directorate (NRCD) and National Lake Conservation Plan (NLCP) / National River Conservation Plan (NRCP)

The National River Conservation Directorate (NRCD) is a wing of the Ministry of Environment and Forests. It provides funds for and oversees implementation of National Lake Conservation Plan (NLCP) and National River Conservation Plan (NRCP) India. However, most of the NRCD activity is focused on river conservation, whereas very little of the NRCD activity is on lakes. The directorate has limited staff resources and thus has limitations in monitoring the performance of number of projects. However, it is in the process of establishing Project Management Units for each river-wise plans or state-wise river/lake conservation plans. These project management units are expected to monitor and evaluate the implementation under NRCD so as to make the investments more effective.

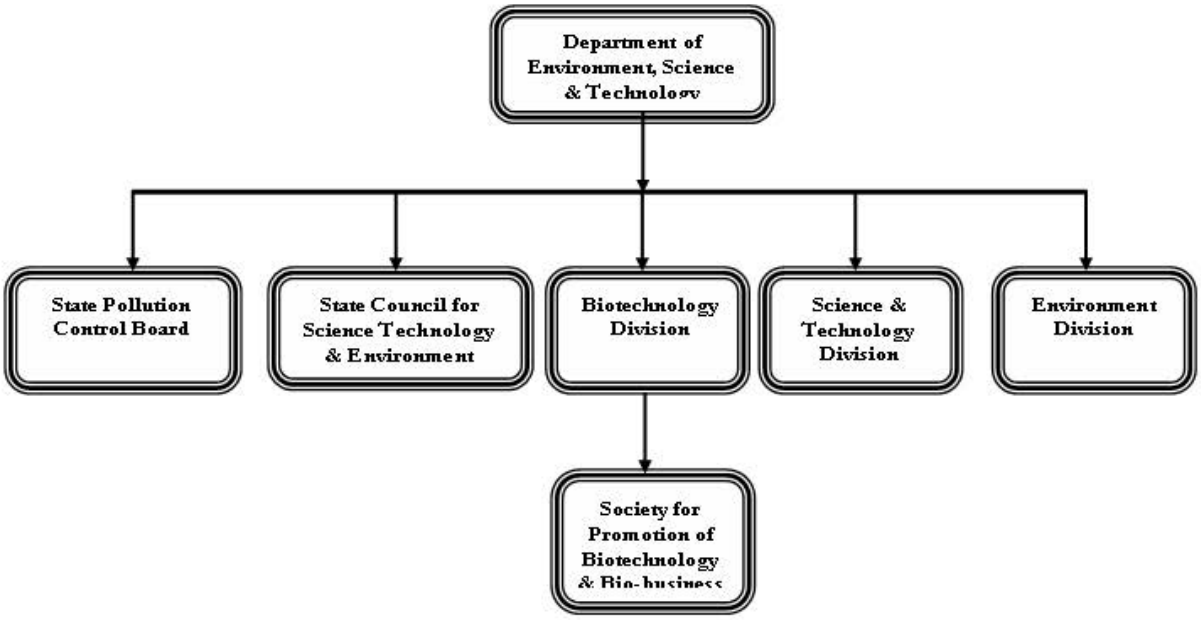
5.2 State Level Organizations

5.2.1 Department of Environment, Science and Technology (DEST)

The DEST comprises three Divisions – Environment, Biotechnology and Science & Technology – and two autonomous institutions – State Pollution Control Board and the Council for Science, Technology & Environment. Under the Environment Division and the Biotechnology Division, two societies have been created to facilitate specific activities. Figure 1 provides the organogram of the Department.

The present structure of the DEST (depicted in Fig 1 above) was established in 2006/2007 and is headed by a Director. Prior to that, the Department of Environment existed in other forms, which was later merged with the State Pollution Control Board.The DEST had an annual budget of about Rs. 10 million in 2007-08, all of which is non-plan expenditure.

The role of each of the three Divisions and the two autonomous bodies are covered in the subsequent sections. As the work of the two Societies (SPBB and SEPSD) are presently limited and are fully integrated with that of the Division, these have not been described separately.



DEST - Environment Division

The mandate of the Environment Division includes the following: (i)Implementing the Environment (Protection) Act, 1986 (ii) Implementing the EIA Notification, (iii) Climate Change, (iv) Information & Education Communications, (v) Natural Resource Management and (vi) Disaster Management as pertaining to environmental issues. Headed by a Senior Environmental Officer, the Division has altogether 5 staff members.

For the purposes of promoting and facilitating other environmental activities, a Special Purpose Vehicle "Society for Environmental Protection and Sustainable Development" has been created under the Division in order to ensure that the funds received from central/donor agencies are directly & efficiently utilized and not routed through the state treasury.

Major works of the division having institutional relevance are formulation of policy, support to planning, organizational capabilities, implementation and in regulation and monitoring to a limited extent.

DEST - Biotechnology Division

The Department of Biotechnology, created in the year 2000, was merged as a Division of DEST in April 2007.Its activities include overseeing the implementation of the State Biotechnology Policy, promoting agricultural biotechnology in the context of medicinal and aromatic plants for rural poverty alleviation and facilitating establishment of biotechnology/nanotechnology parks in the State. The Division receives its funding from both the State Government as well as from Government of India. The Division has a sanctioned strength of 16 persons including 4 Principal Himachal Pradesh State Environment Master Plan Scientific Officers and support staff. Of these, two Principal Scientific Officers are in place. As a part of their ongoing agricultural biotechnology project, the Division has 26 project positions, which are in place. For the purposes of the biotechnology park, a special purpose vehicle "Society for Promotion of Bio-technology

and Bio-Business" has been created to ensure directly utilization (not through accounting channels of the State) of the received funds.

On environmental aspects, it provides policy support to the Government on issues such as Implementation of policy on manufacture, use, import, export and storage of hazardous microorganisms, genetically engineered organisms or cells, supports provision of environmental data/ information through the ENVIS centre and assists in implementing promotion of bioengineering practices in the state including introduction of Bt seeds, if any, in the state and periodic monitoring and verification of the same.

DEST – Science & Technology Division

The Science & Technology Division, formed under the restructured DEST, addresses the interests of the State Government on Science & Technology issues. At present, the Division is headed by a Senior Scientific Officer, who has been deputed to work with the Science & Technology Council. From the institutional considerations, it assists in formulating Science & Technology policy of the state and study the implications of the policy on environment, when implemented.

Himachal Pradesh State Pollution Control Board (HPSPCB)

The major functions in consultation with CPCB of the Himachal Pradesh State Pollution Control Board is to formulate pollution standards (in line with CPCB standards) for water, air, noise etc. and to advise the state government on any matter concerning the prevention, control or abatement of pollution. It is thus responsible for setting standards for water quality, effluent standards, river/ nallah water quality standards as well as of nallah water falling into the rivers besides monitoring and controlling the untreated effluents coming out of the industries (not allowing them to discharge into the rivers or disposed on land, without treatment as per the prescribed standards). It also lays standards for air, noise and other pollution attributes.

HPSPCB is the recognized statutory regulatory agency of the state for the implementation of various environmental laws the State. In its organization structure, State Board has following divisions: (i) Regulatory Division, (ii) Scientific Division, (iii) Consultancy Division (dealing with municipal waste, slaughterhouse waste), (iv) Establishment & Administration, (v) Environmental Planning Division (focus on zoning atlas) (vi) Legal Division and (vii) Division, Finance & Accounts Division.

Himachal Pradesh State Council for Science, Technology and Environment (HPCSTE)

The primary objective of the Council is to deal with science & technology issues relevant to the state. However, the Council is also involved in conducting activities related to environmental matters. The council receives its funding from the Govt. of Himachal Pradesh as well as from Ministry of Science & Technology and Ministry of Environment & Forests, Ministry of Non-conventional Energy Sources, Government of India. The Council has a staff of more than 40 personnel headed by a chairman. The Council has an annual budget (state funding) of about Rs. 10 million.The present environment related activities include Publication of State of Environment Report, Providing environmental

data/ information through the ENVIS centre, Supporting National Green Corps/Eco-clubs programs and Technical studies such as (i) impact of climate change on small villages and (ii) vehicular air pollution besides supporting the implementation of policies on use of coloured recycled polythene carry bags under the HP Non-Biodegradable Garbage Control Act, 1995 and Roof top rain water harvesting in buildings. The major objectives of the HPCSTE are:

- To advise State Government on Science, Technology & Environment related issues & interventions.
- To develop, demonstrate & transfer appropriate technologies for the State.
- To pool & exchange scientific knowledge with National & International scientific Institutions/organisations.
- To promote, popularise and disseminate Scientific & Technological Innovations.
- To create and strengthen science & technology facilities in the state.
- To promote research & development studies relevant to state needs.
- To establish linkages with Universities & R & D Institutions.
- To provide consultancy services in successfully demonstrated/developed technologies.

5.2.2 Directorate of Energy, Power Generating Companies etc.

Himachal Pradesh has a huge Hydropower generation potential therefore the major sources of power in the State in hydroelectric power. A number of power generating companies and distribution agencies are involved with hydropower in the state. Government being the custodian of water regulates these agencies. The generation of hydel-power involves development of dams/ reservoirs to impound water and thus issues like submergence of land as well as resettlement and rehabilitation of inhabitants arise. This has serious repercussions on the environment, mainly on biodiversity due to impact on flora and fauna of the area. Further, a considerable forest land also falls under submergence, requiring environmental improvements.

5.2.3 Department of Forests

The major activities undertaken by Department of Forests, consists of conservation of forests and enforcement of Forest Policy 1952 of Government of India. It also supports wildlife conservation and undertakes afforestation to increase green cover in the state and to protect the environment. Accordingly, a number of projects require alignment with forest policies. For major projects, where green cover is under threat, it also plans and undertakes compensatory afforestation. Therefore, the department of Forests is a major stakeholder in project conceptualization, planning and implementation through its mandatory powers to regulate and control of such activities, which affects forests and wildlife. A number of projects (highways, hydro-power etc.) require use of forest land and/or felling of trees and those must be cleared by Department of Forests.

5.2.4 Department of Industries

For the implementation of Environment Master Plan, the concerned stakeholder is Department of Industries and Division of Mining and Geology under it. The main functions of the Department is to develop industrial policies, develop industrial areas, issue permits for the establishment of industries on the basis of building design, water requirements, and means of effluent disposal etc. with the help of the Inspector of

Factories. The department also supervises development of industrial areas and provides industrial infrastructure within industrial estates along with development of any new industrial areas (info, bio-technology, apparel parks) etc.

As on March 31, 2010, there were 36,845 Micro, Small, Medium & Large industries registered with the state, of which 444 were in medium and large scale. These industries have made a total investment of Rs. 10,408.41 Crores and provided employment to about 2.42 lakhs persons.

From the perspective of environment, the State has endorsed the list of "negative industries" of Ministry of Industry and Commerce, Government of India and thus does not support industries of: Tobacco and Tobacco products including cigarettes and pan masala, Thermal Power Plant (coal/oil based), Coal Washeries/Dry Coal Processing, Inorganic Chemicals excluding medicinal grade oxygen (2804.11),medicinal grade hydrogen peroxide (2847.11), compressed air(2851.30), Organic Chemicals excluding Pro-vitamins/vitamins, Hormones, (29.36), Glycosides (29.39), Sugars (29.40) (reproduction by synthesis not allowed as also down-stream industries), Tanning and dyeing extracts, tannins and their derivatives, dyes, colours, paints and varnishes, putty, fillers and other mastics, inks; Marble and mineral substances not classified elsewhere; Flour Mill/Rice Mill (including Roller flour mills); Foundries using coal; Minerals fuels, mineral oils and products of their distillation; Bituminous substances, mineral waxes; Synthetic rubber products; Cement Clinker and Asbestos raw including fibre; Explosive (including industrial explosives, detonators & fuses; fireworks, matches, propellant powders etc.; Mineral or chemical fertilizers; Insecticides, fungicides, herbicides & pesticides (basic manufacture and formulation); Fibre glass & articles thereof; Manufacture of pulp-wood, pulp, mechanical or chemical (including dissolving pulp); Branded aerated water / soft drinks (non-fruit based); Paper, Writing or printing paper, Paper or paperboard, Map litho-paper, Newsprint, in rolls or sheets, Craft paper, Sanitary towels, Cigarette paper, Grease-proof paper, toilet or facial tissue, Paper & paper board, laminated internally with bitumen, tar or asphalt, Carbon or similar copying paper, products consisting of sheets of paper or paperboard, impregnated, coated or covered with plastics, Paper and paperboard, coated impregnated or covered with wax etc.; Plastics and articles thereof; Production of firewood and charcoal; Mini Steel plants induction / Arc / Submerged furnaces, and/ or rolling mills.

The state has mineral resources of limestone (light grade), quartzite, brass, sand, gold, pyrites, copper, rock salt, slates, natural oil, gas & mica, barytes and gypsum. To support environment, the "Mining and Geology" division under Department of Industries has developed specific policies for river beds, stone crushers and minor minerals.

Overall, the Department of Industries (including mining and geology) is a major stakeholder in implementation and internal regulation of the environmental plan.

5.2.5 Department of Irrigation and Public Health

The major objectives of the department is planning, designing, development and operation and maintenance of water related infrastructure such as

- Drinking Water Supply Schemes.
- Sewerage Systems
- Irrigation systems through source development, lifting water, boring of tube wells & providing distribution systems.

- Flood protection works to protect life and property in the State.

From environmental considerations, the water quality measurement and maintenance is the responsibility of the department. The current problem of untreated sewerage flowing into the nallahs/ rivers needs to be focused upon by the Department.

5.2.6 Directorate of Urban Development

The Directorate of Urban Development was established during the year 1985-86 to direct, control and monitors the activities of the Urban Local Bodies in the State. The Directorate has been assigned the responsibility to look after the legislative, Administrative and Development activities of 49 Municipalities (Local Urban Bodies) i.e. 1 Municipal Corporation, 20 Municipal Councils and 28 Nagar Panchayats, covering about 9.2% of the total population of the state. Consequent upon the 74th amendment of the constitution and the enactment of 3 new Municipal Acts viz. H.P. Municipal Corporation Act, 1994, Municipal Act, 1994 and H.P Municipal Services Act 1994, numerous Constitutional, Statutory and obligatory functions are entrusted to the Directorate. These new Acts have bestoned upon the Municipalities to function in conformity with 12th schedule of the constitution which includes;

1. Urban Planning including Town Planning
2. Regulation of land-use and constructions of buildings
3. Planning for economic and social development.

The Directorate has been completely recognised and formed as the Apex Administrative Unit to regulate, control, advise, guide, administer, coordinate and monitor the entire functioning of the Urban Local Bodies.

Department of Town and Country Planning (DTCP)

The Department is responsible for developing prospective land use plans (Master Plan) of urban areas besides formulating state-wide policies on urban development and on development controls (like FAR etc.). The formulation of such plans takes into consideration the social, commercial, economic and ecological factors as well as the assessed growth potential due to other factors including agriculture, climate, availability of raw materials, existence of mines, etc.

The major objectives of the Town & Country Planning are to:

1. Encourage planned and systematic Urban & Rural growth in a comprehensive manner.
2. Stop haphazard construction.
3. Make optimum use of precious urbanland.
4. Create conductive conditions for encouraging planned construction.
5. Plan for creating essential Urban Infrastructure.

5.2.7 Department of Tourism & Civil Aviation

The Tourism Department of Himachal Pradesh promotes tourism within the state focusing on religious tourism, eco-tourism, paragliding etc. However, it is also engaged in developing areas close to the riverbanks and establishing its Hotels, Restaurants etc. on

the river shores and surroundings. It also works with Department of Public works for development of roads. Therefore, the department has an indirect but "vested"interest in pollution abatement and environmental improvements including environmental management from various services (water supply, solid waste and sewerage management, traffic management etc.).

5.2.8 Himachal Pradesh Public Works Department

The department is mainly responsible for planning, design, construction and maintenance of roads, bridges, ropeways and government buildings in the State. The primary objective and aim of the department is to provide connectivity by way of all weather roads to all the habitations (villages) in the state. The important sectors of economy suchas Agriculture, Horticulture, Mining Forestry & Social sectors like Education, Tourism, Health and Family Planning depend upon efficient road network. The Department supports the construction & maintenance of roads with an effective and eco-frendly technologies.

5.2.9 Department of Transport

The basic services provided by the transport department include: issuing and renewal of learner's licenses, issue, renewal, endorsement in driving licenses and registration/transfer of ownership of vehicles, grand of permits to taxis, trucks, collection of taxes etc. This assists in regulating number of vehicles, Road safety, check on illegal plying of vehicles, compulsory challans in the state and thus has a direct impact on air pollution levels.

Besides the description of major departments as above, there are a number of other government departments (like Agriculture, Horticulture etc.), activities of which also affect the environment and their role is very important in environmental management at state level.

5.3 Local Stakeholders

5.3.1 Local industries

These are the ones, which causes environmental impacts (positive as well as negative – mostly negative) and are affected the most by government policies, regulations / acts etc. Their regulation and monitoring is critical to proper environmental management. Non compliance to environmental guidelines by these industries, result in water, air, soil and noise pollution. With limited monitoring abilities due to both limitations in staff / infrastructure availability with the State Pollution Control Board, these industries continue to ignore the laid guidelines and standards.

5.3.2 Urban Local Bodies

As per amendments in the Municipal Act, 1916, in line with the 73rd and 74th Constitutional Amendment Act, all ULBs are mandated to provide their respective residents (within their area of jurisdiction or municipal limits) with 18 basic urban services including water supply, sanitation, street lighting etc. This shall have environmental implications due to production of sewerage, generation of solid wastes, wastewater treatment and disposal etc. There are 56

Urban Local Bodies viz. one Municipal Corporation, 20 Municipal Councils, and 28 Nagar Panchayats and seven Cantonment Boards in Himachal Pradesh.

5.3.3 Panchayati Raj Institutions

In line with the policy of delegation of powers, all State Governments have enacted Panchayati Raj act and rules and thus local level planning and development has been entrusted to Panchayati Raj Institutions (PRIs). These institutes at village level and block level are engaged in local level planning and implementation. Their involvement in EMP is essential from the consideration of convergence of planning (bottom to top approach) as well as from environmental management. Therefore, they are essentially an important stakeholder in the whole process of environmental management. There are 3243 Gram Sabhas/Gram Panchayats, 75 Panchayat Samitis and 12 Zilla Parishads in the State (Annual Administrative Report, GoHP, 2009-10).

There exist numerous committees at various levels throughout the administrative and governance structures which can be revamped, expanded or reconstituted to provide support to the EMP. For example, each Panchayat Samiti and the Zilla Parishad are mandated to have a General Standing Committee, Finance Committee, Audit and Planning Committee and a Social Justice Commit tee. In addition, the Zilla Parishads also have an Education and Health Committee and an Agriculture and Industries Committee. Further committee such as the Local Area Development Committee (LADC) and Bio-diversity Committee have also been instituted and are already functioning. They have highly limited capacities and competencies, which inhibit the implementation of their functions / plans at grass root level.

5.3.4 Other Local Stakeholders

Farmers: With the intensification on the use of fertilizers and agro-chemicals for increased crop yield, there is increased non-point pollution. The excess fertilizers and chemicals find their way in both surface (drainage) and underground water sources, leading to environment impacts and human health.

Public: With the advent of modernization, there is increased solid waste generation per capita. This requires collection, transportation, processing and disposal of the solid wastes so generated, thus requiring interventions of environmental policies and attributes.

NGOs (Non-Government Organizations): They are normally engaged in developing awareness and undertaking environmental improvement works.

CBOs (Community Based Organizations) or RWAs (ResidentWelfare Associations), Group Housing Societies (GHSs) having interest in improved environment in their area.

Land developers, builders – who wish to develop land and carryout construction activities especially under the improved environmental conditions in the area;

Civil contractors: who have interest in the infrastructure development (construction) activities to be undertaken in the area.

Facility operators: They are engaged in CETP/STP (operation and maintenance), solid waste management facility operation etc. However, due to lack of monitoring and cost implications, they resort to deviate from laid out environmental guidelines.

5.4 Support Organizations (No Direct Stakes)

These are the agencies/organizations, whose activities support the EMP activities. Alternatively, it can be stated that the environmental management plans depend (directly or indirectly) on the activities and support of these organizations. It may happen that some support organizations could be even stakeholders. Such organizations have been listed below:

5.4.1 Central Ground Water Board

The CGWB is responsible for estimation and monitoring of GW resources in the country. To carryout its activities, it works in dependently as well as in close liaison with State Ground Water Boards. During last few years, it has established a number of observation wells in the country to support its GW monitoring activities.

5.4.2 State Ground Water Authority

The Authority is responsible for estimation, monitoring and conservation of ground water resources in the state. Overall, the various stakeholders described above play an important role in environmental management of the state and therefore, their involvement and participation is critical to EMP.

6.0 Major Activities for Institutionalization for Implementation of Environment Master Plan

The implementation of Environment Master plan (EMP) requires actions at various levels; policy level, program level, project level and operational level. These specific actions at sector level indicating lead agencies and collaborating agencies are described in **Annexure – 1**.These actions have been agreed and approved by line departments through extensive consultative process. Basically, the functional requirements emerging out of these specific actions at policy, plan, program and operational level can be categorized into the following:

- Policy Formulation/Standards setting (POLICY)
- Advisory Activities (PLAN and program)
- Planning including participatory planning (PLAN and program)
- Coordination (forward and backward linkages) and Management including conflict resolution (Plan, program and Operational levels)
- Environmental Assessment (Policy, Plan and Operational levels)
- Permissions and Licenses (Operational)
- Monitoring and Regulation of compliance and enforcements - (Operational)
- Research and Research Management, Research Coordination (all levels)
- Environmental Data/Information Management, Documentation and Dissemination (all levels)
- Public Awareness and outreach (operational)

- Training and Capacity Building (all the levels)
- Resource (fund) Management (all levels)

7.0 Stakeholder Assessment from Institutional Considerations

The organograms of different line departments have been summarized in **Annexure – 2**. Further their description in baseline volume indicates that there is no environmental unit / cell at organizations level. From the stakeholder analysis i.e. lead and collaborating agencies given in annexure – 1, it is evident that a large number of stakeholders are involved directly or indirectly in environment management of the state of HP. Sector-guidelines also indicate that uncoordinated and uncontrolled activities of some of these is a major cause of concern to environmental management in the state. For example- in a bid to increase agricultural/land productivity, use of fertilizers and chemicals is being encouraged without monitoring detailed safeguards, which is likely to seriously contribute to environmental hazards, as a result of increasing non-point pollution. Therefore an analysis has been undertaken to understand the roles/importance of various major stakeholders in environmental management vis- ·vis their organizational competence to undertake EMP related activities.

Amongst the stakeholders, the activities of the GoHP are managed by a number of departments. However, the specific role of a department in EMP is going to vary depending on their proximity and ability to impact the environment and create environmental management needs as well as depth and breadth (volume) of their sphere of activities. Based on intensity of environmental management considerations, various activities undertaken by the State Government (managed by various government departments) can be grouped as follows:

1. Substantial Environmental Management Needs (high environmental foot-print sectors)

- Hydropower
- Road, Transport
- Industry including Mining
- Forests, Wildlife and Wetlands
- Irrigation and Public Health
- Tourism

2. Medium Environmental Management Needs (medium environmental foot-print sectors)

- Health (including Biomedical Wastes Management)
- Urban Planning (Solid and Liquid Waste Management)
- Agriculture, Horticulture, Animal Husbandry, Livestock and Fisheries (substantial non point sources of pollution)

3. Low Environmental Management Needs (Low environmental foot-print sectors)

- Non-conventional Energy Sources
- Art and Culture
- Education and Vocational Training
- IT and Telecom (high air conditioning etc.)

- Livelihoods

The intensity has a direct bearing on the organizational (structural) requirements. Secondly, the volume of their activities requires different organizational resources as well as focus. For eg. Department of "Art and Culture" has both low intensity and low extent/volume and thus organizational needs from EMP considerations are likely to be very low, whereas sectors like Roads, Power etc. have both high foot prints as well as high extent/coverage (considerable volume of activities) and therefore their significance in environmental management is very high thus requiring high organizational competence as well as stronger structure. A matrix showing these linkages is presented in Table 2.

Table 2: Environmental Foot Print and Activity Volume of Certain Stakeholders in Himachal Pradesh

	High Environmental Foot print	Medium Environmental Foot Print	Low Environmental Foot print
High Coverage/ Extent	Roads, Power, Mining Transport	Agriculture, Horticulture, Health	Market Infrastructure
Medium coverage	Industry, Tourism	Urban Planning	IT, Livelihoods
Low coverage		Livestock	Non-Conventional Energy, Art and Culture, Education and Vocational Education

Therefore, before undertaking development of an institutional mechanism, each major sector/ organization has been analysed based on sector baseline reports from the considerations of organizational capacity, policy and structural considerations.These sectors/organizations have a number of gaps, which are listed in Table 3.

Some options to over-come the same has been suggested. These include establishment of an Environmental Unit (part of organization structure, delegated authority, functions on regular Basis scrutinizes activities/projects of the department from environmental considerations including adherence to sectoral guidelines and advises accordingly), Environment Cell (functions like environmental unit but not part of organizational structure, have 2-3 designated environmental personnel on board – less authority, meets occasionally and scrutinizes activities/projects of the department from environmental considerations including adherence to sectoral guidelines and advises accordingly) and "designating" an Environmental Officer with a department (scrutinizes projects/activities from environmental considerations including adherence to sectoral guidelines and advises accordingly). Further, Table 3 provides a list of identified support organizations i.e. which organizations can support in bridging the gaps.

DEST is a scientific department engaged in multifarious environmental activities. These include formulating, establishing and managing the State Government Policies on a number of environmental issues. The main functions of DEST can be categorized in three: policy making, advisory services and co-ordination. However, to undertake implementation of EMP (or major activities under this), there is a need to realign the organization structure and its activities to these additional functions. To deal with implementation of EMP, Government shall need constant advice, which can be provided

by DEST. Further, the Co-ordination between the Government, its various departments / autonomous bodies/corporations, different technical support organizations and stakeholders on the policy issues could be the major function and needs to be managed well. Other supporting activities of monitoring, enforcement etc. for better environmental management of the state can be well undertaken by respective technical support organizations. Overall, DEST is best placed to have the major role on policy making, advisory services and co-ordination aspects.

Table 3: Organizational Analysis and Suggestions for Improvement in Various Sectors/Organizations

Sr. No.	Area	Organizational gaps	Possible Options	Responsible Organization	Support Organization
1.	Hydropower	Skilled technical competencies to manage environmental issues in hydropower projects	Designated staff in Environmental unit be trained on EMP	Hydropower	DEST
		Staff Strength to implement Catchment Area Treatment (CAT) Plans		Forest Department	
		Low awareness/ perceptions on need for environmental management	Awareness and Communication	DEST	
		Coordination between Department and DEST	Establish an environment unit in Department of Hydropower	Hydropower	DEST
2.	Tourism	Competencies of staff on environmental management	Training/capacity building of its designated staff of environment unit	Tourism	HPCOST/DEST
		Coordination between Department and DEST		Tourism	DEST
		Low awareness/ perceptions on need for environmental management	Establishment of an environment unit in Department of tourism	DEST	
			Awareness and Communication		
3.	Roads/Buildings	Competencies of staff on environmental management	Training/capacity building of its designated staff of environment unit	PWD	HPCOST
		Coordination between Department, other stakeholders and DEST		PWD	DEST
		Low awareness/perceptions on need for environmental management	Establishment of an environment unit in Department of tourism	DEST	
			Awareness and Communication		
4.	Industry	Competencies of staff	Training/capacity	Industry	HPCOST/Training

Sr. No.	Area	Organizational gaps	Possible Options	Responsible Organization	Support Organization
		on Clean development mechanism, environmental management etc.	building of its designated staff of environment unit		Organizations
		Coordination between Department, other stakeholders and DEST – need for establishing an environment cell in Department of Industry Low awareness/ perceptions on need for environmental management	Establishment of an environment unit in Department of Industry Awareness and Communication	Industry Department DEST	DEST
5.	Urban Development	Competencies of staff on environmental management etc.– need for training/capacity building of its staff	Training/capacity building of its designated staff of environment cell	UDD	DEST
		Coordination between Department, other stakeholders and DEST –	Establishment of an environment cell in Department of Urban Development	UDD	DEST
6	Rural Development	Coordination between Department, and DEST Competency enhancement	Designating an environment officer in Department of Rural Development Training/capacity building of designated environmental officer	Rural Development Rural Development	DEST HPCOST/DEST
7	Forests Eco-Tourism and Command Area Treatment	Coordination between Department, and DEST Competency enhancement	Designation of an environment officer in the Department Training/capacity building of designated environmental officer	Forests Forests	DEST, Tourism HPCOST/DEST
8.	Agriculture, Horticulture	Coordination between Department, and DEST Competency enhancement	Designation of an environment officer in the Department Training / capacity building of designated environmental	Agriculture, Horticulture	DEST HPCOST/DEST

Sr. No.	Area	Organizational gaps	Possible Options	Responsible Organization	Support Organization
			officer		
9.	Health	Coordination between Department, other stakeholders and DEST Competency enhancement	Designation of an environment officer in the Department Training / capacity building of designated environmental officer	Health	DEST
10.	Education	Coordination between Department, and DEST Competency enhancement	Designation of an environment officer in the Department Training / capacity building of designated environmental officer	Education	DEST
11	Transport	Coordination between Department, and other stakeholders (police, traffic etc.) in implementing the act	Designated Head of Environmental Unit in the department	Transport	
		Coordination between Department, and DEST	Establishment of an environment unit in the Department after competency enhancement of its designated officials	Transport	DEST
12	Disaster Management	Coordination between Department, and DEST	Designation of an environment officer in the Department	Revenue	DEST
13	Finance	Coordination between Department, and DEST – to assess environmental management issues in public investments	Designation of an environment economist in the Department after his/her competency building	Finance	DEST Training Organization

8.0 Objectives of Development of an Institutional Mechanism

The objective of the proposed Institutional Mechanism for implementation of the EMP is to enable identification of issues, preparation and implementation of management plans, accountability mechanisms, monitoring and enforcement procedures, and roles for various departments. It should be visualized as a dynamic mechanism, able to adapt itself to changing needs over time and able to adopt fresh practices to retain its resilient character. Therefore, the current ways of institutional relations has been analyzed and used as an input for developing the institutional mechanism.

The specific objective of development of an institutional mechanism is to have an effective (clear, specific, realistic and without duplication) responsibility distribution to

various stakeholders/agencies so that they could implement the environmental management plan in an efficient manner and with economy.

The attainment of the above objective requires identification of various functional (responsibility) areas in implementation of EMP (**broadly specified under section 6.0 earlier**)and their detailed operationalization needs to be worked out. Having worked out the details of responsibilities the major activity remains is the identification of best entities/organizations to manage required functions at different levels in implementation of EMP. For this criteria identified (later under **section 9**) have been used. The mechanism also seeks to address that development of an institutional mechanism must address various responsibility requirements at policy, program and operational levels and should be able to oversee the whole program/project cycle (from conceptualization to planning, implementation and monitoring)

However, as in this case also, wherever an identified stakeholder/entity is not ideal to carry forward the responsibilities, but is the "best suited" amongst the stakeholders/entities, additional measures/activities have been identified to equip the organization to undertake the assigned responsibilities.

The proposed institutional mechanism should entail a form of decentralized governance which would necessitate an integrated approach of top down and bottom up. The mechanism shall be driven by the conviction, commitment and ownership of all levels of the administration and governance to build a healthy relationship between environmental preservation and socio-economic growth and development.

It is a well-known fact that most of the stakeholders (government organizations) at present don't have enough organizational competencies to undertake and support the implementation of the proposed EMP in the state. One of the ways could have been to hire environmental professionals in various departments and pursue the activity. **However, recruitment has not been considered as the option.** Instead, a major consideration in development of the institutional mechanism has been to **limit (not to create) "additional" positions and use available manpower to the maximum.** To make use of available manpower, capacity building of organizations and individuals on environmental management has been strongly advocated.

9.0 Considerations in Identifying the Entities to Best Manage the Roles / functions required for Implementation of EMP

Following considerations/criteria have been used in identifying the most appropriate organization (existing, if not new) to undertake newly envisaged responsibilities. These include:

- Degree of Closeness to its mandate
- Organizational capability (knowledge, experience)
- Organizational capacity (reach etc.) and easier and acceptable ways of supplementing the organizational capacity
- Chances of easier acceptance of authority
- Least transfer/interchanging of staff/resources
- Long term and sustainable
- Efficient and Economic service delivery

- Review and analysis of the best management Practices in other states of India for their application in HP

10.0 Suggested Institutional Mechanism for Implementation of EMP – Redefining Responsibilities

During earlier phases, substantial and significant development resources, both financial and human, were focused to change the operation of organizations. However, the success has been limited due to variations in interdependent behavior of organizations and their relationships and accountability mechanisms. Institutional development therefore encompasses both institutional reforms and organizational development. Bringing changes to the institutional framework is about changing the formal and informal rules of the game, which govern the ways in which organizations function.

The objective of the proposed Institutional Mechanism for implementation of the EMP has been indicated under section 3.0. It is visualized as a dynamic mechanism, able to adapt itself to changing needs over time and able to adopt fresh practices to retain its resilient character. The development of an institutional mechanism provides an opportunity to examine the current ways of institutional (stakeholder) relations, for developing an environment sensitive sphere and to dovetail environmental concerns in current and future functioning as well as thinking of the concerned stakeholders.

The proposed institutional mechanism would entail a form of decentralized governance which would necessitate an integrated approach of both top down and bottom up. The mechanism would be effective with the conviction, commitment and ownership of all levels of the administration and governance to build a healthy relationship between environmental preservation and socio-economic growth and development.

The proposed institutional mechanism will operate mainly through existing administrative and governance structures of the State. However, for developing the institutional mechanism, function-wise analysis has been carried out and the responsibility has been entrusted to specific entity besides providing supporting roles to other entities. **Table 4** provides the list with "R" as main responsible entity and "A" as supporting roles.

Table 4: Responsibility Distribution Amongst Various Government Entities for Implementation of EMP

	DEST	HPCOST	HPSPCB	Power	Other stakeholders	Remarks
Policy	**R**	A	A	A	A	**Empowered Committee**
Advisory	**R**	A	A	A	A	
Coordination and Management	**R**					
Research, Research Management and Coordination	A	**R**	A	A	A	Funding could come from HP Environment Fund - by earmarking a minimum specified percentage of funds for Research)

	DEST	HPCOST	HPSPCB	Power	Other stakeholders	Remarks
Data Mgt and ENVIS	**R**	A	A	A	A	Funding could come from HP Environment Fund - by earmarking a minimum specified percentage of annual funds for ENVIS)
Monitoring and Regulation	A		**R**			Funds could come from fees besides fines/penalties for non-adherence
Training	Organization – to be identified					Funding could come from HP Environment Fund - by earmarking a minimum specified percentage of funds for Training)
Grievance redressal	R	A	A	A	A	
Fund Management	R		A			

The function wise responsibility distribution for effective implementation of EMP is as follows:

10.1 Coordination and Management

The responsibility of coordination with various stakeholders, Government departments and other development agencies should be with DEST. It should not only co-ordinate with various identified stakeholders but should also seek their opinions and communicate it to GoHP as well as integrate it in future policy development. It should develop required formats and procedures for seeking even the public opinion on various environmental issues and as a feedback to policy improvements. Since the information is to be collected from public, Non-Government Organizations and Community Based Organizations (NGOs and CBOs) may be engaged and made partners to undertake the field activities to support DEST.

For effective and operational coordination and management, formation of **High Level Steering Committee** is suggested. This High Level Steering Committee for EMP (HLSC -EMP) should have its secretariat in the DEST, thereby forming a major part of the mandate of the department. The HLSC -EMP should be chaired by the Chief Secretary and the Secretaries/heads of all the key departments should be its ex-officio members. Respective Secretaries/heads should be supported by departmental nodal officers. The Committee should not only direct/steer the implementation of EMP but should also monitor the progress on implementation. This should periodically (once in a month or as needed)

- to approve sectoral policies,
- to review progress of implementation of EMP and
- to guide (modify, improve) the EMP process further.

These periodic review meetings may be used to fine-tune the EMP's progress to address regional or departmental variations in implementation. Nodal officers will all report to DEST.

10.2 Policy Formulation

This is proposed to be undertaken by an "**Empowered Committee**" with its secretariat in DEST. This empowered committee shall consist of nominated members from department of Environment, Forest, Power, Mining, Industry, Transport and two other departments (like tourism, agriculture etc.). This should be headed by Secretary, Environment. It shall have the provisions to receive feedback/inputs on policy formulation from various stakeholders, public etc. It could initially address various policy initiatives, which are needed at different levels and are presented in Table 5.

Table 5 Policy Initiatives Needed by Various Departments

Sr. No.	Area	Issues/Activities	Responsible Organization	Support Organization
1.	Hydropower	Strategic EA for river basins	DEST	
		River basin development to include wild river stretches and no project stretches	Power Department	
		Policy on State level clearances for hydropower (including small hydro and mini hydel) projects	DEST	
2.	Tourism	Policy for integration of environmental linkages in Tourism Master plan	Tourism	DEST
3.	Roads/Buildings	Policy on environmentally sensitive road and building construction	PWD	DEST
4.	Industry	Planning of Industrial Areas taking into account/delimiting eco-sensitive areas	Industry Department	DEST
		Policy on Reduction of Impacts of Industry on land	Industry Department	
		Policy for Cleaner Development Mechanism (supporting incentives, disincentives for conventional, non-clean technologies)	DEST	
		Development of Zoning Atlas (bearing capacity of different regions) for use by Industry Department	DEST	Industry
		Policy on Environmental Clearances for establishing industries and operating industries (of specific types, sizes etc.)	DEST	
5.	Urban Development	Development and adherence to Master plans by integrating environment, Developing and regulating guidelines of town and country planning, Providing land for urban solid waste management	UDD	
		Setting standards/guidelines for wastewater discharge in flowing water	DEST	
6	Rural Development	Integration of environmental considerations in Rural Development Policy	Rural Development	DEST

Sr. No.		Issues/Activities	Responsible Organization	Support Organization
7	Forests Eco-Tourism and Command Area Treatment	Eco-Tourism policy	Forests	DEST, Tourism
8.	Agriculture, Horticulture	Integration of Sustainability Considerations in Agriculture, Horticulture Policy		DEST
9.	Health	Bio-medical and hazardous waste management Rules	DEST	Health, UDD, Industry
10.	Education	Policy on Integration of "Environment Education" as a part of school curriculum	Education	
11	Transport	Policy improvements on "Vehicular Emission Requirements" - under Motor Vehicles Act, 1988.	Transport	
12	Disaster Management	Integration of Environmental considerations in Disaster Management Plans (state level, district level)	Revenue	
13	Finance	Policy on Funding Environmental Management Activities (direct, indirect)	Finance	Tourism, Hydropower, Industry, Roads/Buildings
		Inclusion of DEST in HP State Plan and fund allocation	Finance	DEST

10.3 Advisory

The advisory responsibility should be with DEST. It should provide effective feedback and advice to upcoming projects on hydropower, road development, tourism development etc. and should provide comments/feedback on EIA/EMP plans developed and submitted to GOHP for undertaking above mentioned activities. The DEST should have required competent manpower for the purpose.

10.4 Monitoring and Regulation

The monitoring and regulation of adherence to policies, pollution standards etc. require both the knowledge as well as extensive local level presence. Therefore, the responsibility is proposed to be with HSPCB due to its local level network and monitoring and regulation capabilities. It is further proposed that HSPCB shall arrange to document its monitored parameters (status of pollution levels of air, land, water etc.) and regularly publish it for dissemination, integration in planning and feedback to improve environmental management scenario of that area. The HPSPCB shall actively collaborate with DEST, which shall then use these monitored data and continuously update and redefine its fragile/vulnerable areas and to take course corrections for improved environmental management.

10.5 Data Management and Environmental Information Services

DEST should collate, compile and document the environmental data of the state and should disseminate the same using both electronic and print media. Part of the information like policies, standards etc. should be in public domain, whereas some information could be priced. This information then could be procured by interested entrepreneurs. The HPCOST as a main associate should have a GIS based "State of

environmental map" of the state, which should be updated from time to time based on compiled set of data supplied by DEST. For the purpose, DEST should have an INFORMATION CENTER.

10.6 Training

The implementation of EMP shall require competency up-gradation of concerned officials in various stake-holding entities. These competencies shall be needed for integration of environmental components in project planning, formulation, implementation and monitoring and shall be required at program, project and operational level. Up-gradation of competencies of various stakeholders shall reduce the workload of DEST, as trained manpower then shall be available in various Departments/entities of the Himachal Pradesh Government to enforce environmental guidelines. This should necessarily support formation of environmental units/cells in departments as suggested earlier and to improve the competencies of designated personnel in these units or as "environmental officer" in smaller/low environmental foot- print departments. After careful assessment of exact needs, DEST should organize "Training of Trainers" courses so that the trained manpower could transfer the knowledge to its subordinates in their respective departments, as needed. The role of DEST would be coordinating and not implementation of the trainings. These trainings may be organized by HPCOST, recognized training institutions etc.

The following activities are proposed to be undertaken for Training:

- Review of HP Training Policy
- Development of a specific training policy for each line department, if needed
- Identification of Target Groups to support implementation of Environment Master Plan
- Identification of Training Needs (Training Needs Assessment) of each "target Groups" : This could include improvements in A, K and/or S
- Development of a training framework and plan (Prioritization of Training needs and spreading it over a timespan, single/modular approach of training, training of trainers approach)
- Identification of Training Resources (training institutions; individual resource persons: which could include HP Government employees also)
- Development of Training Curriculum
- Development of Training Modules to undertake trainings
- Identification of Training delivery strategy (class room, hands-on, field visits, demonstrations, group discussions etc.)
- Development of primary and secondary training materials (to be developed by using training resources – institutions, individuals)
- Development of Secondary Training Materials
- Implementation plan for Trainings
- Training Management (communication, logistics, implementation)
- Evaluation
- Feedback Mechanism (improvements in Training Plan, Curriculum, approach, duration, resources, administration etc.)

10.7 Public Awareness

As the requirement envisages grass root level working, this can be effectively carried out by Non-Government Organizations and Community Based Organizations (NGOs and CBOs). However, initially effective dissemination and understanding should be developed with such organizations by using "Training of Trainers" approach. This should be managed by DEST.

10.8 Public Consultation

This is to be led by project proponents in collaboration with the respective line departments. However, there is a need to develop a suitable methodology as well as communication strategy so as to not only address desired issues but to avoid "unwanted" communication.

10.9 Updating Environment Master Plan

As indicated later (Section 11), most of the programs/projects and activities should be monitored and evaluated. It is suggested that their feedback must be integrated to improve future project activities. The feedback should be compiled both by departments and DEST and based on the analysis (to be undertaken by DEST) of the impacts, respective departments should be advised by DEST to improve their sectoral guidelines. With the passage of time (say 10 years), the EMP should be further updated by DEST.

11.0 Action Plan

An action plan has been prepared to supplement the optimal permeation of EMP into the GoHP system. This shall require human, technical and financial resources. However, for taking forward the EMP, special attention must be paid on high foot print sectors like hydropower, roads and industry which are likely to contribute significantly (if mitigation measures are not undertaken) to Environmental damage as well as on sectors benefiting from improved environmental management like tourism etc. may be given. Both the type of sectors – one impacting environment negatively and other receiving benefits from improved environmental management should take leadership roles to undertake the recommendations of this report. The hydropower, public works/roads, urban development and industries departments are the departments that need to have strongest commitment to address environmental issues. A suggested Action Plan with responsibility and timeframe is presented in Table 6.

Table 6: Acton Plan for Implementation of Institutional Mechanism

Sr. No.	Action	Entity (Leadership)	Support Entities	Time frame
1.	Approval of EMP by GoHP	DEST	Other Departments	1 month
2.	Sharing of EMP (internal with departments)	DEST	Other Departments	During 2nd month
3.	Formulation of High Power Steering Committee and Empowered Committee	DEST	During 2	nd month
4.	Establishment of Environmental Units, Environmental Cells and Designating Environmental officers in various departments	Departments		During 3rd month
5.	Training and Capacity Building	DEST, HPCOST	Other departments	4-5 months

Sr. No.	Action	Entity (Leadership)	Support Entities	Time frame
	of Departments (Environmental Units, Cells and Designated Environmental officers			
6.	"Refinement" of sectoral guidelines, if required	DEST	Other departments	6th to 7thmonth
7.	Finalization of Plan on Environmental Data collection, analysis, communication and dissemination including further development of ENVIS	DEST, HSPCB	Other departments	6th to 8th month
8.	Dissemination of EMP up to PRI level (including dissemination using web)	DEST	Other departments	8thmonth
9.	Policy Improvements and approval	High Power steering Committee, DEST	Other departments	Starting 10th month (Continuous process)
10.	EMP Implementation	Respective Departments	DEST (Advisory)	Continuous
11.	Regulation and Monitoring	HPSPCB	Other departments	Continuous

11.1 Operational Mechanism

Government of HP implements various programs, projects and activities, which require environmental safeguards and considerations. The implementation "cycle" of these programs/projects/activities consists of various stages, which can be broadly classified into project conceptualization (including broad design), planning (including operational management plan), implementation and monitoring and evaluation. The monitoring and evaluation (including impact evaluation) provides feedback to further improve the forthcoming program/projects etc.

The proposed environmental master plan has laid sector-wise guidelines to improve environmental management across various sectors. Similarly, the institutional mechanism suggested above has made provisions of environmental units, designated environmental cells and designated environmental officers within various departments. Their operational mechanism has been suggested in Figure 2 ahead. Further, overall operational mechanism for planning is described in **Annexure – 3**.

12.0 Measures for EffectiveInstitutional Mechanism

12.1 Enabling Environment

For implementation of EMP in the State, an enabling environment is a bare minimum necessary condition. This should entail:

- Political will and commitment to the EMP
- Awareness on EMP: Departments and concerned particular officials are adequately aware of the EMP and about the need to mainstream the EMP into the on-going activities of the departments;
- Positive Interactive Attitude: Stakeholders are willing to interact with other key stakeholders (departments) in ensuring that primacy is given to the objectives of the EMP;
- Departments are motivated and equipped to engage with each other in formulation and implementation of planned activities (at both program level and project level) from the stage of conceptualization, formulation, planning, implementation and monitoring and evaluation;

- **Resource Commitments**: Dedicated financial and human resources should be made available to DEST and supporting departments for implementation of EMP;
- **Feedback Mechanism:** The views of the public and the final beneficiaries, crucial in shaping the environmental future of the state of Himachal Pradesh will be continuously sought.
- **Leveraging through Planning Department:** The State Planning Board and the Department of Planning should be advised to play a critical role in mainstreaming environmental issues into the planning process. The role of the Planning Department will be taken over at the district levels by the District Planning Departments headed by the District Commissioners, who are currently assisted by the Chief Planning Officers and by the District Planning Cell. It is assessed that the number of district level functionaries are adequate for the task of dovetailing the EMP into all development activities at the district levels.
- **Accountability and transparency** of functionaries from the lower levels (even *Gram Panchayat* level) to the State level administration.

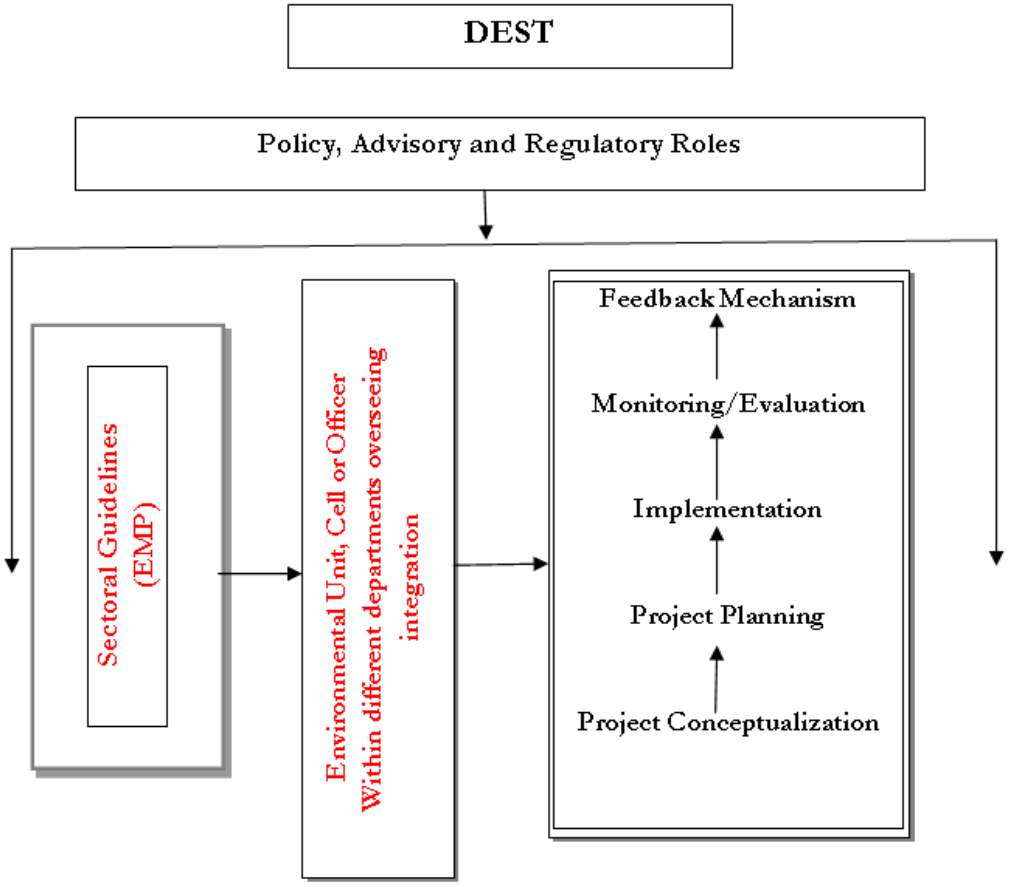


Figure 2: Operational Mechanism for Integration of EMP (Policy and and Sectoral Guidelines) During Various Stages of Program/Project Cycle

12.2 Changes in Institutions to undertake the responsibility

- Conducive with the nature (multi-disciplinary but integrated) of environmental discipline and its breadth and width, DEST should internally

develop a collaborative attitude, as most of the activities are to be managed through collaborations with other Government departments/organizations.

- As environmental issues are integral for the economic sustenance of the State, therefore, DEST should be able to provide and manoeuvre, policy and technical advice, to the key Government decision-makers. However, the approach of DEST must be to influence decision makers through dissemination and access to data/information, making them knowledgeable, develop their understanding **and not through any controls**. **Institutionally, such a** controlling feature has not been provided to DEST so as to not to make it a "power centre". Else, this could become detrimental in mainstreaming environmental issues.
- Changes in Organizational Structure of DEST: In line with the revised mandate, the organizational structure for the DEST Environment Division should be on functional lines. The three main functions entrusted to DEST are policy, advisory and co-ordination. They could be provided as indicated in Fig 1. The divisions should try to develop a balance amongst its three new functions. **The structure would have to be expanded to meet the challenges.**
- DEST should have a dedicated team of professionals with analytical and scientific capabilities (less managerial) to support these activities. Besides environmental focus, it should have people with legal (mainly for policy and monitoring issues) and monitoring background. Their numbers could be decided with the quantum of workload.
- The work focus of the division should be on managing the issues rather than implementing these issues.
- DEST should endeavour to develop more special purpose vehicles/societies in order to strengthen and improve the quality of work being done.
- DEST should also seek public opinion/ feedback in a systematic manner and communicate it to GOHP as well as integrate it in future policy development.
- DEST should support GOHP in raising financial resources for environmental management in the state.

12.3 Nurturing of the Institutional Mechanism

The task of designing and developing an institutional mechanism is not complete, until a supporting mechanism is developed to sustain and nurture the mechanism. Following should be used to achieve the same:

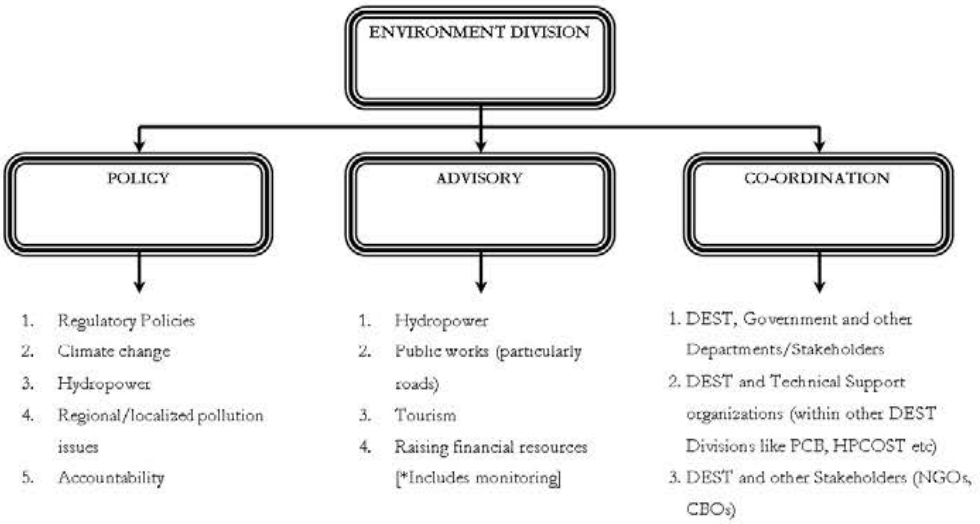


Figure 3: Entities under Environment Division of DEST

- By developing an appropriate communication strategy to disseminate the same at various levels;
- Documentation of results emanating from inter-agencies coordination and evolving and disseminating best management practices for various sectors ;
- Developing management capabilities of concerned officials by training in soft skills like communication, motivation, team work etc.
- Continued endorsement and support by Heads of Departments;

12.4 Funding Mechanisms for Departments to Address Environment Issues

Presented are some of the measures, which could be addressed to provide funding for Environmental Issues and to sustain HP Environment Fund

1. **Inter-departmental sharing of infrastructure and services:** Inter-departmental sharing of infrastructure and services can pay dividends to all the collaborating departments. Agreement to build and use common infrastructure and services should be developed to help quality improvements and to reduce resource strain on the economy and environment. Although such activities can be undertaken by respective departments at their own levels but DEST (by documenting) could play an advisory role in relation to sharing of environmental infrastructure and services.
2. **Coordinated planning, prioritization and action:** It is possible for departments with a shared agenda to opt for coordinated planning, prioritization and implementation of programs, plans and activities. This shall not only avoid duplication of resource use but indirectly would support environment.
3. **Fundraising for HP Environmental Fund:** The HP Environmental Fund was set up in 2008 by the State Government and the DEST was notified as the nodal agency to provide logistical support and discharge duties with respect to all the functions of the Fund as well as to enhance the resource base of the Fund. A range of fundraising techniques have been explored and perfected, which may be of relevance. These techniques, relying on the local and state level potential for fundraising as well as for attracting contributions from persons of Himachal origin living elsewhere, could firm up into a permanent institutional mechanism to augment the Fund base.

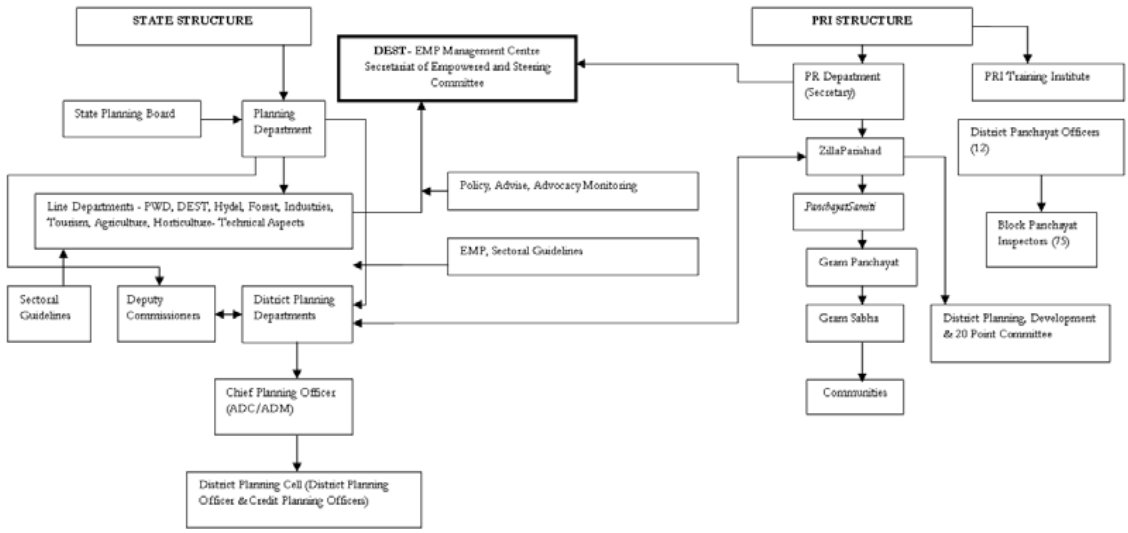
Formulation of a fundraising strategy in concurrence with a communication strategy is likely to assist in fundraising. Regular individual/corporate contributions, donations etc. besides use of events, and attracting legacies from within and outside the State are some of the ways of attracting funds to the HP Environmental Fund. Further contributions to the Fund can be obtained from earnings from internally generated revenue such as toll, user and entry fees, sale of products, etc and roll over the same into an Endowment/Reserve Fund to support sustainability to the fund.

4. **Allocation for Environmental Components:** Each department must allocate required funds for environmental issues in their respective budget.
5. **Role of Financial Institutions:** Government should work with financial institutions to play a more positive role on environmental improvements. This could include credit at differential rate of interest to non-polluting industries.

Incentives for Eco-Friendly Activities: Incentives could be developed for eco-friendly activities under each department. For Ex. Agriculture/Horticulture Department could support organic farming, certification and its marketing. Further, alternative eco-friendly income generation activities could be extended to farmers owning and cultivating land at steep gradients (above 35 degrees slope). This could reduce soil erosion and land degradation.

Institutional Mechanism: Operational Mechanism for Planning

EMP Institutional Mechanism – Convergence with Local Area Planning



Annexure – 1

Proposed Actions for Sectors

1.0 Infrastructure Sector

1.1 Tourism, Art, Architecture & Cultural Heritage

1.2 Potable Water Supply

1.3 Sewage

1.4 Health

1.5 Road & Transport

1.6 Mining & Geology

1.7 Industries

1.8 Energy

1.9 Market Infrastructure

1.10 Rural Planning

1.11 Urban Planning

1.12 Municipal Solid Waste Management

1.13 Hazardous Waste

1.1 Tourism, Art & Culture

Proposed Actions, Type of Response and Inter-sectoral Responsibilities

Issues	Causes	Impacts/ Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
1. Non-availability of safe drinking water/adequate infrastructure at tourist destinations, circuits & trekking routes.	Due to increased tourist traffic and inadequate infrastructure, the gap in the availability of safe drinking water has widened, which has led to the usage of untreated water.	Water born diseases & health risks	Prepare long term water supply Master Plan for tourist destinations & circuits.		√		Department	of Tourism & Tourism Development Council	IPH, Department of Language, Art & Culture
			Prepare an inventory of drinking water supply sources for new trekking routes.				√	Forest Department	IPH, Department of Tourism , & Tourism Development Council
			Implement drinking water quality monitoring programme at tourist transit points, e.g., *dhabas*/restaurants for parameters like pH, Suspended Solids, Total Dissolved Solids, Bacteriological count.			√	Department	of Tourism, Tourism Development Council, IPH, ULBs, Rural Development, SADA, Food & Civil Supplies	IPH, PRIs, NGOs, CSOs
			Develop appropriate regulatory mechanism for siting and management of *dhabas*	√					
			Ensure information display, 'Safe Drinking Water', at the sources.			√		Department of Tourism & Tourism Development Council/Forests	IPH, PRIs, NGOs, CSOs
			Implement protection of water source programme at tourist transit points by isolating it from sewage, solid waste and animals.			√	IPH	PRIs, NGOs, CSOs, *dhaba* operators	

Issues	Causes	Impacts/ Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
			Preparation of Eco-friendly travel guidelines.				√	Department of Forests and Wildlife	Department of Tourism, Rural Development, PRIs, ULBs
2. Disruption of electricity supply at tourist destinations during tourist season	Increased electricity demand from the grid leading to power shortage and power outages. Increased demand requires accelerated hydro power development.	Impacts on account of new hydro power development to meet the demand	Prepare solar/biogas based decentralised electricity supply plan (off grid) for rural/community/tourist &/forest resorts.		√		Department	of Tourism, Tourism Development Council & Forests	Himurja/DEST/ PRI/NGO/CSO Himurja
			Promote solar energy programmes at tourist units/ hotels.			√		Department of Tourism, Tourism Development Council & Forests	Himurja
			Ensure mandatory compliance of National Energy Conservation Building Codes at new tourist resorts/hotels.			√	Department	of Tourism / Tourism Development Council / Forests	ULBs, / Municipalities, / Department of Urban Development, Department of Energy
			Develop and promote niche area tourism by mainstreaming environment into development of new areas of Hill tourism, e.g., corporate/business/ medical/heritage tourism.			√		Department of Tourism, Tourism Development Council	Corporate Houses, Corporate Hospitals, Department of Health, Forests & Wildlife
3. Solid waste littering & improper	Inadequate collection, treatment and disposal	Air / Water / Land	Establish non-biodegradable waste (plastic waste/pet bottles,				√	Department of Tourism,	Recyclers, NGOs, CSOs,

Issues	Causes	Impacts/ Risks	Proposed Actions	Response				Institutional Responsibility	
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disposal along trekking routes, tourist circuits & destinations, e.g. plastic waste, pet bottles, tetra-packs, packets of snack food, food items and batteries from cameras/audio/video equipments	of solid waste at tourist units/destinations/ circuits leads to solid waste build up at these locations. Further, burning of non-biodegradable waste deteriorates air quality.	pollution and associated health risks due to biodegradable, non-biodegradable hazardous waste disposal. Degraded aesthetics	tetra packs, packets of snack food) collection & treatment infrastructure for tourist circuits in the State through PRIs.					Tourism Development Council, Forests, PRIs	PRIs, ULBs Department of Urban Development, Rural Development
			Promote decentralised composting of food waste at *dhabas* & tourist transit points/units/resorts.			√		Department of Tourism, Tourism Development Council, Forests	PRIs, NGOs, CSOs
			Expand the scope of non-biodegradable waste rules to cover dry battery cells/batteries from electronic items or develop rules based on extended producer responsibility.	√		DEST	&	Government of Himachal Pradesh	HPPCB, ULBs, NGOs &, Department of Urban Development
			Monitor & penalise illegal burning of non-biodegradable waste at tourist transit points.			√		HPPCB, Department Of Tourism, Tourism Development Council, Forests	DEST, ULBs, PRIs
4. Disturbance to ecology and critical habitats due to development of new tourist circuits, units & destinations.	Uncontrolled & unregulated tourism.	Loss of vegetation due to new trekking routes and diversion of land. Change in habitat	Undertake studies on the carrying capacity of the new tourist circuits/destinations.			√	Department	of Forests & Wildlife, Department of Tourism	Department of Tourism, Tourism Development Council,
			Undertake studies on the carrying capacity for expansion of existing tourist circuits/destinations.			√		Department of Forests & Wildlife, Department of Tourism	Department of Tourism, Tourism Development Council
			Minimise diversion of forest land in area specific Tourism Master Plan.		√		Department	of Tourism, Tourism	Forests, Urban Development Department,

			Response			Institutional Responsibility	
						Coordinating Agencies	Collaborating Agencies
						Development Council	Department of Rural Development, PRIs
		Develop area specific Eco-tourism Master Plan.		√		Eco-tourism Society, Department of Forests	Department of Tourism, Tourism Development Council
5. Lack of carrying capacity studies/ assessments	Change in land Construction of tourist capacity and other tourist infrastructure requires additional land. by hill cutting or diversion of forest land. Mass congregation of pilgrims and other visitors during religious fairs/events.	Undertake studies on the carrying capacity for the expansion of existing tourist circuits/destinations. Regulate and control land use change under long term area specific Tourism Master Plan.		√	Department	of Tourism, Tourism Development Council, Forests	Town & Country Planning
		Identification and preservation of valley slopes with aesthetic view under area specific Tourism Master Plan.		√		Department of Tourism, Tourism Development council	Town & Country Planning, PRIs
		Develop and promote diversification of tourism activities, such as Rural *Haat* (markets) as part of rural tourism along the existing tourism circuits/destinations.			√		
		Develop and promote eco-friendly activities and appropriate guidelines, e.g., camping, trekking, cycling in existing and proposed tourist circuits/destinations.			√		
		Mainstream environment in development of guidelines on 'Homestays'/bread and breakfast schemes.			√		

		Risks		Response			Institutional Responsibility	
					Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
6.Increased emissions due to increased traffic at tourist destinations/ circuits/-routes, heritage sites & religious places.	Location specific traffic congestion Lack of parking space	Outdoor air quality deterioration and associated health risks	Develop destination specific transportation plan.		√		Department	of Tourism, Tourism Development Council	Transportation Department, Urban Development, ASI, Department of Language, Art & Culture
			Establish infrastructure, like parking space as per transportation plan.				√	Department of Tourism, Tourism Development Council	Transportation Department, Urban Development, ASI, Department of Language Art & Culture
			Strengthen air quality monitoring programme at specific destination sites.			√	HPPCB/Tourism	Development Council	DEST, Department of Tourism, Tourism Development Council, Transport Department
			Introduce Environment service charge at entry points. Identify ecologically sensitive tourist destinations/circuits, e.g., Rohtang pass, Mani Mahesh, Sangla Valley, Mandi, Sacred Groves etc.	√				Office of Divisional Commissioner	Department of Forests & Wildlife, Department of Tourism, LADC SADA
			Prohibit/penalise polluting vehicles to enter the buffer zone of archaeological/ heritage sites.			√	Transport	Department	DEST, Department of Tourism, Tourism Development Council, Transport, Petrol

Issues	Causes	Impacts/ Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
									Pump Association
			Ensure operation of Bharat Stage - IV compliant vehicles.			√		Transport Department	DEST, Department of Tourism, Tourism Development Council, Transport, Petrol Pump Association
7.Inadequate sanitation at tourist units/destinations/ circuits, religious places, heritage sites, trekking & transportation routes.	Unregulated sewage discharge and open defecation. Lack of infrastructure facilities, like latrines at transit points (*dhabas*) & soak pits. Lack of adequate capacity of existing sanitation infrastructure. Non existence of sanitation infrastructure at tourist destinations/units.	Contamination of the water source/ health risks	Prepare long term sanitation master plan for tourist destinations & circuits.		√		Department	of tourism, Tourism Development Council,	IPH, ASI, Department of Languages, Art & Culture
			Establish sewage infrastructure, like latrines at tourist transit points/religious places & heritage sites. Construct toilet tents on all treks; set up and use toilet tents at least 100m away from water bodies.			√		*Dhaba* Operators, Tourist site & Heritage / Tourist site operators	Department of Tourism, Tourism Development Council, PRIs
8.Inadequate monitoring of unregulated activities, encroachments at tourist/heritage/ pilgrimage sites/ *dhaba* operators, hawkers, pony owners/operators	Land encroachment, e.g., space occupied for parking of buses/ vehicles. Buffer zone activities/ camping near water sources/water bodies/ lakes, kindling of fire at campsites, washing of vehicles near water sources.	Air & Water pollution/ Biodiversity loss, loss of items of heritage, poor aesthetics.	Develop regulatory framework for *dhabas*, especially for maintaining hygienic and sanitary conditions. Penalise transporters/vehicle operators for encroachment of road. Introduce battery operated vehicles and alternate mode of travels in certain tourist circuits and destinations.	√		√	Traffic Police	Department	of Tourism, Tourism Development Council, ASI, Department of Language, Art & Culture

Issues	Causes	Impacts/ Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
	Illegal collection of species of flora & fauna in forest areas. Pilferage/loss of items of heritage value. Bathing in water bodies/lakes/rivers		Develop & implement environmental code of practice for trekking and campsites.			√		Department of Forests & Wildlife	Department of Tourism, Tourism Development Council, tour operators ASI, Department of Language Art & Culture, DEST.
			Review of the existing orders/directives and develop appropriate guidelines for various Departments in relation to tourism related duties, e.g., Tourist Police, Home Guards for monitoring the activities.				√	Department of Environment Science & Technology	Concerned Departments
			Development of Tourist Information Centres, Information Kiosks, displays focusing on the protection of environment and local art, culture and heritage at vantage locations, e.g., hotels/resorts/mid-ways, enroute tourist circuits/destinations, public transport system, mass communication tools.				√	Department of Tourism	Department of Information and Public Relations
			Increased surveillance of tourist activities.			√	Police	Department of Forests,	Department of Language, Art & Culture, Department of Tourism, Hotel, Forest, Resort Association
9. Inadequate tourist	Limited infrastructure,	Increased	Preparation of area specific		√			Department of	Department of

Issues	Causes	Impacts/ Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
infrastructure	connectivity (train/road/air), power and water supply and disposal of liquid and solid waste. Limited hotels & other types of accommodations.	health risks, unhygienic an unsanitary conditions du to overcrowding.	Master Plan consisting of satellite destination mapping to decongest existing tourist destinations. Adopt/adapt and promote good practices for Hill Tourism. Develop infrastructure in tourist circuits/destinations keeping in mind the architecture of the hill region. Develop and promote appropriate rainwater harvesting structures suitable to the infrastructural facilities being developed. Develop and promote green ratings of resorts/ tourists units, which promote and demonstrate optimal energy use and other natural resource use and disposal (water, liquid and solid waste) in hill tourism.					Tourism, Tourism Development Council.	Urban Development, Department of Rural Development, Town & Country Planning, NGOs, CSO, Forests & Wildlife
10. Lack of awareness, training and capacity building on environmental issues related to tourism	Limited reach and extent of awareness campaign due to topography/hilly terrain. Lack of NGO/CSO participation	Unchanged consumer behavior leading to continuation of environment-unfriendly practices	Environmental awareness and capacity building programme on Solid Waste Management / Sanitation / Water for *dhaba* / transit point operators, trekkers & porters. Environmental awareness and capacity building programme for resort owners/Hotels Association. Environmental awareness programme for village communities involved in rural			√	Department	of Environment Science & Technology	Department of Tourism, Tourism Development Council, HPPCB, NGOs, CSO, IPH, Forests

Issues	Causes	Impacts/ Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
			tourism. Environmental awareness programmes for tour operators/associations.						
11. Inadequate attention on the preservation of local art, architecture and culture.	Insufficient dissemination of knowledge and understanding of rich and varied local art, culture, heritage and architecture New buildings/ infrastructure are planned, designed and constructed without adequately considering the local architecture, heritage and culture.	Increase in new buildings/ Infrastructure, which do not conform to the laid down norms Rise in obtrusive buildings/ Infrastructure which do not blend with local surroundings. Risk of such places losing their heritage and potential loss of value of the destination as tourist circuits / destinations	Planning and design of new buildings following the ridge approach and its strict compliance by all project proponents. Use of local materials and resources in the planning, design and construction of new buildings following the prevalent local art, architecture and culture, which blends with the surroundings. Plan, design and construct new buildings/infrastructure, which blends with local art, architecture and culture. Depict murals and frescoes in the new buildings/infrastructure as per the prevalent local art, architecture and culture. Develop promotional materials on local art and architecture and set them as displays, e.g., murals/frescoes/wall scapings on the roadsides and pavements for aesthetic ambience in urban and rural settings. Develop and maintain green areas in and around the				√	Department of Language, Art and Culture	Town and Country Planning Department of Tourism LADA, SADA, Urban Local Bodies, PRIs, INTACH, Temple Trusts, *Devasthan Samiti*/ Board, NGOs/CSOs

Issues	Causes	Impacts/ Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
			protected monuments and maintenance of sanitation for better aesthetics. Levy environment service charges to generate revenue and proceeds to be utilised for the maintenance of protected monuments. Maintenance of unprotected monuments by ULBs/PRIs						

1.2 Potable Water Supply

Proposed Actions, Type of Response and Inter-sectoral Responsibilities

Issues/ Problems	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
Reduced water availability due to increasing demand (population & tourists)	Unreliable water supply. Increase in demand from population/tourists.	Deprivation of basic necessity and quality of life. Water riots. Health risk.	Promote rainwater harvesting programme both in rural & urban areas in the State.			√	√	IPH/RD	Department of Urban Development, ULBs, PRIs, CSOs.
			Develop a policy framework for allocating water & prices of allocated water.	√				Govt. of Himachal Pradesh	IPH, Health, Rural Development Departments, NGOs/CSOs, ULBs.
			Promote household drinking water storage, purification & prevention of microbial contamination programmes in urban/rural areas.			√	√	IPH	Rural Development Departments, PRIs, NGOs, CSOs, Health & Family Welfare Department, ULBs.
			Prepare & implement community/household level projects on water storage structures in rural areas				√	PRIs	IPH, Health, Rural Development Departments, NGOs/CSOs, ULBs.
			Monitoring of water borne diseases versus interventions at district level				√	Department of Environmental Science &Technology (DEST)	IPH, Health, PRIs, ULBs
			Introduce reuse of water from treated sewage to reduce water demand from non drinking usage.			√	√	Department of Urban Development	IPH, ULBs, PRIs, CSOs.
			Introduce dual system of plumbing to reuse grey water for flushing in buildings.			√		ULBs	Department of Urban Development, ULBs, PRIs, CSOs.
Reduced water	Limited water	Drying up of	Develop and implement source			√	√	IPH	PRIs/NGOs/CSOs, ULBs,

	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
availability due to source over-exploitation, source un-sustainability and neglect of traditional water source.	resources. Lack of river basin level planning. Competing water usage.	source. Catchment Degradations. Waste of investment. Risk of food insecurity. Agriculture / Horticulture revenue loss.	rejuvenation plans throughout the State.						Department of Agriculture, Department of Urban Development.
			Appointment of water regulator.	√		Government of		Himachal Pradesh	IPH, CSO, NGOs, PRIs, DEST, ULBs, Department of Rural Development, Department of Urban Development, ULBs.
Reduced water availability due to infrastructure constraints, e.g., non-availability of electricity supply & increased leakage in the public distribution system.	Unauthorised tapping/metering. Old/worn out infrastructure leading to leakage.	Unaccounted resource loss leading to strain on existing sources. Loss of revenue.	Accelerate/initiate strict actions envisaged in the acts to stop unauthorised tapping of water.			√		IPH/ULBs	Department of Urban Development, Municipality, NGOs/CSOs/PRIs.
			Develop district-wise programmes to reduce existing leakage significantly through strict compliance of laws & technical intervention & plugging.			√	IPH/ULBs	Infrastructure	Developers, Operators, NGOs/CSOs/ Ministry of Urban Development, Power Utility.
			Encourage water sector reforms in water supply distribution, metering & revenue collection.			√	√	IPH/ULBs	Infrastructure Developers, Operators, NGOs/CSOs/Department of Urban Development.
			Ensure availability of uninterrupted electricity supply			√	HPSEB Ltd.	Power Division.	
Reduced water availability due to lack of integrated water management strategies / plans, monitoring & funds for implementation.	Hydropower projects/other water uses require water diversion. Competing water use. Non-availability of adequate funds for planning & implementation.	Changes in hydrological regimes lead to variation in ecology of connected natural drainage systems as well as water uses down-stream. Ecological imbalance.	Develop & implement basin plan consisting of water balance based on water availability, water requirement (different sectors) & its allocation and discharge in coordination with other States & Central Government.			√	√	IPH, Water Management Board	Department of Urban Development, ULBs / NGOs / PRIs / CSOs, CWC, CGWB, Department of Forests, Department of Energy, DEST.

Issues/ Problems	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
		Catchment degradation. Water pollution.	Preparation and implementation of Catchment Area Treatment (CAT) plans.		√		√	Department of Forest and Wildlife	Department of Urban Development, ULBs/ NGOs/PRIs/CSOs, CWC, CGWB, Department of Forests, Department of Energy, DEST.
			Constitute a State level Steering Committee to implement all the plans in an integrated manner.			√	√	IPH, Water Management Board.	All line Departments
			Monitor the basin, CAT and wetland management plans by concerned responsible agencies.			√	√	By concerned agencies	Department of Forests, Department of Agriculture, Department of Minerals, Department of Fisheries, State Energy Utilities, DEST, Department of Tourism ULBs, IPH, HPPCB
Deterioration of surface & groundwater quality due to contamination.	Water pollution due to fertiliser, pesticides, sewage & dung ingress in water sources.	Increased public health risk & burden of diseases.	Accelerate/Initiate action for implementation of IEC programme under each health scheme/ programmes being implemented at State level.			√		HPPCB/IPH/RD	DEST/ULBs, PRIs/ CSOs, HPPCB, Health & Family Welfare Department
	Poor management of waste water contamination due to wrong siting of waste disposal sites, e.g., location of waste disposal site below the HFL in the river basin.		Design & Initiate awareness development programmes / projects with NGOs/CSOs.			√	Health & Family Welfare Department		CSOs/NGOs
			Allocation of waste disposal site or dumping site above HFL in the river basin. Further, the site should follow criteria prescribed by the Central Pollution Control Board.			√		ULBs	Department of Forests, Department of Agriculture, Department of Minerals, Department of Fisheries, State Energy Utilities, DEST, Department of Tourism, IPH , HPPCB
Inadequate sewage infrastructure & sanitation services	Drinking water source / transmission &	Increased public health risk/mortality &	Accelerate/initiate actions for drugs distribution envisaged in project implementation plan of NRHM for				√	Health & Family Welfare Department	Rural Development Department/PRIs/ NGOs/CSOs

			Response			Institutional Responsibility	
						Coordinating Agencies	Collaborating Agencies
in the State.	distribution. Contamination due to inadequate sewage & solid waste treatment and disposal.	burden of water borne diseases Water related diseases due to unsafe drinking water on account of inadequate sanitation.	the State.				
			Accelerate/initiate actions for health infrastructure development & project implementation plan for sanitation under NRHM.		√	Health & Family Welfare Department	Rural Development Department/PRIs/ NGOs /CSOs, DEST
			Accelerate/implement/plans/projects for biomedical waste management in rural/urban areas.	√	√	Health & Family Welfare Department	Rural Development Department/PRIs/ NGOs/CSOs, DEST, IPH
			Accelerate/implement plans/projects for Municipal Solid Waste disposal in rural/urban areas.	√	√	ULBs/PRIs	Rural Development Department/PRIs/ NGOs/CSOs, DEST, IPH, Health and Family Welfare Department
			Accelerate and implement plans/projects for sewage collection, treatment & recycling.	√	√	UD/RD	Department of Urban Development, PRIs/ CSOs / NGOs
Inadequate community participation in rural water supply & sanitation leads to poor water management..	Inadequate ownership of the resource.	Resource loss/wastage. Increased Government expenditure for management of resources. Increases drudgery of women for fetching water in remote areas in the State.	Accelerate/implement actions / projects under sanitation plans of PRIs at village level.	√	√	PRIs	IPH, Rural Development Departments/Health & Family Welfare Department
			Develop & implement gender empowerment & women participation in rural sanitation projects, e.g., water conservation project.	√	PRIs	IPH, Rural	Development Departments/Health & Family Welfare Department
Gaps in coordination of institutions managing water sector leads to water management which leads to gap in operational efficiency & financial realisation.	Lack of implementation of reforms. Lack of pricing of resource. Continued subsidies on resource. Resource under valuation. Absence of	Resources loss/wastage Revenue loss to the sector.	Accelerate time bound reforms/programmes/projects leading to increased efficiency. Carry out viability studies for different economic instruments. 'Payment for Environmental Services/ Polluter Pays' in water sector in the State.	√	√ √	IPH, Department of Environment Science & Technology	ULBs, Rural and Development Departments / PRIs / NGOs / CSOs, IPH, ULBs, Industry, Consultants, Directorate of Factories, Departments of Health & Family Welfare, IPH

Issues/ Problems	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
	decentralised operation & maintenance of water supply schemes.								

1.3 Sewage

Proposed Actions, Type of Response and Inter-sectoral Responsibilities

Issues/Problems	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
1. Increasing gap in sewage collection, treatment & disposal is leading to water pollution.	Increased sewage generation from population/tourist. Inadequate infrastructure due to incomplete connectivity & coverage & absence of Sewage Treatment Plants (STPs).	Increased water pollution. Increased burden of diseases/ health risks.	Prepare and implement long term Master Plans for urban/rural areas including tourist destinations. The master plan should include strict siting of STPs as per Town & Country Planning acts/guidelines.			√	√	Department of Urban Development/Department of Rural Development	TCPO, IPH PRIs, NGOs, CSOs, Health & Family Welfare Department, Municipalities, ULBs, Department of Tourism
			Implement Sanitation Master Plan. The implementation should include optimum operation & maintenance of the system including separate energy metering for STPs. The skill level of personnel in the line Departments should be upgraded to meet project requirements.				√	Department of Urban Development/Department of Rural Development	TCPO, IPH, PRIs, NGOs, CSOs, Health & Family Welfare Department, Municipalities, ULBs, Department of Tourism
			Monitor the execution / implementation of Sanitation Master Plans & community sanitation projects.			√	√	Department of Urban Development/Department of Rural Development	IPH, HPPCB, ULBs, PRIs, CSOs, DEST, Department of Health & Family Welfare
2. Increased public health risks due to discharge & disposal of untreated sewage on land & water bodies.	Water pollution due to sewage and dung ingress in water sources. Unhygienic methods of handling waste. Poor management of waste.	Increased burden of diseases.	Prepare sewage interception, diversion & treatment plans for catchment areas of recipient water bodies.			√	√	Department of Urban Development/Department of Rural Development	IPH, Department of Forest, PRIs, NGOs, CSOs, Health & Family Welfare Department, Municipalities,

Issues/Problems	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
									ULBs, Department of Tourism
			Extensive water quality monitoring of surface and groundwater bodies & complete disclosure of monitoring results.			√	√	Himachal Pradesh Pollution Control Board	IPH, Department of Health, Department of Urban Development, Department of Rural Development & ULB
			Ensure publication of monitoring results including trend analysis & follow up actions.				√	UD/HPPCB	IPH, Health, PRIs, ULBs
3. Increased public health risks due to open defecation in rural/urban areas & inadequate sanitation at tourist units / destinations / transit points & transportation routes.	Inadequate sanitation infrastructure (rural & urban). Unregulated tourist transit points. Drinking water source / transmission & distribution coming in contact with sewage, Municipal & Bio-Medical Wastes.	Increased burden of diseases/ mortality.	Prepare & implement community/household level projects on sanitation in rural areas/urban slums.				√	PRIs	IPH, Health, Rural Development Departments, NGOs/CSOs, PRIs
			Develop & implement sanitation plans for *mela* ground transit points, trekking routes, tourist destinations as part of Tourism Master Plan.			√	√	Department of Urban Development / Department of Rural Development	IPH, Infrastructure Developers, Operators, NGOs/CSOs/ ULBs, Department of Tourism.

Issues/Problems	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
4. Inadequate integration of water resource/water supply/sewage/ sanitation approach leads to higher water consumption and sewage generation.	Competing water use. Inadequate demand side management. Inadequate monitoring of consumption. Independent institutional responsibility for consumption.	Change in hydrological regimes leads to ecological imbalance. Resource loss. Catchment degradation/ sewage generation. Water pollution	Ensure adequate water availability for implementation of sewerage schemes in urban areas & low cost sanitation in rural areas/urban slums.			√	√	PRIs	IPH, ULBs/ NGOs/PRIs/ CSOs, CWC, CGWB, DEST.
			Promotion of appropriate technology for recycling and treatment, e.g., decentralised treatment, common septic tanks, soak pits, manuring as per CEPHHO guidelines/manual.		√		√	PRIs	IPH, ULBs/ NGOs/PRIs/ CSOs, CWC, CGWB, DEST
5. Inadequate finances to accelerate / upgrade / implement water supply & sewage infrastructure results in water pollution.	Inadequate pricing of resources. Continued subsidy. Resource under valuation. Government expenditure.	Water pollution due to inadequate infrastructure.	Implement reforms for water supply distribution, metering and revenue collection, sewage collection, treatment & disposal, sanitation.			√	√	IPH/ Department of Urban Development.	Infrastructure Developers, Operators, NGOs / CSOs / ULBs.
			Carry out viability studies for different economic instruments, e.g., environmental services charge. 'Polluter Pays' principle in water & sewage sector in the State & implement the solution.	√		√	√	Department of Urban Development/ Department of Rural Development.	Consultants, Directorate of Factories, Departments of Health & Family Welfare.

Issues/Problems	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
			3. Develop and implement IT solution, e.g., online billing & payment.				√	Department of Urban Development/ Department of Rural Development.	DEST, IPH, ULBs, IPH.
6. Gap in institutional operational mechanisms related to sanitation leads to gap in operational efficiency.	Inadequate implementation of existing regulation & reforms. Inadequate integrated planning & coordination.	Gaps in service delivery. Increased water pollution.	Constitute a State level coordination committee to prioritise & implement integrated water resources /water supply/sanitation plans, programmes and projects.		√	√	√	IPH/UD/RD	Department of health & family welfare, ULBs
			Monitoring the progress of prioritised plans, programmes & projects quarterly.		√	√	√	Department of Environmental Science &Technology (DEST)	IPH/Department of Urban Development, Department of Rural Development, Department of Health & Family Welfare, ULBs.
7. Tardy implementation of reforms/lack of public participation in water supply & sewage sector leading to reduced coverage of sanitation services.	Lack of implementation of reforms. Lack of business model.	Reduced infrastructure development. Gaps in service delivery. Increased waste pollution.	Accelerate & implement time bound reforms / programmes / projects leading to Private Sector & NGO participation in the sector.			√	√	UD/RD/IPH	PRIs/NGOs/ CSOs, IPH, ULBs
			Accelerate / implement actions / projects under sanitation plans of PRI at village level.			√	√	Department of Rural Development	IPH, PRIs, Rural Development Department/ Health & Family Welfare Department
			Develop and implement gender empowerment & participation under rural sanitation projects.			√		Department of Rural Development	IPH, PRIs, Health & Family Welfare Department
8. Inadequate awareness leads to	Lack of ownership of the resource.	Unhygienic living condition/ burden	Accelerate/Initiate action for implementation of IEC			√	UD/RD	DEST/ULBs/	PRIs/ CSOs,

				Response			Institutional Responsibility	
					Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
lack of community participation in sanitation sector.	Difficult terrain & desperate location. Lack of gender participation. Lack of NGOs participation.	of disease. Increased Government expenditure for management of sanitation. Water pollution.	programmes under each health scheme/ programmes being implemented at the State level.						HPPCB, Health & Family Welfare Department
			Design & Initiate awareness development programmes / projects with NGOs/CSOs.			√		UD/RD	PRIs, NGOs, CSOs, Health & Family Welfare Department, Municipalities, ULBs, Department of Tourism, IPH.

1.4 Health

Proposed Actions, Type of Response and Inter-sectoral Responsibilities

Issues/Problems	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordination Agencies	Collaborating Agencies
1. Water related diseases due to inaccessibility to safe drinking water.	Untreated water supply source. Microbiological contamination from human/animal excreta, etc. Chemical contamination from agriculture / pesticides. Lack of dependable water source. Lack of storage infrastructure.	Health risks / epidemics diarrhoea/water related diseases Health risks / unhygienic living conditions.	Promote household drinking water storage, purification and prevention of microbial contamination programme in urban/rural areas.			√	√	Health & Family Welfare Department.	TCP IPH Rural Development Department, PRIs, CSOs.
			Prepare & implement community/household level 'water supply source protection projects' in rural areas.				√	PRIs	Health, Rural Development Departments, CSOs Department of Agriculture Department of Forests.
			Prepare & implement community / household level projects on water storage structures in rural areas.				√	PRIs	Health, Rural Development Department, NGOs/CSOs.
			Monitoring of water borne diseases by setting up water testing labs at district level.				√	IPH,	DEST, Health, PRIs, ULBs.
			Increase monitoring (frequency & location) of drinking water quality in rural, urban areas at source & household levels. These part parameters could be pH, total dissolved solids, suspended			√		IPH	DEST, PCB, ULBs/PRIs/ CSOs, Health & Family Welfare Department.

Issues/Problems	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	P :t	Coordination Agencies	
			solids, biological oxygen demand/dissolved oxygen, bacteriological count Maximum Probable Number Method.						
			Promote safe and potable drinking water by way of installing RO/UV based water treatment system in schools.				√	Department of Education.	Department of Planning.
2. Health issues due to inadequate sanitation	Lack of infrastructure. Lack of latrines. Inadequate sewage collection, treatment & disposal.	Health risks/unhygienic living conditions/water borne diseases.	Accelerate/initiate actions envisaged in project implementation plan for sanitation.				√	PRIs	Department of Health & Family Welfare, TCP, Department of Education, NGOs/CSOs
			Monitor progress of National Rural Health Mission(NRHM) programme performance.				√	PRIs	Health & Family Welfare Department, Department of Education Department of Environment, Science & Technology / NGOs / CSOs
			Monitor occurrence of water borne diseases versus intervention, e.g., functional latrines in households/communities in rural areas & urban slums in each district.			√		Department of Environment, Science &Technology	Health & Family Welfare Department/NGOs/CSOs/ULBs/PRIs, MCs ULBs HIMUDA
			Ensure adequate water supply & provide proper sewerage system by connecting each household with sewerage system.					IPH	
3. Health issues	Inadequate	Health risks /	Accelerate / initiate actions					Urban Local	Health & Family Welfare Department, TCP,

Issues/Problems		Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordination Agencies	Collaborating Agencies
due to inadequate solid waste collection & treatment.	infrastructure for Municipal Solid Waste collection, treatment & disposal Inadequate infrastructure for Bio-Medical Waste collection, treatment & disposal	unhygienic living conditions/water borne diseases	envisaged in project implementation plan for Bio-Medical Waste management under NRHM.				√	Bodies	Infrastructure Developers / Operators / NGOs /CSOs / PRIs
			Accelerate/initiate actions for bio-medical waste management by setting up incinerators at district level, industrial areas and also in ULBs, which receive high number of tourists in view of promotion of health tourism in the State.				√	Health & Family Welfare Department &PRIs	Infrastructure Developers/Operators/NGOs/CSOs/ULBs Department of Tourism
			Monitor occurrence of infectious diseases in rural/urban areas versus intervention, e.g., Municipal Solid Waste / Bio – Medical Waste in each district.			√	√	Department of Environment, Science &Technology	Health & Family Welfare Department / NGOs, ULBs, PRIs
4. Personal hygiene & sanitation.	Population behavior with respect to: Open defecation. Lack ofhabit of hand washing. Lack of kitchen cleanliness. Lack of bathing. Lack of latrine use.	Health risks / unhygienic living conditions / water borne diseases.	Awareness generation for promoting personal hygiene & safe sanitation practices in urban & rural areas.				√	PRIs &Education	Health & Family Welfare Department, NGOs/CSOs/ULBs
			Strengthening of existing awareness campaigns for propagating personal hygiene & safe sanitation practices in rural/urban areas.			√		PRIs &Education	Health & Family Welfare Department, NGOs/CSOs
			Strengthen awareness campaigns on health & environment theme &			√		Department of Environment,	Health , NGOs PRIs CSOs/CBOs HP- SC/ST

Issues/Problems	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordination Agencies	Collaborating Agencies
			monitor the performance of awareness campaigns.					Science &Technology	Schools
5. Health deterioration due to air pollution	Exposure to smoke due to burning of wood as domestic fuel. Air pollution due to increased vehicular traffic. Air pollution due to emissions from industries especially in Solan and Sirmaur.	Health risks / increase in respiratory diseases.	Awareness generation to promote awareness about health impacts of fuel wood/biomass usage as domestic fuel.			√	√	Himachal Pradesh Pollution Control Board (HPPCB)	Health & Family Welfare Department, TCP, NGOs/CSOs
			Promote alternate domestic safe/cleaner fuel to reduce dependence on fuel wood in urban areas.			√		Himurja	ULBs
			Promote solar energy applications for domestic usage in rural/urban areas through incentives.			√		Himurja	PRIs/CSOs/ NGOs
			Strict compliance to air quality standards in industrial areas.			√		HPPCB	DEST / Department of Industries
			Strengthen awareness campaigns & monitor air quality in urban areas.			√		HPPCB	ULBs Transportation, Department of Industries
			Strengthening of existing awareness campaigns for promoting safe/cleaner fuel & solar energy usage.			√		Himurja	NGOs/ CSOs / DEST
			Strengthen awareness campaigns & monitor their performance.			√		DEST	Health/Himurja/ NGOs/CSOs
			Design & promote crematorium, which minimise consumption of fuel wood.				√	MCs	ULBs, RWAs, Citizens groups.

Issues/Problems	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordination Agencies	Collaborating Agencies
			Promote electric crematorium.						
6. Lack of awareness about health issues & practices	Limited reach & extent of public awareness campaigns due to topography/hilly terrain Lack of NGO/CSO participation	Health risks / increased burden of diseases / mortality	Accelerate/initiate actions for implementation of IEC programmes under each health scheme/programmes being implemented at State level.			√		Health & Family Welfare Department	DEST/IPH/Rural Development Departments/ PRIs/CSOs
			Design & Initiate awareness generation programmes/projects with NGOs/CSOs.			√		Health & Family Welfare Department	CSOs/NGOs
7. Inadequate health infrastructure	Inadequate mechanism for drugs availability and distribution Inadequate capacity of health infrastructure / facilities including buildings & equipment Shortage of trained medical / paramedical staff at PHC / CHC level Lack of NGOs/ CSOs & Private Sector participation in health care system	Health Risks / Increased burden of disease / mortality.	Accelerate/initiate actions for drugs distribution envisaged in project implementation plan of NRHM for the State.				√	Department of Health & Family Welfare	TCP, Rural Development Departments/ PRIs/ NGOs/CSOs
			Accelerate/initiate actions for health infrastructure development.				√	Department of Health & Family Welfare	Rural Development Departments/PRIs/NGOs/CSOs
			Accelerate/initiate actions for hiring medical/paramedical staff on contract basis.				√	Health & Family Welfare Department	Rural Development Departments/PRIs/NGOs/CSOs

		Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordination Agencies	Collaborating Agencies
8. Health ' malnutrition	Poor nutrition to vulnerable social segments, e.g., BPL families / Infants/mothers.	Health risks/mortality.	Accelerate/initiate actions under RCH component of NRHM.				√	Health & Family Welfare Department & Social Justice & Empowerment	Rural Development Departments/PRIs
			Monitoring of Infant/maternal nutrition supplement programmes under different schemes.			√		Health & Family Welfare Department	Rural Development Departments/PRIs/NGOs/CSOs
9. Occupational health of workers in industries	Inadequate ventilation, cleanliness, sanitation and safe working practices.	Health risks/increased disease burden.	Strict monitoring of workers' health.			√		Directorate of Factories	Rural Development Departments/PRIs/NGOs/CSOs DEST, HPPCB
			Implementation occupational health & safety (OHS) management system.				√	Industry	Consultant, Directorate of Factories, Department of Health & Family Welfare
10. Communicable diseases due to tourism (HIV/AIDS)	Proliferation of HIV/AIDS due to unsafe practices. Lack of awareness.	Health risks / increased disease burden.	Implementation of prevention, care & support & treatment components under National AIDS Control Programme – III. This includes implementation of Information, Education, Communication & Capacity (IEC) building campaigns.			√	√	Health & Family Welfare Department & Higher Education	NGOs, CSO, PRIs, ULBs DEST
11.I nadequate infrastructure for management of hazardous waste, biomedical waste, radioactive waste.	Improper siting. Inadequate treatment and disposal. Mixing of wastes	Health. risks/increased disease burden.	Segregation of wastes from different streams. Undertake need assessment for setting up new treatment				√	HPPCB	Department of Health and Family Welfare, Health Institutions (Private / Government) ULBs, MCs

	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	P	e P :t		
	from different streams.		and disposal facilities.						
12. Inadequate Monitoring & Evaluation.	Inadequate awareness. Inadequate staff. Inadequate capacity & skills.	Early warning system of health epidemics/ disease outbreak not functional.	Undertake training need assessment and prepare capacity building plan ncluding hiring of specialised and skilled staff. Launch awareness programmes.			√		Health & Family Welfare Department & Social Justice & Empowerment	Health Institutions (Private/Government) ULBs MCs
13. Inadequate Research & Development (R&D) & medical professional course/training & retraining for existing staff in emerging health issues.	Lack of specialised & super specialty health institutions in the State. Lack of trained health professionals/ paramedical staff.	Health risks/increased disease burden. Projected growth in Health and Tourism may not be realized.	Assess and identify gaps in R&D in view of new & emerging health risks & diseases. Undertake need assessment of setting up new super specialty health institutions in the State to address R&D needs, medical professional course & training including paramedical staff. Seek accreditation for existing & new health institutions undertaking R&D, imparting medical professional courses & trainings.					Directorate of Medical Education.	Department of Health & Family Welfare, Medical Council of India.

1.5 Road & Transport

Proposed Actions, Type of Response and Inter-sectoral Responsibilities

Issues/Problems	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
1. Lack of Access due to Poor Road Connectivity.	Lack of availability of infrastructure facilities, collection facilities. Expensive transportation.	Loss/wastage of produce and increased pollution. Deterioration in quality of produce . Input resource loss, e.g., fertlisers, soil nutrients, water.	Development of State Highway Master Plan in line with Tourism Master Plan, horticulture development plan and other State plans.		√		√	PWD	ULBs, Department of Urban Development, Department of Rural Development, PRIs, NGOs, CSOs, Municipalities, Department of Transportation, Department of Industry.
			Development of State Rural Road Master Plan for rural roads, connecting roads in line with Tourism Master Plan, horticulture development plan and other plans.		√		√	PWD	Rural Development Department, PRIs, NGOs, CSOs, Health & Family Welfare Department, Municipalities, ULBs, Department of Urban Development, Department of Tourism, Department of Transportation, Department of Industry.

Issues/Problems	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
2. Poor Road Conditions Leading to Delayed Access to Warehousing as well as Markets.	Lack of maintenance of road infrastructure. Poor traffic management. Input resource loss.	Loss/wastage of produce & increased pollution. Deterioration in quality of produce. Input resource loss, e.g., fertlisers, soil nutrients, water.	Prepare State Highway/rural road upgradation plan as part of State Highway & Rural Road Master Plan.				√	PWD	Rural Development Department, PRIs, NGOs, CSOs, Health & Family Welfare Department, Municipalities, ULBs, Department of Urban Development, Department of Tourism, Department of Transportation, Department of Industry.
3. Development of New Road Infrastructure Leading to Associated Environmental Problems.	Change in land use. Activity generation.	Habitat degradation. Air pollution. Water pollution. Soil erosion. Land use change.	Develop rural roads infrastructure as per Indian Roads Congress codes.				√	PWD	ULBs, Department of Urban Development, Department of Rural Development, PRIs, NGOs, CSOs, Municipalities.
			Make Environment Impact Assessment & Environment Management Plan mandatory for all development of new State Highways. Provisions of funding mitigation measures as part of Environment Impact Assessment & Environment Management Plan should be made mandatory as part of project cost.		√			PWD	ULBs, Department of Urban Development, Department of Rural Development, PRIs, NGOs, CSOs, Municipalities, Department of Transportation, Department of Industry.

Issues/Problems	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
			Carry out strategic environmental assessment (EA) for State Highway/Rural Road Master Plan.			√		Steering Committee of Secretaries.	PWD, DEST, ULBs, Department of Urban Development, Department of Rural Development, PRIs, NGOs, CSOs, Municipalities, Department of Transportation, Department of Industry.
			Monitor both State Highway & Rural Road Master Plan as per EA's recommendation.			√		Steering Committee of Secretaries.	PWD, DEST, ULBs, Department of Urban Development, Department of Rural Development, PRIs, NGOs, CSOs, Municipalities, Department of Transportation, Department of Industry.
			Monitoring muck disposal plan of all State/National rural road project as part of Environment Management Plan.			√		PWD	DEST, PRIs, Infrastructure Developers, Operators, NGOs, CSOs, ULBs, IPH, Department of Urban Development, Department of Tourism, Department of Transportation, Department of Industry.

Issues/Problems	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
			Develop environmental training and capacity building plan for PWD/other stakeholders as part of strategic EA plan.			√		Department of Environment,Science & Technology	PWD, PRIs, Infrastructure Developers, Operators, NGOs, CSOs, ULBs, IPH, Department of Urban Development, Department of Tourism, Department of Transportation, Department of Industry.
4. Development of Road Infrastructure Leading to Unplanned/Unauthorised Urbanisation in both Rural and Urban Areas.	Fragmentation of habitat. Loss of flora and fauna. Unauthorised shops and encroachment adjacent to right of way both in rural and urban areas.	Soil erosion. Restricted movement leading to safety hazards. Waste generation (Municipal Solid Waste & sewage). Congestion on the road.	Strict implementation of Municipal laws & bye laws.			√		ULBs/PRIs, PWD	PWD, Infrastructure Developers, Operators, NGOs, CSOs, IPH, Department of Urban Development, Department of Rural Development, Department of Transportation, Department of Industry.
			Strict implementation of laws related to environment at State & National Highways.			√		ULBs/PRIs, PWD	PWD, Infrastructure Developers, Operators, NGOs, CSOs, IPH, Department of Urban Development, Department of Rural Development, Department of Transportation, Department of Industry.

Issues/Problems	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
			Strict implementation of State Highways/Rural Road Master Plan & strategic road sector Environment Assessment plan.			√		Office of Chief Secretary	PWD, Infrastructure Developers, Operators, NGOs, CSOs, ULBs, PRIs, Department of Urban Development, Department of Rural Development, Department of Transportation, Department of Industry.
5. Lack of Parking Infrastructure in Urban Areas Leading to Congestion and Air Pollution.	Lack of space at markets/commercial establishments, tourist places, religious places. Vehicle numbers exceeding planned development.	Traffic congestion. Air pollution. Safety/public health hazards.	Development of parking infrastructure as part of Urban Master Plan.				√	ULBs	PWD, ULBs, PRIs, Department of Urban Development, Department of Rural Development.
			Development of parking infrastructure as part of Tourism Master Plan.				√	Department of Tourism	PWD, ULBs, PRIs, Department of Urban Development, Department of Rural Development, Department of Transportation, Department of Industry.
			Ensure Private Sector participation in parking infrastructure.				√	ULBs/PRIs	PWD, ULBs, PRIs, Department of Urban Development, Department of Rural Development, Department of Transportation, Department of Industry.

Issues/Problems	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
			Strict implementation of traffic rules.			√		Himachal Police	PWD, ULBs, PRIs, Department of Urban Development, Department of Rural Development, Department of Transportation, Department of Industry.
6. Traffic Congestion at Tourist Spots in Rural Areas leading to Problems, such as Air Pollution and Waste Generation.	Ad hoc development in the absences of planned development.	Air pollution. Waste generation. Safety/public health risks.	Identify and privatise places of tourist interest, where traffic is a bottleneck.			√		Department of Tourism	Department of Urban Development, Department of Rural Development, PWD, PRIs, Department of Transportation, Department of Industry.
			Develop traffic management plan for specific tourist places, where traffic is a bottleneck, e.g., Rohtang pass, Kufri.			√		Department of Tourism	Department of Urban Development, Department of Rural Development, PWD, PRIs, Department of Transportation, Department of Industry.
			Monitoring of air quality at specific tourist spots.			√		HPPCB	Department of Tourism, DEST, PRIs .

Issues/Problems	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
7. Lack of Traffic Management in Urban Areas Leading to Air and Noise Pollution	Lack of traffic management during peak tourist season.	Air pollution. Noise pollution.	Develop traffic management plans for urban areas.		√		ULBs	Infrastructure Developers,	Operators, NGOs, CSOs, Department of Urban Development, Himachal Pradesh Police.
			Monitoring Air & Noise Pollution.			√		Department of Urban Development	Consultant, IPH, ULBs, Departments of Health & Family Welfare, Department of Transportation, Department of Industry.
8. Poor Public Transportation in Urban Areas Leading to Traffic Congestion	Lack of alternate transportation system and inefficient operation of existing system, e.g., ropeways, combining existing public bus transportation with other modes.	Air pollution. Noise pollution. Safety/public health risks.	Develop urban transportation plan using alternate modes.		√		ULBs	PWD, DEST,	Himachal Police, ULBs, Department of Health & Family Welfare, Department of Transportation, Department of Industry
9. Lack of Safety and Public Health Risks due to Congested Road Infrastructure.	Migration of labor for new construction & upgradation of road infrastructure. Difficult operation of health infrastructure. Difficult access to health infrastructure.	Safety/public health risks.	Development & implementation of district-wise rapid response plan for accidents & other emergencies.		√		√	Accident/ Disaster Management Unit	Department of Health & Family Welfare, ULBs, Rural and Urban Development Departments, PRIs, NGOs, CSOs, IPH, ULBs.

Issues/Problems	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
			Repatriation of migrant labor should be made mandatory as part contractor's contractual conditions. Contractor should be penalised for non-compliance.	√				PWD	Department of Health and Family Welfare, ULBs, Rural and Urban Development Departments, PRIs, NGOs, CSOs, IPH, ULBs, Department of Transportation, Department of Industry.
10. Lack of Resources for Road / Highway Upgradation and Infrastructure Development.	Lack of Private Sector participation in road infrastructure development. Lack of resources results in decreased environmental management.	Non implementation / mainstreaming of environmental & safety safeguards.	Ensure Private Sector participation in road infrastructure development.			√		PWD	ULBs, Department of Urban Development, Department of Rural Development, PRIs, NGOs, CSOs, Municipalities, Department of Transportation, Department of Industry.
			Project development under PPP.			√		PWD	ULBs, Department of Urban Development, Department of Rural Development, PRIs, NGOs, CSOs, Municipalities, Department of Transportation, Department of Industry.

Issues/Problems	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
			Environmental budget should be prepared for implementing mitigation measures as part of DPR.			√		PWD	ULBs, Department of Urban Development, Department of Rural Development, PRIs, NGOs, CSOs, Municipalities, Department of Transportation, Department of Industry.

1.6 Mining & Geology

Proposed Actions, Type of Response and Inter-sectoral Responsibilities

Issues / Problems	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agency	Collaborating Agency
1. Siting of mining areas.	Mining deposits are site specific & have to be developed & mined/operated only where they exist. Hence, it is all the more important to select proper mining sites, which causes the least damage to environment.	Disturbance to environment, forest land, fertile land, etc. Problems due to land acquisition and rehabilitation of land and persons displaced. Disturbance to vegetation growth along with bio-diversity and fauna of the area. Air, water and noise pollution. Land degradation and waste disposal etc. Loss of aesthetic beauty etc.	Proper appraisal of the mineral deposit with respect to environmental issue. Concept of sustainable development to be kept in view while considering mining projects. If all clearances have been granted for mining lease, strict implementation of mining plan, mine closure plan, EIA/EMP documents, Pollution Control Board conditions of the Consents, MoEF / Forest Department conditions of the consents etc. should be carried out. Strict monitoring of all environmental issues.			√	√	Dept. of Industries, Mining & Geology	Planning Department, HP State Land Use and Wasteland Development Board, Dept. of Industries, Central Pollution Control Board, Himachal Pradesh Pollution Control Board, Industry Associations Department of Environment Science & Technology NGOs / CSOs
2 Ambient Air Quality/air pollution due to dust generated during various mining processes.	Dust generated due to various mining activities causing air pollution. Drilling Blasting Loading and unloading of mined materials On haulage roads, transportation of material through trucks. Fixed sources, like crushers, screen, conveyors, etc. Air borne dust due to wind action.	The consequences of air pollution due to dust generated during mining operations may impact: Visible plumes and haze. Staining and soiling of surfaces. Aesthetic or chemical contamination of vegetation or water bodies.	To identify potential sources of dust. Prediction of dust levels likely to occur near the mines site. Evaluating the potential of dust particles to affect environment and human health. Incorporating dust predictions and control measures into mine planning and design, which include: Dust to be controlled by erecting enclosures. Internal roads to be surfaced.			√ √ √	√	Project Proponent	Department of Industries, Mining & Geology Dept. of Urban Development/ ULBs Central Pollution Control Board, Himachal Pradesh Pollution Control Board,Dept of Transport Himachal Pradesh Public Works

				Response				Institutional Responsibility
				Policy	Plan	Programme	Project	Coordinating Agency	Collaborating Agency
			Dust to be suppressed by water sprays. Green barriers along mine roads. Before charging and blasting, consider atmosphere conditions. Regular monitoring for SPM (Suspended Particulate Matter), NO_X (Oxides of Nitrogen) and SO_2 (Sulphur Dioxide) levels at fixed locations.						Department HP Infrastructure Development Board Department of Environment Science & Technology.
3. Water quality/water pollution/depletion of water sources.			To follow zero discharge policy into natural water sources, thereby eliminating the causes of contamination. Recycling of water and setting up of water treatment plants. Suitable treatment of water passing through a settling tank before discharging into natural courses. Water to be systematically stored and used for plantation. Bench the slopes inward. Proper drains towards hillside to be constructed for proper drainage of rain water.			√	√	Project Proponent	Department of Industries, Mining & Geology Dept. of Urban Development/ ULBs CPCB, HPPCB Dept of Transport Himachal Pradesh, Public Works Department, Department of Environment, Science & Technology

Issues / Problems	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agency	Collaborating Agency
		temperature by a few degree Celsius (ºC). Aesthetic pollution due to change in colour due to toxic elements. Foam and froth due to mineral beneficiation. Radio-activity. Lowering of water table and depletion of water resources.							
4. Noise pollution	The noise generated due to mining and allied equipments arises from: Working of machinery like loaders, dozers, locomotives, etc. Fixed plant installations, like crushers, conveyors, pumps, ventilation fans. Mobile plants, like compressed air rock drills, large portable compressors, diesel, trucks, front end loaders, etc.	Exposure to noise beyond certain level is harmful to human health and efficiency. The generation of unreasonable noise within the environment affects people adversely. Interference with sleep. Effect on	For abatement of noise: Barriers to acoustic line of sight serve as feasible solutions. Barriers may be: Walling Planting Control of noise by: Reducing sound at source. Interrupting the path of noise. Protecting the receiver. Other techniques Such as Reducing time of exposure. Lubrication maintenance			√	√	Project Proponent	Department of Industries, Mining & Geology Dept. of Urban Development/ ULBs CPCB, HPPCB Dept of Transport HP PWD DEST

Issues / Problems	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agency	Collaborating Agency
	Blasting activities.	hearing Effect on communication Effect on mental and physical health. Effect on working efficiency. Continuous exposure of workers to high levels of noise may result to: Annoyance Fatigue Hypertension Loss of hearing Temporary shift in threshold limit of hearing. Other anatomical disturbances, like change in breathing amplitude, gastric secretion, etc.	and speed rating. Design of equipments Green belts. Ear protection Controlled blasting.						
5. Waste management	Removal of over-burden and inter-burden. Refuse from ore processing plants including slimes, mud and tailings. Waste from lubricants, oil and grease from mining machinery. Disposal of sub-grade mineral.	External dumps are permanent sources of land pollution as they get washed off with rains and cause air borne dust through wind action. They look ugly and repulsive. In hilly areas, the	No mining to be allowed where ore overburden ratio is more than 1: 0.20. Disposal of over-burden and waste to be done at predetermined locations as per the mining plan. Location to be properly designed for stabilisation and re-vegetation and to resist long term erosion. Proper drainage to be	√		√	√	Dept. of Industries Mining & Geology Dept. of Urban Development/ ULBs Project Proponent	Department of Industries, Mining & Geology Central Pollution Control Board, Himachal Pradesh Pollution Control Board,

Issues / Problems	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agency	Collaborating Agency
		waste flowing through natural surface destroys vegetation, chokes natural drainage and the run off during rainy season; and spoils the surrounding landscape in terms of stability and natural land form.	constructed to handle heavy rainfall events. Appropriate garland drains to be provided all around. Proper aesthetic to the waste dumps be given in relation to the surrounding landscape, so that the area blends with the natural land after rehabilitation.						Department of Transport, Himachal Pradesh Public Works Department, Department of Environment Science & Technology
6. Change in land use.	Mining is a temporary land use and is not an everlasting process. The land use pattern undergoes a change due to the use of land for mining, excavation, dumping and other associated activities.	Where communities exist at a potential mine site, mining impacts on the lost environment can significantly influence community attitude to the operation. Change in topography. Change in local drainage patterns etc.	Any substantial change from the pre mining land form should be contemplated only after full consultation with the local community, regulatory authorities and research has been undertaken. The post mining land form, drainage and vegetation association should be stable, self sustaining, visually compatible with surrounding land and also meet community expectation. Strict compliance of Mine Plans and Mine Closure Plans, which are approved by Indian Bureau of Mines, Government of India.			√	√	Dept. of Industries, Mining & Geology Project Proponent	Department of Industries, Mining & Geology Dept. of Urban Development/ ULBs CPCB, HPPCB Dept of Transport HP PWD DEST
7 Loss of flora and fauna.	The mining operations cause change in the density of flora and also affects the plantation in the core as well as buffer zones. Impact on fauna due to noise, land degradation and	Loss of natural vegetation cover. Fleeing away of fauna	Strict implementation of compensatory afforestation plan as part of EIA/EMP and the mining plan. Cataloguing individual species for identification of rare and endangered plants and animals.			√	√	Department of Forests	Planning Department, HP State Land Use and Wasteland Development Board Department of

	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agency	Collaborating Agency
	deforestation also results because of change in the land use.		Minimising impacts of mines on flora and fauna through proper layout and designs. Proper top-soil management for ensuring proper rehabilitation of land by plantation.						Industries, Mining & Geology HPPCB DEST Forest Department Forest Survey of India DEST
8.Poor Aesthetics/visual impacts	Mining activities remove vegetation cover, modify the land forms, create colour contrasts and impose man-made objects into natural vistas.	Looks like an eye sore	Improve aesthetic beauty by planning proper location of dumps, plants, residential areas along with plantation. Visual safeguards. like tree screens & screening with bunds to be considered. Proper check dams for controlling the debri flow to improve aesthetic of the area. Contouring or reshaping the worked out benches/pits or dumps of waste rock.			√	√	Department of Industries mining & Geology Department of tourism, Department of Environment Science & Technology	Industry Associations, Planning Department, HP State Land Use and Wasteland Development Board, Forest Department, Forest Survey of India

1.7 Industries

Proposed Actions, Type of Response and Inter-sectoral Responsibilities

Issues/Problems	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
1. Siting of mining areas.	Concentration of industries in Shivalik Himalaya & focus on the extraction of a few mineral resources. The siting of Industries is being done as per the available land bank & not as per the Zoning Atlas for Industries.	Over extraction of mineral resources & environment pollution.	Undertake Regional Environmental Impact Assessments/Cumulative Impact Assessment. Complete Zoning Atlas for industrial siting & ensure its strict implementation. Preparation of region specific map for siting (in GIS environment). Preparation of region specific industrial siting guidelines. Revisiting land-use surrounding hazardous units (in case industry is already commissioned) Prepare district-wise Environmental Atlas. Proper appraisal of the site with respect to environmental issues.			√	√	Dept. of Industries	Planning Department, HP State Land Use & Wasteland Development Board, Dept. of Industries, CPCB, HP-PCB, Industry Associations DEST NGOs/CSOs

				Response	Institutional Responsibility	
					Coordinating Agencies	Collaborating Agencies
			Concept of sustainable development to be kept in view while considering mining project. If all clearances are through for grant of mining lease, adhere to strict implementation of mining plan, mine closure plan, Environment Impact Assessment / Environment Management Plan document, PCB conditions, MoEF/Forest Department conditions etc. Strict monitoring of all environmental issues.			

				Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
2 Ambient Air Quality/air pollution due to dust generated during various mining processes.	Dust generated due to various mining activities causing air pollution.	Exceedence of the National Ambient Air Quality Standards (NAAQS).	Strict implementation of Urban Master Plan including zonation.		√		√	Dept. of Urban Development/ULBs	Dept of Industries
			Preparation and implementation of green belt management plan and restoration of exposedareaaspartof industrial estate development plan.		√		√	-do-	-do-
		Impact on human health, particularly that of industrial workers.						Department of Industries	CPCB, HPPCB Dept of Transport HP PWD HP Infrastructure Development Board Department of Tourism
			Disposal of loose material at designated places.			√			

				Response			Institutional Responsibility	
				Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
3. Deteriorating water quality and quantity.	Concentration of industries in Shivalik Himalaya & focus on the extraction of a few mineral resources.	Further, deterioration of water quality in terms of benchmarks set in Primary Water Quality Criteria & Designated Best Use of Fresh Waters (A-E).	Optimisation of usage by introducing the concept of 3 Rs (Reduce, Recover & Recycling) & zero discharge industry.			√	Department of Industries	CPPCB HPPCB DEST NGOs/CSOs Dept. of Industries Central Ground Water Board DEST
			Prepare & implement water harvesting plan to ensure water conservation decreasing in areas of water table.			IPH		
	Ancillary development in the industrial area including urban infrastructure entailing construction activities, improper discharge of industrial effluents (treated/untreated), sewage and Municipal solid wastes.	Water table decreases locally, often drastically, resulting in drying up of wells & springs in the neighbourhood	Strictly monitor exposed area restoration plan as part of Environment Management Plan of mines.			Himachal Pollution Control Board		Department of Industries, Industry, Association DEST Dept of Industries, HP Infrastructure Development Board Department of Tourism
	Deeper excavation on	Adverse effect on water users and the aquatic ecosystem. The impact is particularly						Industry Associations IPH, ULBs HP Infrastructure Development

Issues/Problems	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
	the surface or underground digging.	significant if water users situated downstream of the site are abstracting water for drinking/domestic use. Suspended solids can also significantly increase water treatment costs.	Strictly monitor water quality in mined areas and industries.						Board Department of Tourism
	Exposure of fresh rocks due to mining initiates weathering with the inevitable generation of substances, which cause water pollution.						Himachal Pollution Control Board		-do-
	Mining activities increase suspended solids and chemical contamination in the water at the site and downstream.								
4. Noise pollution	Concentration of industries in Shivalik Himalaya & focus on the extraction of a few mineral resources.	Exceedence of the National Ambient Noise levels.	Prohibit blasting operations in mines/industry.				√	Department of Industries	DEST, CPCB, HPPCB, Police, HP PWD HP Infrastructure Development Board Department of Tourism
	Ancillary development in the industrial area including urban infrastructure entailing construction activities, vehicular movement, industrial operations	Noise drives away wild animals and birds from the nearby forest.	Strict implementation of noise mitigation measures as part of Environment Management Plan.						

Issues/Problems	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
	etc. Noise and vibrations due to blasting & operation of machines & equipments used in the mines for various purposes including transportation of the overburden & mineral.	Impact on human health, particularly on that of industrial workers.	Strict implementation of buffer zone management plan as part of industrial estate development plan.			√	√		DEST HPPCB DEST HPPCB Industry Association CSOs, NGOs
5. Inadequate hazardous waste treatment & disposal.	Congregation of industries in Shivalik Himalaya & focus on the extraction of a few mineral resources. Hazardous waste inHimachal Pradesh comprises Sludge from Effluent Treatment Plants, Waste Oils, Contaminated Containers, Others (Residual wastes) & Process Residue. Gaps in Hazardous Waste Generation & treatment. Inadequate number of Common	Gaps between hazardous waste generation & treatment may increase further leading to deterioration of water quality.	Strict implementation of Hazardous waste management plan as part ofEnvironment Management Plan.				√	Department of Industries	HPPCB, DEST
			Implementation of hazardous waste infrastructure development plan, e.g., Commom Effluent Treatment Plans/Treatment, Storage and Disposal Facility.			√		Industry Association	HPPCB, DEST
			Strict monitoring of hazardous waste generation & disposal.			√		HPPCB	DEST, Industries, Industry Association CSOs, NGOs.

Issues/Problems	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
	Effluent Treatment Plants (CETPs) & treatment, e.g., no CETP for Baddi and Barotiwala areas.								
6. Land degradation.	The land use pattern undergoes change due to use of land for mining, excavation, dumping & other associated activities. . Digging of open pits & dumping of overburden rock mass in the form of heaps. Polluted water from pits affects the characteristics of the topsoil, thus, affecting the end use. The damage pattern on the surface undergoes change due to alterations in the surface topography because of mining and associated activities.	The land use in the surrounding areas is affected due to the impact of mining on water regime. Change in value of the land& surrounding areas.	Development & implementation of exposed area restoration plan as part of Environment Management Plan of mined areas. Restoration/conservation of industry & mine area drainage pattern as part of exposed area restoration plan. Strict implementation of Catchment Area Treatment integrated with exposed area restoration plan.				√ √	HPPCB Department of Forests	Revenue Department, Planning Department, HP State Land Use & Wasteland Development Board, Industry Associations, HPSEB, HP PCL, HIMURJA, SJVNL Department of Energy, HP PWD HPPCB, DEST IPH Industry Associations

Issues/Problems	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
7 Loss of flora & fauna.	Removal of all vegetation (flora) & fauna from the area for mining & other purposes.	Loss of natural vegetation cover by clear felling, smothering and dust	Strict implementation of compensatory afforestation plan as part of Environment Management Plan.				√	Dept. of Forests	Planning Department, HP State Land Use & Wasteland Development
	Pollution of water in the surrounding water bodies, due to flow of debris on the slope, affects the aquatic ecology of water bodies.		Strict implementation of buffer zone management plan as part of industrial estate development/mine development areas					Dept. of Industries	-do-
	Dust in the atmosphere is caused by mining & associated activities. Dust when deposited on the leaves of the plants in the surrounding areas, retards their growth		Formulation & implementation of an integrated compensatory afforestation, buffer zone management plan.				√		
			Monitoring of green cover.					Office of Chief Secretary	All Line Departments
						√		-do-	Forest Department Forest Survey of India
8 Poor aesthetics.	Improper siting of Industries.	Change in land use.	Strict implementation of landscape restoration plan as part of exposed area restoration plan.			√		Department of Industries	Industry Associations, Planning Department, HP State Land

Issues/Problems	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
	Removal of vegetation from the mining area & flow of debris on the slope give an ugly look.	Change in value of the land& surrounding areas.	Monitoring of green cover.						Use and Wasteland Development Forest Department Forest Survey of India
9 Inadequate infrastructure & civic amenities in the industrial areas.	Improper siting of Industries/Industrial Areas.	Pressure on existing infrastructure & civic amenities.	Promote development of State of Art Industrial Areas.				√	Industries Department	Himachal Pradesh State Industries Development Corporation (HPSIDC),
	Inadequate need assessment of infrastructure & civic amenities.		Creation of Area Specific Statutory Development Agencies & entrust them with the task of managing urban growth in areas of their jurisdiction & for ensuring creation & strengthening of planned growth of social, housing, health, commercial and other related infrastructure.				√		Himachal Pradesh Housing and Urban Development Agency (HIMUDA),
	Inadequacies in perspective/Master Plan for Industrial Areas.								Area Specific Development Agencies,
			Promote self certification for industrial units including approval of building plans for specified plot sizes would be automatically deemed to have been given, provided the units certify themselves that they have			√			Town & Country Planning Department/ HPSIDC.

Issues/Problems	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
			adhered to the basic norms.						
10 Inadequate carrying capacity based planning process.	Improper siting of Industries/Industrial Areas.	Pressure on existing infrastructure & civic amenities.	Promote cluster based approach to industrial development.			√		Industries Department	HPSIDC
	Inadequacies in perspective/ Master Plan for Industrial Areas.	Haphazard growth, leading to ribbon development.	Prioritisation of industries that can be promoted in Himachal Pradesh.						
	Ribbon development.		Promote industries categorised as green rather than those listed as orange and red.						
	Inadequate attention to promote cluster based approach for development of Industries / Industrial Areas.		Promote and incentivise non polluting industries, e.g., IT, Biotechnology.						
			Capacity building / strengthening of ITIs to develop a cadre of trained professionals.						
11 Limited technological options to switch to green/clean technologies	Inadequate incentives for setting up / switching to green / clean technologies.	Deterioration of baseline environment conditions of land, water, air & noise.	Identify the areas where introduction of clean technologies is possible;			√		Industries Department	HPPCB DEST
	Inadequate understanding of	Increased capital cost & investment for	Identify the source(s) from where clean technology and data/details thereof can be obtained;						
			Assess the technology						

Issues/Problems	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
	green/clean technologies, which could be introduced in Himachal Pradesh.	setting up / switching to green / clean technologies.	available indigenously as well as those to be imported; Modify the technology, if necessary and demonstrate it to the satisfaction of the users, so that it can be replicated; Undertake Research and Development to develop technologies for cleaner production; Collect, collate and disseminate information on clean technology; Maintain interaction with the industry, financial institutions and Research and Development Laboratories for adoption of clean technologies.						
12 Impact of cement industry on tourism and transportation sector	Growth in cement industries in State as a result of Industrial Policy focus on utilisation of limestone resources Inadequate infrastructure including roads to assimilate unplanned growth in the cement industry.	Impact on Ambient Air and Noise Quality Deterioration of quality of roads and related infrastructure Reduced inflow of	Regulate the new cement industries based on the master plan of the given Industrial Area	√				Industries Department	HPPCB, DEST, Cement Manufacturers, Industry Associations

Issues/Problems	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
		tourists							
13 Inadequate transport management & infrastructure for transporting industrial & agri-horticultural produces.	Inadequate assessment of planning for infrastructure needs including transportation infrastructure.	Increased pressure on available infrastructure for transportation of industrial & agri-horticultural produce.	Evolve an efficient mechanism on competitive rates, so that transportation of raw material and industrial products is smooth & on competitive rates.			√		Industries Department	Industry Association Transporters' Association
		Deterioration of baseline environment conditions, especially that of air, noise and water.	Foster conducive environment of mutual appreciation and trust between Industry and Transport Unions and encourage regular dialogues between them so as to solve contentious issues at the local level.						
14 Issues related to migration, labour, housing & health.	Influx of migratory work force (skilled/unskilled) in and around Industrial Areas.	Social unrest in view of increased migration.	Demarcate specific areas around such industrial clusters where housing infrastructure could be created both in the Government & Private sector. Permission for purchase of land for captive housing would be given in a time bound manner to the industrial units set up in the State.				√	Industries Department	Service Providing Agencies
	Inadequate civic amenities in & around Industrial Areas.	Deterioration of quality of life in the existing urban/peri-urban areas &							Utilities Departments
	Inadequate Social								Industry Association

Issues/Problems	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
	Infrastructure (housing facilities, health, educational institutions etc.).	around Industrial Areas. Rise in the instances of communicable diseases.	Ensure supply of power & water to such housing complexes. Encourage Industries to tie up with local adjoining *Panchayats* and villages for arranging captive accommodation by helping such villagers augment their accommodation so as to cater to the specific needs of the workers, who could be housed in such units. Prepare Master Plan for new and existing Industrial Areas, focusing on the provision of infrastructure, including social infrastructure.						PRIs

1.8 Energy

Proposed Actions, Type of Response and Inter-sectoral Responsibilities

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
1. Change in natural flow/hydrology and water dynamics of the reservoir/wetland/water body.	Construction of a large number of reservoirs and dams; diversion of streams and rivers and hydro-electric projects lead to reduced flow into wetlands/water bodies/reservoirs. Further, the release of impounded water by dam/reservoir depends on the management authority. Small hydropower projects & other infrastructure development projects requiring water diversion also	Changes in Hydrological regime leading to variation in ecology of the small stream/*khud,* which in turn affects large streams & rivers. Ecological imbalance in aquatic flora & fauna including fisheries.	Assessment of hydrology in the immediate catchment / river basin for small hydro projects.				√	Power Utilities	Directorate of Energy Himurja HPSEB, BBMB HPPCL, SJVNL, IPH, Departments of Fisheries, Forests & Wildlife DEST HP PCB
			Assist line Department to ensure coordination between relevant authorities for the timing and volume of water release.		√	√			
			Assessment of sustainable ecological flow (15% or more, whichever is higher).	√		√			
			Ensure release of minimum 15% flow in downstream section of the river, which is made mandatory as stipulated in the Policy.						
			Ensure monitoring of downstream flow.						
			Assess effectiveness of the downstream flow.						
			Cumulative Impact Assessment at basin level (Strategic Environmental						

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
	change the hydrology of the wetland/water body/river.		Assessment prior to hydropower development). Guideline for Local Area Developmen Authority (LADA) to make it environmentally sustainable. Development of detailed Guidelines for every project with clear cut output on quid-pro-quo basis. Payment for Ecosystem Services (PES) for Energy sector. Earmark 1% of budget of the Catchment Area Treatment plan for PES through quid-pro-quo basis. Maintenance of Longitudinal Aquatic Connectivity of stream / river. River bed modification between diversion & tailrace outfall in a Run of River scheme, so as to derive higher environmental benefits from releasing downstream					

				Response				Institutional Responsibility	
					Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
			discharge. Fish pass is must in all barrages, irrespective of whether finding of fish reported or not. Routing of downstream discharge through fish pass in the diversion structure, even if fish is not reported.						
2. Silting of reservoirs due to deteriorating catchment leads to their reduced storage capacity / power generation.	Continuous soil erosion in the catchment area.	Reduced power generation. Reduced life of reservoir. Ecological imbalance in the catchment.	Develop and implement river basin management plan. Develop and implement silt management plan. Promulgation of policies to ensure that all development agencies (including Central) working in the State adopt environmentally benign sustainable technologies. Develop and promote Green Road technologies. Develop and seek synergy in Hydro projects. Implement Catchment Area Treatment plans and EMP.	√		√	√	State Compensatory Afforestation Fund Managemnet and Planning Authority	Department of Agriculture, Department of Horticulture, Department of Rural Development, Department of Animal Husbandry, Department of Fisheries, HP PWD, HPSEB, Forum of Hydropower Producers (HPPF) for Satluj & Hydropower Producer Forums of other River Basin(s).

			Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
			Monitor implementation of Catchment Area Treatment plans and Environment Management Plan with reference to silt load & composition (Chemical & Physical) including gravity, hardness and shape of particles.						
3. Catchment area disturbance, e.g., deforestation/removal of vegetation/grazing is leading to soil erosion & siltation of water body/reservoirs & destruction of aquatic fauna/flora.	Continuous deforestation both legal & illegal in the catchment leads to declining forest cover & productivity of forests & adjoining lands. Further, uncontrolled grazing in meadows & pasture land leads to increased pressure on & reduced water holding capacity of forests and other lands. This causes	Siltation leading to reduction of reservoir/dam/wetland capacity. Loss of habitat/biodiversity/producti Disturbance to feeding, breeding and nesting of birds including migratory birds.	Monitor construction phase & post project (catchment area treatment plan, silt monitoring plan, watershed development programme) programmes/plans to assess the efficacy of proposed & implemented measures for replications.			√	√	Office of the Chief Secretary.	HPSEB, HPPCL/ SJVNL ZP/PS/GP/LADCs Department of Agriculture Department of Rural Department Department of Animal Husbandry Watershed Development Committees, Department of Fisheries, Department of Forests, HPPCB, DEST, IPH.

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
	continuous soil erosion & siltation.								
4. Depletion of benthic flora & fauna in wetlands/reservoirs/water bodies due to desilting.	Depletion of benthic flora & fauna in wetlands/water bodies/reservoirs due to desilting.	Disturbance to wetland/ecology & food chain. Disruption of breeding & feeding of fish. Alteration in water flow. Decrease in water retention leads to high Total Dissolved Solids/turbidity and decreased oxygen levels, thereby increasing fish mortality.	Prescribe seasonality of the flushing & its monitoring.		√	√		Power Utilities Dept. of Fisheries HP PCB DEST.	DEST, HP SCST, NGOs, Department of Fisheries, CSOs, Zila Parishad/Panchayat Secretaries/Gram Panchayats.
			Ensure dredge spoils do not re-enter the water body/wetland/reservoir as part of reservoir management plan implementation.			√			
			Determine the effect of sediment and silt on benthic communities as part of water body/reservoir management & monitoring plan.		√	√	√		
			Identify & implement measures for dredge spoil stabilisation as part of the reservoir/water body/basin management.		√	√	√		
			Maintain adequate depth all the year round as part of reservoir operation plan.						
			Maintenance of Longitudinal Aquatic Connectivity of stream/river.						

			Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
			River bed modification between diversion & tailrace outfall in a ROR scheme, so as to derive higher environmental benefits from releasing downstream discharge. Fish pass is a must in all barrages, irrespective of whether finding of fish reported or not. Routing of downstream discharge through fish pass in the diversion structure, even if fish is not reported.						
5. Change in land use in the catchment and fringe areas/buffer zone, e.g., submergence and promotion of agriculture/horticulture activities leading to adverse impacts on reservoirs/water bodies.	Submergence causes change in land use. Shift in land use & agricultural production patterns in the catchment, buffer zone & fringe areas. It has been reported in Pong wetland report of Forest	Eutrophication risks Potential health risks across the entire food chain. Fish mortality & decline in productivity. Rehabilitation & resettlement. Ecological imbalance due to loss of forest land.	Undertake investigative studies on the impact of insecticidal and fertiliser residue on biotic life of aquatic lotic ecosystems & prioritise water bodies based on the level of concern. Assist Department of Agriculture & Horticulture Department in formulating action plan in the identified		√		√	DEST, Power Utilities	HP- PCB, ZP/PS/GP, Bhakhra Management Board (BBMB), Department of Revenue, Department of Agriculture, Department of Horticulture, Department of Fisheries, DEST, HPSEB, SJVNL / Utilities, Multi-stakeholders

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
	Department that chemicals, such as CAN, Urea, 12-32-16, DAP, Sulphur Phosphate & insecticides, such as nuvan, etc. pollute water of reservoir and deteriorate flora & fauna.		areas based on the level of concern according to investigative studies.						Committee of the concerned river basin.
			Formulation & implementation of R&R plan in conformity with NRRP-2007, State Guidelines & Standard R&R plan to be made mandatory for all power projects through dedicated, qualified & experienced R&R staff			√	√		
			Strict implementation of (R&R) plans						
			Implementation of Environment Management Plans.						
			Promote bio-farming, IPN, IPNM, bio-fertiliser, bio-pesticide, etc.						
			Preparation. of integrated Catchment Are Treatment plan for the entire basin on the pattern of integrated Environment Impact Assessment/Environment Management Plans.						

				Response			Institutional Responsibility	
					Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
			Creation of Basin Catchment Are Treatment plan fund for expeditious implementation of Catchment Are Treatment plans. Mechanism to be developed for cost sharing on project to project basis, which should be based on proportionate method instead of any limitation of percentage of project cost.					
6. Inadequate enforcement of regulated activities due to involvement of multiple agencies, e.g., operation of reservoir is managed by power utility, forest areas/wetlands come under the jurisdiction of Department of Fisheries, tourism promotion under Department of Tourism, etc.	Lack of coordination between agencies. Lack of implementation of integrated basin plan.	Ecological imbalance in aquatic flora & fauna including fisheries. Loss of wetland/water body/reservoir area due to institutional gaps. Deterioration of surface water quality.	Remote sensing based & other suitable technology based monitoring mechanism to be promoted. Formulation & implementation of Reservoir Management & Action Plan Formulation. & implementation of dumping area management plans. Training of enforcement/regulatory staff & augmentation of		√	√	√	Directorate of Energy/Power Utilities Office of Secretary, Environment	Department of Forest, Department of Agriculture NGO's, CSO's, Department of Tourism, BBMB, SJVNL, HPSEB, ULBs, Department of Fisheries, Department of Forests & Wildlife, IPH, HPPCB HPPF.

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
			enforcement infrastructure.						
7. Inadequate flow monitoring at each reservoir leads to sub-optimal flow management.	Lack of basin planning approach & basin plans.	Reduced availability of ecological flow. Ecological imbalance.	Promotion & adaptation of suitable technology for continuous (24 hour) monitoring, particularly during lean season. Development & implementation of river water monitoring plan downstream of dams/reservoirs.			√	DEST	Power Utilities, BBMB, SJVNL, IPH	
8. Hazardous waste generation due to CFL disposal.	Lack of collection & disposal mechanism for CFL.	Hazardous waste generation. Public health risks.	Develop & implement extended producer responsibility based collection, transportation & disposal regulation. Awareness for general public about the harmful effects of mercury.	√		√	√	HPSEB/DEST, CFL Distribution Companies.	Utilities, ULBs, PRIs, NGOs, CSOs, HPSEB
9. Inadequate usage of non-conventional sources of energy.	Lack of awareness. Lack of mass replications. Technology constraints.	Impacts due to hydropower development. Higher emission of pollutants.	Develop & implement community based decentralised grid programmes/energy programmes using solar & biogas energy for rural areas.	√		√	√	Himurja State Expert	HPSEB, Utilities, Department of Rural Development, PRIs

			Ensure at least 10 % solar/biogas usage in upcoming tourist resorts/hotels while granting EIA clearance to them.			√	Appraisal Committee Himurja	Himurja, HPSEB, DEST, ULBs, HPPCB.
			Develop awareness programmes for usage of solar & biogas energy in the State.	√			Electricity Regulatory Commission	HPSEB, Utilities, PRIs, ULBs, Department of Rural Development, NGOs/CSOs.
			Make implementation of energy conservation building code mandatory for tourist resorts/commercial establishments, Government buildings					Himurja, HPSEB, Utilities, ULBs, Department of Rural Development, Department of Urban Development, NGOs/CSOs.
			Progressive & increased use of energy mix (including non conventional energy) for energy generation & consumption in the State.					
			Review the pine needle collection mechanism & its pricing policy.					
			Develop & implement pine needle collection					

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
			mechanism involving locals. Engage with & incentivise industrial units to develop & promote pine needles for use as combustible materials.						
11Disaster management during construction & operation phases.	Man made failure. Natural calamities. Cavity collapse in underground construction (Tunnel, power house etc.). Oil spillage from transformers, etc.	Flooding. Damage of properties. Loss of lives.	Promotion of a culture of prevention, preparedness & resilience at all levels through knowledge, innovation & education. Undertaking reconstruction as an opportunity to build disaster resilient structures & habitat for ensuring safer living. Preparation of inundation map. Disaster management plan formulation, implementation & periodic checks on preparedness. Integration of project disaster management plan with district or State		√		√	Power utilities	Himurja, State Disaster Authority, BBMB, SJVNL, IPH, HPPCL.

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
			disaster management plan. Preparation of safety, safeguarding plans & their approval by third party. Implementation of safety measures & their periodic check.						

1.9 Market Infrastructure

Proposed Actions, Type of Response and Inter-sectoral Responsibilities

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
1. Inadequate use of system approach in agriculture/horticulture marketing practices leading to spoilage/wastage.	Inadequate market information Inadequate transportation & collection facilities Expensive transportation	Loss/wastage of produce and increased pollution Deterioration in quality of produce Input resource loss, e.g., fertilisers, soil nutrients, water	Develop & implement IT interventions in agriculture/horticulture produce collection, transportation, storage & selling.			√	√	HPMC	Department of Agriculture, Department of Horticulture, Department of Rural Development, Telecom Service Providers, PRIs Department of Industries.
			Develop & implement state level APMC market information system & integrate it with national/international system.			√	√	HPMC	Department of Agriculture, Department of Horticulture, Department of Rural Development, Telecom Service Providers, PRIs Department of Industries.
			Maintain & manage product logistic system based on market information/intelligence Identify decentralised waste treatment opportunities,			√	√	HPMC	Department of Agriculture, Department of Horticulture, Department of Rural Development, Telecom Service Providers, PRIs

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
			particularly for predominantly organic waste including options of composting/vermi-composting in suitable climatic conditions *Mandis* could be developed as outlets for selling compost						Department of Industries.
2. Inadequate market infrastructure & access to markets leading to spoilage and wastage of products.	Inadequate marketing infrastructure facilities. Inadequate marketing information. Inadequate transportation & collection facilities. Difficulty in transportation of agricultural products due to difficult terrain. High cost of surface transport of produce to the consuming markets. Poor communication network due to hostile terrain.	Wastage of produce. Reduction in economy. Deterioration in the quality of produce. Remunerative prices for their farm produce Develop & implement efficient and conducive transport facility with Private Sector participation.	Develop market infrastructure in line with national benchmark.			√	√	HPMC	Department of Agriculture, Department of Horticulture, Department of Rural Development, Telecom Service Providers, PRIs, Municipalities.
			Renovate & upgrade existing market infrastructure to minimise spoilage & wastage.			√	√	HPMC	Department of Agriculture, Department of Horticulture, Department of Rural Development, Telecom Service Providers, Municipalities, IPH Department of Industries.

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
			Develop & implement efficient & conducive transportation plan with Private Sector participation.			√	√	HPMC	Department of Agriculture, Department of Horticulture, Department of Rural Development, Telecom Service Providers, PWD, Department of Transport.
3. Inadequate market infrastructure due to shift in cropping patterns because of market-driven forces & climate change.	Major shift is from cereal crops to vegetable crops Changes in provision of irrigation system. More demand for traditional mixed cropping and mixed farming. Due to environmental changes.	Unsustainable farming Challenging to sustain farm income & achieving self sufficiency. Declining traditional cropping practices & animal husbandry. Long term repercussion on farm income & employment & farm based livelihoods.	Identify & access long term infrastructure needs in view of crop diversification & shift in cropping pattern for the next twenty years.			√	HPMC	Department	of Agriculture, Department of Horticulture, Department of Rural Development, Telecom Service Providers, PWD, Department of Transport.
			Develop & implement business and action plans including financing requirements.				√	HPMC	Department of Agriculture, Department of Horticulture, Department of Rural Development, Telecom Service Providers, PWD, Department of Transport.
			Implement action plan with Private Sector participation.			√		HPMC	Department of Agriculture, Department of Horticulture, Department of

				Response			Institutional Responsibility	
				Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
								Rural Development, Telecom Service Providers, PWD, Department of Transport.
4. Inadequate packing and packaging mechanisms leading to spoilage and wastage of products.	Air flow rates around the commodity. Temperature & relative humidity. Use of bad quality packaging .accessories, such as trays, cups, wraps, etc. Use of corrugated fibreboard containers. Non-organic sterile material are not used.	No maintenance of the quality & safety of crops. Damage to or deterioration of the goods' quality. Reduction in economy.	Develop & implement upgradation plan for packing & packaging mechanisms in line with international standards.	√	√		HPMC	Department of Agriculture, Department of Horticulture, Department Rural Development, Telecom Service Providers, PWD, Department of Transport, NGOs, CSOs.
			Promote reuse & recycling of disposed packing material. Develop suitable strategies & alternatives of packaging materials made of plastics. Identification & adoption of good practices to reduce/eliminate waste generation.	√	√	HPMC	Department	of Agriculture, Department of Horticulture, Department of Rural Development, Telecom Service Providers, PWD, Department of Transport, NGOs, CSOs.
5. Inadequate storage and warehousing infrastructure near production areas and in markets leading to spoilage & wastage of	Inadequate equipment facility. Inadequate post harvest storage & processing facilities . Improper packaging.	Inadequate stock for future requirements. Inadequate yields. Reduction in economy.	Accelerate/initiate actions for renovation/ upgradation envisaged in project implementation plan		√	√	HPMC	Infrastructure Developers/ Operators/ NCDC/PRIs, Department of Horticulture,

				Response		Institutional Responsibility	
						Coordinating Agencies	Collaborating Agencies
products.	High moisture content. Frequently inadequate knowledge of methods to care for the food properly. Losses in processing & handling. Freezing injury. Chilling injury.	Impacts on quality & quantity. No assurance of proper air circulation.	for management of existing storage facilities.				Department of Agriculture.
			Develop & implement storage infrastructure development plan based on market research & operations management study envisaged for agriculture/ horticulture.	√	√	HPMC	Infrastructure Developers/ Operators/ NCDC/PRIs, Department of Horticulture, Department of Agriculture.
			Develop and implement aviation infrastructure development plan in the States as an alternative to road infrastructure.	√	√	Department of Aviation/NHAI	Department of Agriculture, Department of Horticulture, Department of Tourism, Infrastructure Developers, PRIs.
			Integrate operations of storage & warehousing infrastructure with logistics management through automated online system.	√	√	HPMC	Infrastructure Developers/IT/ Telecom Service Providers, Department of Agriculture, Department of Horticulture, Operators/ NGOs.
			Develop & implement waste management system at storage areas.	√	√	HPMC	Infrastructure Developers/ Operators/ NGOs/ULBs, Department of
			Promote processing &		√	R&D Institutes	

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
			value addition by undertaking Research & Development & adopting good practices.					& Universities	Agriculture, Department of Horticulture. Department of Health Department of Ayush State Medicinal Plants Board Department of Forests R&D Institutes Universities
			Promote marketing of medicinal plants & NTFP.				√	Himachal State Ariculture Marketing Board.	
6. Wastage, spoilage & loss of products due to inadequate road infrastructure & maintenance leading to its delayed transportation to the markets.	Bad conditions of roads. Inadequacy of facilities. Potholes on the roads and landslips. Irresponsible driving. Overloading of mixed fruits & vegetables. Unsuitable transport containers. Virtual absence of refrigerated. & insulated trucks Delays in product procurement after harvesting or at collection centres.	Wastage of time. Road accidents. Loss of fruits due to temperature mismanagement. Impacts on economy. Can't fulfil market requirements on time. Enable proper air circulation in fruits & vegetables .	Promote plans/programmes for maintenance of all weather State Highways/arterial roads.			√	√	Public Works Department (PWD).	Department of Agriculture/ Horticulture, Department of Transportation, HPMC.
			Promote development of alternate road infrastructure as per infrastructure development plan under Public Private Partnership.			√		Public Works Department (PWD).	Department of Agriculture/ Horticulture, Department of Transportation, HPMC.
			Develop parking & storage infrastructure at transit points on major routes.			√	Himachal	Road Transport Corporation, Shimla	PWD, Department of Agriculture/ Horticulture, ULBs, PRIs, DEST.

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
			Monitor the performance of air quality.			√		Himachal Road Transport Corporation, Shimla.	Department of Agriculture/ Horticulture, Department of Transportation, HPMC.
			Undertake Research & Development to reduce/eliminate post harvesting losses.				√		Universities R&D Institutions focusing on Agriculture & Horticulture.
			Identify & adopt good practices in reducing the post harvesting losses.				√		
7. Inadequate sewage & solid waste management infrastructure at markets leading to increase in public health risks.	Uncollected solid waste. Leakage from landfills. No proper waste disposal method. Impropermanagement of disposal. Plastic waste. Inefficient infrastructure.	Health risks. Skin & blood infections. Eye & respiratory infections. Bone & muscle disorder. Chronic respiratory disease. Wet waste decomposes & releases bad odour & leads to unhygienic conditions. Unattended waste lying around attracts disease causing creatures.	Prepare & implement APMC solid waste collection, segregation & disposal management plan.			√	√	APMC/Market Association.	HPMCC/ULBs, PRIs, IPH, Department of Agriculture, Department of Horticulture
			Since APMC waste is rich in organic content, develop vermi composting/organic compost plan to dispose APMC solid waste. This compost can be sold at the outlets in APMC market.			√	√	APMC/Market Association.	HPMC/ULBs, PRIs, IPH, Department of Agriculture, Department of Horticulture.
			Prepare & implement APMC sewage collection & disposal management plan.			√	√	APMC/Market Association.	HPMC/ULBs, PRIs, IPH, Department of Agriculture,

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
									Department of Horticulture
			Implement occupational health & safety (OHS) management system.				√	Department of Labour	Department of Health & Family Welfare, DEST.
			Promote awareness programmes on health safety.			√	√	Department of Health	Department of Agriculture, Department of Horticulture, Government & Private Institutes/NGOs /CSOs.
8. Inadequate use of systematic market survey & planning in agriculture & horticulture sector at State level leading to inadequate market infrastructure planning & operation.	Inadequate integrated handling system to manage the product. Inadequate storages, grading and packing facilities. High transportation costs. Insufficient infrastructure. Inadequate finance, shortage of skilled labour. Improper storage, drying, grading practices at farm level. Inadequacy of processing/storage facilities/orchard management. Absence of cold storages.	Product loss/wastage. Loss of revenue. Impacts on frequent deliveries of harvested fruits. Input resource loss.	Commission a market research study for identifying new markets both in country & aboard in view of product diversification & differentiation for the next ten/twenty & thirty years. Identify market infrastructure needs to support new/ existing markets. Implement and operationalise both product marketing & infrastructure development plans.		√		√	HPMC	Department of Horticulture/ Agriculture, Department of Rural Development, PRIs, NGOs/ CSOs.

				Response			Institutional Responsibility	
				Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
9. Indiscriminate Use of chemicals leading to over ripening/spoilage & wastage of agriculture/horticulture produce and increased public health risks.	Excessive usage of chemicals for enhancing the production rate. Usage of sub standard chemicals.	Health risks to consumers/farmers. Toxic products. Early mortality.	Accelerate/Initiate action plan/programme at State level for implementation of control methods, such as biological, chemical & cultural.	√	√	√	Department of Agriculture / Department of Horticulture.	HPAMC/CSOs/ NGOs/PRIs, Department of Rural Development
			Design & Initiate programmes/projects for promoting organic farming products.		√	√	HPMC	Department of Agriculture /Horticulture, Department of Rural Developmen
			Strictly implement disease quarantine measures in APMC market.		√	√	HPMC	Department of Horticulture/ Agriculture, Department of Rural Development, PRIs, NGOs/ CSOs,

		Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
		Product wastage/loss Low yield. High raw material input cost. Inadequate. infrastructure development knowledge.	Develop & promote awareness programmes for using market information/intelligence. Develop & implement training programmes for ICT penetration & usage among farmers. Develop & implement a programme of *Kisan* Kiosks at *Panchayat* office where ICT infrastructure can be operationalised.			√	√	Department of Horticulture/ Department of Agriculture.	Department of Rural Development, Telecom Service Providers/ Government & Private Institutes/NGOs /CSOs, PRIs, HPMC.

1.10 Rural Planning

Proposed Actions, Type of Response and Inter-sectoral Responsibilities

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Coordinating Agencies	Collaborating Agencies
				Policy	Plan	Programme	Project		
1. Inadequacy & lack of environmental mainstreaming in development planning of rural areas .	Socially acceptable & gainful employment opportunities are not adequately & equitably available. Planning strategies of Himachal Pradesh are based mostly on the lines followed by the Central Government.	Migration to urban areas, especially of youth. Increased urbanisation and growth of slum areas. Stress on basic amenities & inequitable access to basic amenities & resources. Alienation & deepening of social Incohesiveness.	Extend Sectoral Decentralised Planning (SDP) to Tribal & Backward Areas of Himachal Pradesh with environmental mainstreaming as per decision of the Government. Integrate planning principles of inclusive development in all rural development planning & State Government programmes/schemes with environmental mainstreaming as per decision of the Government. Generate employment opportunities by ensuring better coordination among Government, CSOs & Private Sector by promoting investment & improving marketable vocational skills, especially in clean technologies.		√	√	√	Department of Planning	Department of Rural Development (RD), *Zila Parishad* (ZP), *Gram Panchayat* (GP), *Panchayat Samiti* (PS), Public Works Department (PWD), Irrigation & Public Health (I&PH), State Housing Board and other sectoral Departments implementing the capital components in respective budgets as Employment. Generation.
2. Decreasing farm	About 10% of the	Deterioration of	Implement agricultural & allied					Department	Department of Rural

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Coordinating Agencies	Collaborating Agencies
				Policy	Plan	Programme	Project		
productivity (including agriculture, horticulture, animal husbandry, fisheries & related sectors,etc.) with increasing population.	total land area is cultivated. High population pressure on cultivated land. Small land holdings of most of the cultivators. About 20% of the cultivated area is under irrigation & remaining 80% is rain-fed.	livelihoods/loss of livelihoods of 84.5% of small & marginal farmers in the State. Abandoning of farming & increasing migration from rural areas.	sector reforms in the State. Strengthen implementation of Integrated Watershed Management Plan (IWMP) & MNREGAfocusing on agriculture production. Develop & implement crop and horticulture diversification plans, programmes & projects including herbs & medicinal plantations & floriculture. Implement backward & forward linkages to farm & horticulture sector to increase resource conservation & reduce waste generation.		√	√	√	of Planning	Development (RD) *Zila Parishad* (ZP) *Gram Panchayat* (GP) *Panchayat Samiti* (PS) 13 Sectors/Deptt. with development budget heads (as given in the footnote
3 Inadequate rural infrastructure planning & implementation from environmental perspective.	Remoteness & inaccessibility. Gaps in demand and supply. Increased population pressure.	High cost of development & maintenance of infrastructure . High transportation costs because of inadequate road network.	Prioritise future infrastructure investment for creating rural infrastructure & improve management practices of existing infrastructure planning by mainstreaming environmental safeguards at every level, e.g., State, district, block & *Panchayat*. Maintain & upgrade existing rural		√	√	√	Deptt. Planning	Himachal Pradesh Infrastructure Development Board Himachal Pradesh Road & Other Infrastructure Development Corporation Limited

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Coordinating Agencies	Collaborating Agencies
				Policy	Plan	Programme	Project		
		Poor quality of the infrastructure.	infrastructure including transport, power, rural water supply & sanitation with mainstreamed environmental safeguards. Strengthen industrial units in all districts & backward pockets as per the Revised Backward Area Industrial Policy with environmental safeguards.						Department of Rural Development (RD) *Zila Parishad* (ZP) *Gram Panchayat* (GP) *Panchayat Samiti* (PS) 13 Sectors/Departments with development budget heads (as given in the footnote
4 Inadequate education & health facilities.	Inadequate & poor quality service delivery of education & health. Inadequate physical infrastructure for providing health & education needs of the rural population.	Human Development potential may not be fully realised.	Expand health facilities with increased health & infrastructure development in rural areas with bio-medical waste management. Expand environmental education facilities & infrastructure in rural areas in the State, e.g., IEC activities under Total Sanitation Campaign, watershed development programmes, MGNREGA, etc., which link to increased health infrastructure & increased environmental awareness. Enhance labour awareness & capacity by investing in health &		√	√	√	Department Planning	Department of Rural Development (RD) *Zila Parishad* (ZP) *Gram Panchayat* (GP) *Panchayat Samiti* (PS) Department of Elementary Education Department of Health and Family Welfare 13 Sectors/Departments with development budget heads (as given in the footnote

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Coordinating Agencies	Collaborating Agencies
				Policy	Plan	Programme	Project		
			environmental education, programmes & projects.						
5. Inadequate institutional finance & credit flows (including micro finance) for environmentally sustainable economic activities.	Inadequate institutional finance. Inadequate numbers & skills of SHGs, Mahila Mandals & other Community based Organisations.	Potential of microfinance in rural development may not be fully realised.	Promote & strengthen institutional finance for financing long term rural environmental infrastructure development programmes & projects. Promote Microfinance Institutions for financing village level water supply/sanitation & clean technologies projects.		√	√	√	Department Planning NABARD and other Banking Institutions	Department of Planning NABARD and other Banking Institutions
6. Inadequate skills among rural population.	Inadequate number of rural Institutions for developing skills. Inadequate opportunities to build skills of rural population. Inadequate livelihood diversification options & opportunities.	Full potential of skills of rural population may not be realised.	Promote bio-technology for generating employment in the field of agriculture & horticulture. Provision of income generating assets aimed at encouraging small scale & cottage industries & providing gainful employment opportunities through backward & forward linkages. Develop & foster coordination among *Panchayats*, Government and CSOs for upgradation of skills Promote rural enterprise catering		√	√	√	Department of Planning	All line Departments implementing development programmes and schemes. Micro, Small and Medium Enterprises Development Institute.

Issues	Causes	Impacts/Risks	Proposed Actions	Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
			to skills & needs of rural populace.						
7. Inadequate capacity of Institutions, like *Panchayat*, Cooperatives and others for planning & implementation of rural development programmes.	Inadequate financial investment in developing the capacity of the *Panchayats*, Cooperatives etc Inadequate technical & administrative & micro-planning skills.	Poor micro planning. Inadequate technical & administrative & micro-planning skills.	Preparation of Model Guidelines/Manuals to facilitate the preparation of the best Micro Plans with environmental mainstreaming by the *Panchayats*. Constitution of core group of experts for monitoring & advocacy regarding Micro Planning mainstreamed with environmental safeguards. Enable & empower Water Users/PRIs & stakeholders to plan, implement & manage the drinking water & minor irrigation systems Promote joint training of Government officials working with PRIs. Promote & facilitate Intra-state exposure visits to places where successful models of rural development programmes with environmental mainstreaming		√	√	√	Department of *Panchayati Raj*	

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Coordinating Agencies	Collaborating Agencies
				Policy	Plan	Programme	Project		
			have been demonstrated. Study/Exposure visits of core group members & selected office bearers of *Gram Panchayats* outside the State & within the State. Organise *Panchayat Sammelans* with environment as theme at regular intervals. Promote & facilitate network of elected women representatives, CBOs & *Mahila Mandals* for undertaking environmental projects.						
8. Inadequate social cohesion leading to unequal participation in rural development .	Lack of inclusive development. Inadequate representation/inclusion of marginalised sections of the society in the development programmes, schemes, projects.	Increased vulnerability of the marginalised sections of the society. Alienation of marginalised sections of the society.	Empower families & broaden the below the poverty line by enlarging the scope of the rural development programmes for poverty alleviation and welfare of women, the Scheduled Castes & Scheduled Tribes. Empower Women, SC/ST by imparting new skills/capacity enhancement, especially in clean		√	√	√	Department of Planning	Himachal Pradesh State SC/ST Corporation, Backward Classes Finance and Development Corporation, Social Women Development Corporation, Minorities Finance

Issues	Causes	Impacts/Risks	Proposed Actions	Response					
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
			technologies to end exclusion.						and Development Corporation, Department of Social Justice and Empowerment.

1.11 Urban Planning

Proposed Actions, Type of Response and Inter-sectoral Responsibilities

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Coordinating Agencies	Collaborating Agencies
				Policy	Plan	Programme	Project		
Inadequate Water Supply.	Increase in urban population. Migration from rural to urban areas. Increasing gaps between demand & supply. Remoteness & inaccessibility of habitation. Scanty & uneven distribution of rainfall. Siltation of water bodies.	Increased pressure on existing water resources.	Identification of potential schemes including water Harvesting. Beneficiary mapping & identification. Ensuring availability of water equitably. Make Rain Water Harvesting StructureS mandatory in all commercial & residential areas, new buildings & townships.				√	IPH	Department of Planning Department of Urban Development Town & Country Planning ULBs *Zila Parishad* (ZP)
Inadequate Sewerage System.	Inadequate Sewerage network coverage (between new & old city/towns. Poor sanitary conditions in towns/wards, which are not covered by	Pollution of water resources from disposal of untreated sewage.	Identification of areas not connected to current sewerage networks. Identify new sewerage schemes to bring the uncovered areas under				√	IPH/ULB	HP PCB, DEST

			Proposed Actions	Response					
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
	sewerage networks. Inadequate/improper treatment & disposal of sewage.		new sewerage network. Develop integrated water supply & sewerage projects. Prevention & control of water pollution. Make waste water treatment & recycling mandatory in new buildings & townships.						
Inadequate Solid Waste Management.	Poosanitary conditions in towns/wards, which are not covered by SWM services.	Increased instances of outbreak of diseases like diarrhoea and malaria, etc. due to indiscriminate dumping & improper disposal of solid waste, for instance, incineration.	Identify suitable sites in the Master Plan for Muncipal Solid Waste Treatment & Disposal facility location, keeping in mind the hilly conditions. Adopt regional approach in the development of Muncipal Solid Waste Treatment & Disposal facility. Attempt setting up decentralised Muncipal Solid Waste Treatment & Disposal facility.				√	Department of Urban Development Town & Country Planning ULBs	Department of Planning .
Inadequate Energy	Use of wood/fuel in	Increased energy	Increased awareness on			√	√	Department of	Directorate of

				Response					
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
Efficient measures & practices in building design & construction.	heating of buildings (residential/commercia Understanding of Because of voluntary nature of ECBC implementation, its tardy in Himachal Pradesh. & renewable energy sources is limited. & operating appliances & equipments run on new & renewable energy sources.		Energy Conservation Building Code. implementation of Energy Conservation Building Code in all Government & per Equivalent Car Space factoring in hill conditions in all new buildings & township projects. Provide green areas and open spaces as per norms factoring in hill conditions in all new buildings and township projects, Make mandatory provisions for use of new & renewable sources in street lighting & passive solar architectural features in plan layout .				Urban Development Town & Country Planning	Energy HIMURJA Department of Planning
Inadequate Energy	Dependence on road	Inclusive growth may	Develop urban			√	√	Department of	Department of

			Proposed Actions	Response					
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
Efficient measures & practices in transport sector.	transport in the urban & transport planning in view of the hilly terrain. Limited options alternate modes of transport. High cost of fuels in remote & inaccessible areas in HP due to high transportation cost. Preference for diesel in transport sector.	not be achieved as inadequate interventions for improvement of public & non-motorised transport will make the services inaccessible to the poorer sections of society, the major users of these modes. It will also decrease productivity (due to increased congestion) & poor safety on the road. Increased use of rail freight, non-motorised and public transport modes and introduction of cleaner vehicles and fuels may contribute greatly to air pollution. Energy Security may be jeopardised because of increased fuel consumption. Non Conformity to the emission	transport in line with policies, such as National Urban Housing & Habitat Policy to ensure that cities remain dense & of mixed land-use with adequate provisions for housing for the poor to ensure that their travel distances remain small. Develop urban planning guidelines to encourage transit-oriented development. Discourage sprawl, rationalise parking policies & charges, & mandate public transport accessibility indicators for large developments. Institute intelligent transport systems to enable schemes, such as congestion charging. Improving vehicle efficiency.					Transport	Planning Department of Urban Development Town & Country Planning *Zila Parishad*

Issues	Causes	Impacts/Risks	Proposed Actions	Response					
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
		standards.	Shifting freight transport from road to railways & waterways & alternate modes of transport. Shifting passenger transport to public transport. Shifting vehicles to electric & hybrid varieties. Greater penetration of biodiesel. Earmark buffer zones along the National/State Highways/MDRS, where no construction activity is allowed to curb ribbon development. Consider freezing of land use along the National & State Highways to curb the vicious trend of ribbon development & urban corridors.	√				TCP	Department of Planning Department of Urban Development

Issues	Causes	Impacts/Risks		Response				Coordinating Agencies	Collaborating Agencies
				Policy	Plan	Programme	Project		
			Extend the Town & Country Planning Act, 1977, to include 25-30 metre wide strips along the National & State Highways (on both sides) to combat ribbon development.						
Lack of equity in provision of services.	Inadequate focus on planning basic services for urban poor.	Continued alienation of urban poor & inaccessibility & high cost of accessibility to the basic urban services for the poor.	List vacant & under-utilised lands. Prepare an updated list of vacant lands including Government & private land, land notified for acquisition. Mark vacant land pockets on the map & assess the area available. Examine the land use assigned to vacant pockets in the master Plan. Identify under-utilised			√	√	Department of Planning Department of Revenue	TCP, UD Department, ULBs, IPH, Department, ULBs, Transport Department, Directorate of Energy, Himachal Pradesh-PWD Himachal Pradesh State Land Use & Wasteland Development Board .

Issues	Causes	Impacts/Risks	Proposed Actions	Response					
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
			Government lands & lands proposed for redevelopment. Identify lands proposed for future residential development. Assess land that would become available after enforcement of the pro-poor reforms. Reservation of 20-25% of developed land for EWS/LIG housing in every new public/private residential development. Assess land acquisition costs, land development costs & construction costs & market price of land. Examine the current land assembly mechanisms & policy obstacles to land supply. Establish a system of redressal for continued alienation of land by the State Government to the						

Issues	Causes	Impacts/Risks	Proposed Actions	Response					
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
			ULBs to ensure continuous supply of developed land for EWS/LIG housing. Identify land ownership status of vacant pockets. Ensure availability of sites for housing the poor. Creation of land pool for housing the poor. Timely construction of houses. Provide bank Loans to the beneficiaries. Provide security of tenure to every beneficiary. Provide access to infrastructure services at affordable rates.						

1.12 Municipal Solid Waste

Proposed Actions, Type of Response and Inter-sectoral Responsibilities

Issues/Problems	Causes	Impacts/Risks	Proposed Actions	Response			Institutional Responsibility	
				Policy Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
1. Increasing gap in Municipal Solid Wastegeneration versus collection, treatment & disposal (rural & urban) leading to increased pollution.	Increased MSW generation from population/tourists/industries. Inadequate availability of infrastructure.	Increased pollution. Increased disease burden/health risks.	Prepare & and implement integrated solid waste management plan for rural/urban areas/tourists destinations, including religious places & *mela* grounds as perMunicipal Solid Waste (Management & Handling) Rules.		√	√	Department of Urban Development, Department of Rural Development.	ULBs, IPH, HPPCB, DEST, PRIs, NGOs, CSOs, Health & Family Welfare Department, Municipalities.
			Monitor the progress of integrated solid waste management plan & community sanitation projects at household level.		√	√	Department of Urban Development Department of Rural Development.	PRIs, NGOs, CSOs, Health & Family Welfare Department, Municipalities, ULBs, IPH, HPPCB, DEST Department of Tourism.
2. Increased public health risks due to discharge & disposal of untreated waste on land & in water bodies.	Environmental pollution due to unscientific MSW ingress in water sources. Unhygienic methods of handling waste. Poor waste management.	Increased incidences of diseases. Public health risks.	Prepare & implement integrated solid waste management plan at rural/urban levels.		√	√	Department of Urban Development, Department of Rural Development.	IPH, PRIs, NGOs, CSOs, Health & Family Welfare Department, Municipalities, HPPCB, DEST, Department of Tourism

Issues/Problems	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
			Promote door to door Municipal Solid Waste collection and segregation through innovative mechanisms to meet the challenge of unavailability of personnel.				√	Department of Urban Development Department of Rural Development.	PRIs, NGOs, CSOs, Health & Family Welfare Department, HPPCB, Municipalities, DEST, , Department of Tourism.
3. Increased public health risks due to solid waste littering and improper disposal (MSW collection, treatment and disposal) at tourist units/destinations/ circuits/religious places/heritage sites/trekking & transportation routes.	Inadequate sanitation infrastructure (rural & urban) Unregulated tourist transit points Drinking water source/transmission and distribution coming in contact with Municipal Solid Waste.	Increased disease burden/mortality.	Prepare & implement micro level MSW projects to ensure proper solid waste management.				√	Department of Urban Development, Department of Rural Development.	IPH, Health, DEST, HPPCB, NGOs/CSOs, PRIs.
			Develop & implement integrated solid waste management plan as part of Tourism Master Plan.			√	√	Department of Urban Development Department of Rural Development.	Infrastructure Developers, Operators, NGOs/CSOs/ IPH/ULBs, DEST, HPPCB Department of Tourism.
			Design & implement fiscal mechanism to incentivise & provide for implementing integrated solid waste management plan.				√	Department of Urban Development Department of Rural Development, DEST.	Infrastructure Developers, Operators, NGOs/CSOs/ IPH/ULBs, DEST, HPPCB, Department of Tourism.

Issues/Problems	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
4. MSW littering in the vicinity of catchment areas of water bodies leading to pollution.	Lack of MSW monitoring. Independent infrastructure for MSW management.	Resource loss, catchment degradation/water pollution.	Deployment of appropriate technological options to prevent scattering of MSW by monkeys, stray dogs & other animals.			√	√	Department of Urban Development, Department of Rural Development,	Forest, Infrastructure Developers, Operators, NGOs/CSOs/ IPH/ULBs, DEST, HPPCB, Department of Tourism.
			Implement periodical campaigns for MSW collection for monitoring aesthetics.		√		√	Department of Urban Development, Department of Rural Development, DEST.	Infrastructure Developers, Operators, NGOs/CSOs/ IPH/ULBs, DEST, HPPCB, Department of Tourism.
			Prepare & implement wetland management plan.				√	Department of Urban Development, Department of Rural Development, DEST	Infrastructure Developers, Operators, NGOs/CSOs/ IPH/ULBs, DEST, HPPCB, Department of Tourism.
			Develop & implement basin wise/district wise rain water harvesting programme.			√	√	Department of Urban Development, Department of Rural Development, DEST	Infrastructure Developers, Operators, NGOs/CSOs/ IPH/ULBs, DEST, HPPCB, Department of Tourism.

Issues/Problems	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
			Constitute a State level Steering Committee to implement the three plans in an integrated manner.			√	√	Department of Urban Development, Department of Rural Development, DEST	Infrastructure Developers, Operators, NGOs/CSOs/ IPH/ULBs, DEST, HPPCB, Department of Tourism.
5. Poor segregation of MSW at source.	Lack of awareness. Consumer behaviour. Variation in MSW compression. Unavailability of technology at the source of segregation.	Increased pollution. Reduced resource recovery.	Ensure door to door MSW collection system.			√	√	Department of Urban Development Department of Rural Development, DEST, M.C.	Infrastructure Developers, Operators, NGOs/CSOs/ IPH/ULBs, DEST, HPPCB, Department of Tourism, M.C.
			Promote door to door collection, transportation & disposal including outsourcing.			√	√	Department of Urban Development, Department of Rural Development, DEST, M.C.	Infrastructure Developers, Operators, NGOs/CSOs/ IPH/ULBs, DEST, HPPCB, Department of Tourism M.C.
			Promote & implement decentralised waste management including composting.			Department		of Urban Development, Department of Rural Development, DEST, M.C..	Infrastructure Developers, DEST, HPPCB, Operators, NGOs/CSOs/ IPH/ULBs, DEST, HPPCB, Department of Tourism, M.C.
6. Inadequate finance to accelerate/upgrade/implement MSW/sanitation infrastructure leading to poor sanitation.	Inadequate pricing of resource. Continued subsidy. Resource under valuation. Government	Increased pollution due to inadequate infrastructure.	Implement Private Sector participation for collection, transportation & disposal of Municipal Solid Waste.			√	√	ULBs.	Infrastructure Developers, DEST, HPPCB, Operators, NGOs/CSOs/ IPH, Department of Urban Development

Issues/Problems	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
			Carry out viability studies for different economic instruments. Implement 'Payment for Environmental Services/Polluter Pays' in sanitation sector in the State & implement the solution.	√		√	√	Department of Urban Development.	Consultants, IPH, ULBs, DEST, HPPCB, Departments of Health & Family Welfare.
7. Gaps in Mechanism related to MSW/sanitation leading to reduced efficiency.	Inadequate implementation of reforms. Inadequate integrated planning & coordination.	Gaps in service delivery. Increased pollution.	Constitute a State level Coordination Committee to prioritise & implement sanitation plans integrated with, programmes & projects.		√	√	√	Department of Urban Development.	DEST, HPPCB Department of Rural Development, Department of Health & Family Welfare, ULBs
			Quarterly monitoring of the progress of prioritised plans, programmes & projects.		√	√	√	Department of Urban Development.	IPH, Department of Rural Development, DEST, HPPCB, Department of Health & Family Welfare, ULBs
8. Inadequate Private Sector/PRI participation in MSW/sanitation sector leading to reduced coverage of sanitation services.	Inadequate implementation of reforms. Lack of a business model.	Reduced infrastructure development. Gaps in service delivery. Increased pollution.	Accelerate & implement time bound reforms/programmes/projects leading to Private Sector & NGO participation in the sector.			√	√	Department of Urban Development, Department of Rural Development	DEST, HPPCB/ PRIs/NGOs/CSOs, IPH, ULBs
			Accelerate/implement actions/projects under PRI sanitation plans at village level.			√	√	Department of Urban Development, Department of Rural Development .	IPH, PRIs/Health & Family Welfare Department, DEST, HPPCB.

Issues/Problems	Causes	Impacts/Risks	Proposed Actions	Response			Institutional Responsibility	
				Policy Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
			Develop & implement gender empowerment & participation under rural sanitation projects.		√		Department of Urban Development, Department of Rural Development.	IPH, PRIs / Health & Family Welfare Department, DEST, HPPCB.
9. Inadequate awareness leading to low community/NGO participation in MSW service & sanitation.	Inadequate ownership. Difficult terrain & dispersed location. Inadequate gender participation. Inadequate NGO participation.	Unhygienic living conditions/disease burden. Increased Government expenditure for sanitation management. Increased pollution.	Accelerate/Initiate action for implementation of IEC programmes under each health/urban scheme/ programmes being implemented at State level.		√	Department	of Urban Development, Department of Rural Development.	DEST/IPH, HPPCB, Rural Development Department/PRIs /CSOs, HPPCB, Health & Family Welfare Department, ULBs
			Design & Initiate awareness generation programmes/projects with NGOs/CSOs/PRIs/ULBs.		√		ULBs/PRIs..	PRIs/NGOs, Department of Urban Development, Department of Tourism.
10. Lack of skilled personnel in MSW management.	Inadequate regulatory compliance Inadequate participatory approach.	Loss of valuable resource. Failure of formal sector Muncipal Solid Waste financial model. Increased pollution due to treatment & disposal in informal sector.	Mainstreaming of informal sector into Muncipal Solid Waste management. Deployment of appropriate staff should be mandatory at least at the Council level, like Environmental Engineer and Health Officer to address Environmental Issues & Management.		√	√	ULBs/PRIs	Private Sector, Department of Urban Development, Departments of Rural Development, PRIs, NGOs, CSOs, Health & Family Welfare Department, Municipalities

Issues/Problems	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
11. Lack of sites for setting up Solid Waste Management facility.	Non-availability of land. Inadequate Planning.	Unhygienic living condition/burden of disease. Increased pollution due to inadequate infrastructure.	Site selection for Muncipal Solid Waste facility should be as per MSW Rule, 2000. Sites should be marked for MSW facility in the City/Town development plans at the planning stage if land is available. Strict monitoring of all environmental issues. The role of HP Pollution Control Board should be enhanced at actual implementation level.	√	√		√	Town & Country Planning	Revenue Department, Department of Forest, ULBs, PRIs, Department of Urban Development, Department of Rural Development, HPPCB, DEST,NGOs/CSOs,

1.13 Hazardous Waste

Proposed Actions, Type of Response and Inter-sectoral Responsibilities

Issues / Problems	Cause	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
1 Improper siting of Industries.	Concentration of industries in Shivalik Himalaya & focus on extraction of a few mineral resources. The siting of Industries is being done as per the available land bank & not as per the Zoning Atlas for Industries.	Over extraction of mineral resources & environmental pollution.	Undertake Regional EIAs/Cumulative Impact Assessment. Complete Zoning Atlas for industrial siting & strict implementation of siting criteria. Preparation of Region specific map for siting (in GIS environment). Preparation of Region-specific industrial siting guidelines. Revisiting land-use around hazardous units (in case industry is already commissioned). Prepare district-wise Environmental Atlases. Proper appraisal of the site with respect to environmental issues. Concept of sustainable development to be kept in			√	√	Department of Industries.	Planning Department, HP State Land Use & Wasteland Development Board, Department of Industries, CPCB, HPPCB, Industry Associations, DEST, NGOs/CSOs.

				Response			Institutional Responsibility	
							Coordinating Agencies	Collaborating Agencies
			view while considering mining project. If all clearances are through for grant of mining lease, strict implementation of mining plan, mine closure plan, EIA/EMP document, PCB conditions of consent, MoEF/Forest Department conditions etc. Strict monitoring of all environmental issues.					
2 Ambient Air Quality/Air Pollution due to dust generated during various processes of mining.	Dust generated due to various mining activities causing air pollution.	Exceedence of National Ambient Air quality Standards (NAAQS). Impact on human health, particularly that of industrial workers.	Strict implementation of urban master plan including zonation. Preparation & implementation of green belt management plan & restoration of exposed area as part of industrial estate development plan. Disposal of loose material at designated places.	√ √ √		√ √	Department. of Urban Development / ULBs. -do- Department of Industries.	Department of Industries -do- CPCB, HPPCB, Department of Transport, HPPWD, Himachal Pradesh Infrastructure Development Board, Department of Tourism.

Issues / Problems	Cause	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
3. Deteriorating water quality and quantity.	Concentration of industries in Shivalik Himalaya and focus on extraction of few mineral resources.	Further, deterioration of quality water in terms of benchmarks set Primary Water Quality Criteria and Designated Best Use of Fresh Waters (A-E)	Optimistion of waste usage by introducing concept of 3 Rs (Reduce, Recover & Recycle & zero discharge industry. Prepare & implement water harvesting plan to ensure water conservation and check lowering of water table.				√	Department of Industries IPH	CPCB, HPPCB, DEST, NGOs/CSOs, Department of Industries, Central Ground Water Board, DEST.
	Ancillary development in the industrial area including urban infrastructure development entailing construction activities, improper discharge of industrial effluents (treated/untreated), sewage & municipal solid wastes.	Water table decreases locally, often drastically, resulting in the drying up of wells and springs in the neighbourhood.	Strictly monitor exposed area restoration plan as part of Environment Management Plan of mines.					HPPCB	Department of Industries, Industry Association, DEST, Department of Industries, HP Infrastructure Development Board, Department of Tourism .
	Deeper excavation on the surface or underground digging.	Adverse effect on water users and the aquatic ecosystem. The impact is particularly significant if water users downstream of the site are abstracting water	Strictly monitor water quality in mined areas & industries.				HPPCB	HPPCB	Industry Associations, IPH, ULBs, HP Infrastructure Development Board, Department of Tourism.
	Exposure of fresh rocks due to mining initiates weathering with the inevitable generation of substances which cause water pollution.	drinking/domestic use. Suspended solids can also							-do-

Issues / Problems	Cause	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
	Mining activities increase suspended solids & chemical contamination in the water at the site & downstream.	significantly increase water treatment costs.							
4. Inadequate hazardous waste treatment and disposal.	Congregation of industries in Shivalik Himalaya & focus on extraction of a few mineral resources. Hazardous waste in Himachal Pradesh comprises sludge from Effluent Treatment Plant, Waste, Oil, Contaminated Containers, Others (Residual wastes) & Process Residue Gaps in hazardous waste generation & treatment Inadequate number of Common Effluent Treatment Plants (CETPs) & treatment facilities, e.g., there is no CETP for Baddi & Barotiwala area	Gaps between hazardous waste generation & treatment may increase further leading to deterioration of water quality	Strict implementation of hazardous waste management plan as part ofEnvironment Management Planof mines.. Implementation of hazardous waste infrastructure development plan, e.g., Common Effluent Treatment Plant /Treatment, Storage and Disposal Facility Strict monitoring of hazardous waste generation and disposal			√ √	√	Department of Industries. Industry Associations. HPPCB	HPPCB, DEST. HPPCB, DEST. DEST, Department of Industries, Industry Associations, CSOs, NGOs.

Issues / Problems	Cause	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
5 Land degradation.	Land use pattern undergoes change due t use of land for mining, excavation, dumping & oth associated activities. Digging of open pits & dumping of overburden rock mass in the form of heaps. Polluted water from pits affects the characteristics of the topsoil, thereby affecting the end use. The damage pattern on the surface undergoes a change due to alterations in the surface topography due to mining & associate activities.	Land use in the surrounding areas is affected due to the impact of mining on water regime. Change in value of the land & surrounding areas.	Development & implementation of exposed area restoration plan as part of EMP in mined areas. Restoration/conservation of drainage pattern of industry & mine areas as part of exposed area restoration plan. Strict implementation of Catchment Area Treatment integrated with exposed area restoration plan.			√	√	HPPCB Department of Forests.	Revenue Department, Planning Department, Himachal Pradesh State Land Use & Wasteland Development Board, Industry Associations, HBSEB, HPPCL, HIMURJA, SJVNL, Department of Energy, HP PWD, HPPCB, DEST. IPH, Industry Associations
6 Loss of Flora and Fauna.	Removal of all vegetation (flora) & fauna from the area for mining & other purposes. Pollution of water in the surrounding water bodies due to flow of debris on th slope affects the aquatic ecology of water bodies.	Loss of natural vegetation cover by clear felling, smothering & dust.	Strict implementation of compensatory afforestation plan as part of Environment Management Plan. Strict implementation of buffer zone management plan as part of industrial estate development/mine				√ √	Department of Forests Department of Industries	Planning Department, HP State Land Use & Wasteland Development. -do-

Issues / Problems	Cause	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
	Dust in the atmosphere is contributed by mining and associated activities. Dust when deposited on the leaves of the plants in the surrounding areas, retards their growth.		development areas. Formulation & implementation of an integrated compensatory afforestation, buffer zone management plan. Monitoring of green cover.			√		Office of Chief Secretary -do-	All Line Departments. Forest Department, Forest Survey of India.
7Limited technological options to switch to green/clean technologies.	Inadequate incentives for setting up/switching to green/clean technologies. Inadequate understanding of green/clean technologies, which could be introduced in Himachal Pradesh.	Deterioration of baseline environment conditions of land, water, air & noise. Increased capital cost & investment for setting /switching to green/clean technologies.	Identify the areas where introduction of clean technologies is possible; Identify the source(s) from where clean technology & data/details thereof can be obtained; Assess the technology available indigenously as well as those to be imported; Modify the technology, if necessary & demonstrate it to the satisfaction of the users so that it can be replicated; Undertake Research & Development to develop technologies for cleaner production; Collect, collate & disseminate information on clean technology Maintain interaction with the industry, financial			√	Industries	Department	HPPCB, DEST.

Issues / Problems	Cause	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordinating Agencies	Collaborating Agencies
			institutions & Research & Development Laboratories for adoption of clean technologies.						
8 Occupation health of workers in industries handling hazardous waste.	Inadequate usage of PPE Inadequate safety systems in industries.	Increased health risks/disease burden.	Strict monitoring of safety systems in industries.			√		Department of labour.	DEST/HPPCB, Department of industries, Directorate of factory.
9.Mercury waste/Mercury contaminated waste management & disposal.	Inadequate safetysystems in industries Inadequate hazardous waste management system.	Deterioration of baseline environment conditions of land, water & air. Increased health risks/disease burden.	Strict implementation of Hazardous waste management plan as part of EMP. Inventrization of sources. Strictly monitor water quality.			√	HPPCB.	DEST,	Department of industries, Directorate of factory.

2.0 Natural Resource Management (NRM)

2.1 Forest & Wildlife

Proposed Actions, Type of Response and Inter-sectoral Responsibilities

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordination Agency	Collaboration Agency
1. Forest degradation	Excessive demand for timber and other forest produce often led to removal far in excess of the Annual Allowable Cut (AAC). This led to forest degradation	Reduced bio-diversity due to loss of habitat for a particular type of flora and fauna. Irregular water flow, drying up of natural springs and increased vulnerability to flashfloods during rains. Loss of soil fertility associated with soil erosion, resulting in the reduction of agricultural productivity, down-stream	Increasing the effectiveness of participation of community through Joint Forest Management (JFM) programme by setting up new JFM committees where it is nonexistent/non functional. Implementation of State Plan Scheme on Accelerated Programme of Restoration and Regeneration of Forest Cover.		√	√		Forest Department	Gram Panchayat (GP) Village Development Committees (VDCs)/ user groups, Mahela Mandal, SHG
			Development of alternate Community based livelihood programmes/ projects around/in the vicinity of protected areas e.g. eco development programmes			√	√	Forest Department	Department of Planning, Rural Development Department VDCs
			Maintaining the prescribed forest yield through natural regeneration, afforestation and plantation. Promote wild fruit trees plantation in forests and degraded lands.			√		Forest Department	Village Development Committees (VDCs)/ user groups CSOs
			Introduction/Strengthening			√		Agriculture /	Forest, NGOs

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordination Agency	Collaboration Agency
			of watershed (macro/micro) Development Programme in the State to conserve soil and water.					Rural Development Department	
			Strengthening of Catchment Area Treatment Plan in existing areas based on survival rates and soil & water conservation measures.				√	Forest Department	Project proponents/LADCs/CSOs
			Monitor project programme/ (JFM)/ Eco Development / atershed/ CAT plan) Implementation.			√		Forest Department	Village Development Committees/ user groups CSOs
2. High Anthropogenic Pressure	About two third of the State's geographical area is under recorded forests, but a substantial part of this is not conductive for tree growth, being under permanent snow, glaciers and cold deserts. About 90% population is rural who mostly depend upon fuel-wood and other forest products for	Faster Degradation of Forests due to deforestation excessive exploitation of forest produce / economic values.	Increase forest cover/ per capita availability through JFM/PFM in degraded forests or wastelands or village common/panchayat			√	√	Forest Department	Department of Planning, Department of Rural Development, JFM Committees
			Specific development plans for managing wastelands, culturable fallow or other lands		√	√	√	Forest Department	Department of Planning, Department of Rural Development, JFM Committees
			Development of long term literacy and livelihood programmes for migratory gujjar graziers to encourage and adopt new agro-economic activities e.g. dairying, horticulture, livestock rearing, with cottage industry and			√		Department of Planning	Department of Planning, Department of Rural Development, Department of Social Justice and Empowerment, Department of Forests

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordination Agency	Collaboration Agency
	their day-today energy requirements. The manner, in which the fuel wood is obtained, has an adverse impact on forests health and vitality. In practice, however, even young poles are hacked and trees are badly lopped.		vegetable cultivation						
			Develop policy instrument for restoration of ownership rights of common land to panchayats for promoting community based forestry projects			√		Forest Department	Department of Planning, Department of Rural Development, ZP/PS/GP
			Promotion of alternatives to fuel- wood like LPG/ and renewable energy sources like Solar Energy through in- centives like subsidy. Promoting smokeless 'Dhauladhar chulhas' by providing subsidy for better kitchen hygiene and women's health.			√	√	Department of Planning, Department of Rural Development	Himurja and Forest Department
3. Increasing Livestock pressure on forest	Substantial forest areas of the State, other than areas taken up for regeneration and plantations, are open to grazing. Cultivation of green fodder in agricultural fields is virtually non-existent, as are	Continuous grazing diminishes productivity and gives rise to spread of inferior grasses and un-palatable weed plant species like Lantana camara, Parthenium and Ageratumspecise	Identification & Development of village Common Land / Panchayat for pasture. Plantation of community or- chards and fodder crops.			√	√	Forest Department	VDC, Dept of Animal Husbandry, Dept of Rural Development , Dept of Horticulture, Dept of Planning
			Develops tall feeding and developing an equitable system for the distribution of grass from strips with in closed and planted belts programmes at household / community level.			√	√	Dept of Animal Husbandry	VDC, Dept of Rural Development , Dept of Horticulture, Dept of Planning

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordination Agency	Collaboration Agency
	stall- feeding practices		Programmes for upgrading breeds and reducing non-productive livestock, thus increasing farmers' returns.			√	√	Dept of Animal Husbandry	VDC, Dept of Rural Development , Dept of Horticulture, Dept of Planning
4.. Timber Distribution (TD) Rights	Due to the division of the families, the number of right holders is multiplying and the forests are depleting. Almost half of the yield prescribed annually from the forest goes to timber distribution right holders.	Selective harvesting of certain species leads to change in forest composition and depletion of desired species. Loss of Biodiversity. Due to growth of single species tree species forests become prone to pest/ diseases	Assessment of timber needs and monitoring by Panchayats/VDCs for felling of marked trees.	√	√	√	√	Forest Department	Panchayats/ VDCs
			Regulation related to Timber distribution need to be updated/ amended to plug the economic losses and to identify the genuine and needy users of timber.	√		√	√	Forest Department	HDFDC Panchayats/ VDCs
			Develop a time bound programme for gradual phasing out of timber distribution rights and provision of timbers at market rates. However, it may require amendments in the existing regulation/ provisions on rights.	√		√	√	Forest Department	Panchayats/ VDCs
			Promote multiple timber yielding species e.g. Deodar and Kail along with Chil and fir/spruce in plantation and afforestation projects.			√	√	Forest Department	HPFDC

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordination Agency	Collaboration Agency
			Initiate penal action against major defaulters such as suspension of timber distribution rights.			√		Forest Department	-
			Community/ Panchayat monitoring of timber distribution/ usage.			√		Forest Department	-
			Promote agroforestry/from forestry/village common land plantation to meet the timber need locally			√			
5. Forest Encroachment	The incidence of encroachment is alarming in the un-demarcated protected forests that are without boundary pillars	Loss of forest land.	Demarcate protected forests with boundary pillars.			√		Forest Department	Department of Planning, Village Development Comities, Department of forest, Town and Country Planning
			Strict implementation of existing legislation and prosecution of offenders under Forest Act, Town & Country Planning Act.		√		√		
	As these adjoin private lands. They are prone to encroachment								
		Over exploration	Periodic monitoring by ZP and PS e.g. ZP to liaison with the forest Department for ejectment; PS to monitor the cases of over exploitation report to						
	Inhabitation at the periphery of the forests								

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordination Agency	Collaboration Agency
			Forest Department.						
	Over forests dependence on forest & its products	Social Conflicts							
		Illegal felling of trees							
6. Unsustainable Harvesting of Forest Produce	Unscientific harvesting and over- exploitation of forest resources beyond the its carrying capacity or regeneration capacity	Several species of medicinal and aromatic plants either becoming extinct or being listed as endangered species.	Enforce regulatory measures especially for private pharmaceutical companies harvesting medicinal plants for commercial use.	√		√		Forest Department	State forest Corporation
			Monitoring by Panchayat/Village Development Comities at the time of harvesting of forest produce and MAP and in prospecting activities relating to such forest produce.		√			ZP/PS/VDC	Village Development Comities
		Depletion of forest							Department of Forest
		Irreversible loss due to extinction of species and natural imbalance	Use existing gene bank/set up a gene bank, preserve and document the germplasm of medicinal and aromatic				√	Forest Department	DEST, State Agriculture Universities.
									DEST, Deptt. of Biotechnology, State Agriculture

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordination Agency	Collaboration Agency
			plants.					Forest Department	University, (SAR, ICAR) and Central Agricultural Institutes
			Use biotechnology for propagating and harvesting forest produce and MAP.					Forest Department	Department of Ayurved
			Develop and implement district wise programme to reduce pressure forest produce.			√			
			Undertake medicinal plants survey, identification, collection, cultivation conservation, utilization, marketing, value addition, research & development, training, development of nurseries & agro techniques, quality control and inter-linkage with other departments.			√			
7. Inhibited natural regeneration due to ban on green felling	The complete ban on green felling in the forests is not conducive for the growth of forests	Degradation of forest due to loss of regenerative capacity of forest	Felling in the nature of regeneration felling and thinning can be carried out to induce regeneration and to remove congestion in the crops. Thus, the working plan prescription	√	√	√	√	Forest Department	HPFDC Himalayan Forest Research Institute GB Plant Institute of Himalayan Environment

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordination Agency	Collaboration Agency
			which is a tool for forest management needs to be implemented. Silvicultural operations are not necessarily commercial harvesting and therefore Govt. of India (MoEF) should be approached for approval.						and Development, Kullu
			Gather scientific data to assess the impacts and review changes by setting up of permanent plots for long term monitoring (in each Forest types) in the State to understand the forest eco- system and dynamics in pristine and wilderness areas and those forest where trees have been logged before the ban on green felling was brought in. (This can be set up to gather scientific data on climatic and biological parameters, especially in Alpine and Shivalik eco- systems).			√		Forest Department	HP University Dr. Y. S. Parmar University of Horticulture & Forestry, Nauni, Solan Himalayan Forest Research Institute GB Pant Institute of Himalayan Environment and Development
8. Lack of stress on Diversification of Forest Plantation	Choice of the aforestation species. Fast growing species	Imbalance in natural diversity in forest plantation	Promote Deodar and Kail along with Chil and fir/spruce in plantation and afforestation projects.			√		Forest Department / HPFDC	Dept of Planning, Dept of rural Development

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordination Agency	Collaboration Agency
	like Pine are preferred in plantation which leads to rising monoculture plantation	which promotes monoculture plantations.	Promote mixed plantations of willow, poplar, oak, fir, bamboo, wild fruit species and others as per the requirement of the site.						
		Long term impact on plant and animal species Lack of undergrowth for grazing Poone to pest infestation disease outburst	PS to formulate plans in respect of lands identified by the Gram panchayats in coordination with concerned Range Officers for developing/organizing nurseries for afforestation.		√			Forest Department / HPFDC	ZP/PS/GP Dept of Planning, Dept of rural Development
			Gram Panchayats (GP) to identify village common lands, other com- munity and no forest lands for development of village wood lots in consultation with the local forest guards/Block officers. This will also include location of site, species to be planted and details of such areas, which need maintenance.			√		Forest Department	Dept of Planning, Dept of rural Development
			PS and GP to supervise monitor afforestation, plantation and nursery works within their area and report to the concerned Forest Officer.			√		Forest Department	Dept of rural Development

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordination Agency	Collaboration Agency
			Conservation of biological diversity should guide afforestation programmes and not carbon sequestration potential alone.						
			Promote use of pine needles for making bio briquettes to enable regeneration flora as well as the reduce pres- sure on fuel wood			√			
9. Forest fires and natural hazards	Natural, accidental and sometimes intentional fires in forest areas. Each year thousands of ha of forest area gets burnt especially in the "Chil" forest belt, primarily due to negligence of the villagers. Fires are very common in	Loss of forest cover, flora & fauna. Adverse impact on soil characteristics and increased soil erosion. The microclimate is also adversely affected.	GP to enlist the cooperation of the local people to protect forest form fires and to help Forest Department in extinguishing forest fires by constituting fire protection committee.	√	√	√		Forest Department	ZP/PS/GP Department of Revenue State Disaster Management Authority
			PS/GP to recommend action under existing regulation against major and habitual defaulters and to report concerned authorities of the Forest Department.			√		Forest Department Forest Department	ZP/PS/GP Department of Revenue State Disaster Management Authority ZP/PS/GP

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordination Agency	Collaboration Agency
	the higher altitude "Blue Pine" forests during November and early December. This is when the weather is very dry and winter rains are delayed		ZP/PS/GP to incentivize community involvement in some mainstream forest department activities including forest protection, afforestation and fire fighting.			√		Forest Department	Department of Revenue State Disaster Management Authority
			Revise Relief manual				√	Forest Department	HPPWD Road and Pathways Railway lines
). Diversion of forest for non forestry purposes	Forest diverted for various users/departments namely PWD, other roads/Hydroelectric Project/Mining Irrigation/TL/RL etc. Transmission lines railway lines	Degraded quality of catchment area Loss of forest cover soil erosion, water resources flora and fauna Increased sedimentation from clear felling, mining and other activities. Disturbance to	Strict implementation of Policy Guidelines for recommendation of FCA Cases approved by Government of H.P. on 30th September, 2009. Strict implementations of notification for the preparation of the Catchment Area Treatment Plans stipulated vide notification no. FFE-B-F (2)-72/2004-Pt-II dated the 30.09.2009. Promote usage of alternatives solutions like				√ √ √	Forest Department Forest Department	HPSEB/HPPCL/SJVNL/Himurja/Transmission lines Industries/Mining IPH, (IQPH) Other User agency/departments Project Proponents and developers

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordination Agency	Collaboration Agency
		wild life habitat.	bio-engineering under catchment area treatment plans, instead of only thrusting engineering solutions.						
11. Fragmented Protected Area Network	Protected areas are few and far in between and do not protect full assemblage of gene, species and ecosystem level diversity in the state	Inadequate protected area network threatens long term survival and viability of species, especially of the critically, endangered and vulnerable species.	Review of existing protected area network with respect to biogeographic zones and forest types at regular intervals. (Coverage/ species protection) (Extent/ Boundaries) to assess the needs for conservation and effectiveness of existing network at regular intervals.			√		Forest Department	DEST/HP SCST
			Develop action plan based on needs identification.		√			Forest Department	DEST/HP SCST
12. Crop damage by wild animals	Habitation and settlements and cropping practices (agri-horticulture) close to forest and protected areas.	Increase in Human – Wildlife conflict.	Creation of buffer zones around the Pas.			√	√	Forest Department	Dept of Planning
			Compensation payment			√		Forest Department Forest Department	Dept of Rural Development
		Poaching/killing of wild animals	Implement Crop Insurance Schemes			√		Forest Department	Dept of Agriculture Dept of Horticulture ZP/PS/GP

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordination Agency	Collaboration Agency
	Shrinking of wildlife habitat due to deforestation & development activities.		Re-orienting afforestation programmes including vegetative barriers to focus on species that help mitigate man-animal conflict			√			
13. Stress on wild life population	Hunting of wild animals is one of the main causes for the loss and decline of wildlife in the State.	Decline in population of species and even extinction of threatened wild life n the long term	Develop & implement awareness programme for ZP to educate masses against illicit felling and poaching			√		Forest Department	ZP/PS/PG
			Monitoring offences of illicit felling/poaching ZP/PS monthly reporting to Range Officer for action			√		Forest Department	ZP/PS/PG
			GP to prevent and report the cases of illicit felling/poaching to the DFO concerned and take cognizance of patrolling of Forest Guards in their jurisdiction			√		Forest Department	ZP/PS/PG
14. Loss of naturally occurring vegetation	Lantana camara, Ageratum conysoides	Degraded habitats due to extensive	Working plans to identify areas infested with alien and invasive species and		√			Forest Department	Dept of Planning, Rural Development Agriculture Horticulture

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordination Agency	Collaboration Agency
due to spread of alien and invasive species	Parthenium hysterophorus have spread far and wide in the State as a result of clear felling and wherever there is opening in the natural forest cover. Lack of eradication, rehabilitation and alternative use of exotic weeds	colonization of open areas by alien species. Replace native species in the long term and would also affect area under cropping.	prepare a plan suitable intervention depending on the species, extent of the areas infested. Eradication of invasive and alien species from forest areas to check infestation of invasive and alien species into cropped areas						
			Develop techno-economic feasibility study and marked based incentives for utilization of products derived from Lantana bush.				√	Forest Department	Dept of Planning, Rural Development Agriculture Horticulture
			Promote use of forest produce for value addition, like use of pine needles for making of bio-briquettes to be used as domestic fuel.			√		Forest Department	Dept of Planning, Rural Development Agriculture Horticulture

2.2 Wetland

Proposed Actions, Type of Response and Inter-sectoral Responsibilities

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordination Agency	Collaboration Agency
1. Shrinking of Wetland area due to change in land use and human & livestock activities.	An anthropogenic activity, unplanned urban and agricultural development, industries, road construction, impoundment, resource extraction and dredge disposal is leading to continuous shrinking of wetland area. Encroachment because of unclear land tenure and lack of property rights of the wetlands and surrounding areas is the major reason for shrinkage of the wetland area	Catchment degradation Loss of wetlands and their productive functions Exert biotic pressure on the immediate environment micro habitats and riparian forests. New wetland formation due to retreating glaciers in high altitudes (moraine) and due to commissioning of hydroelectric projects. New species in wetlands e.g. Grebe (Podiceps sp.) have been recorded for Himachal Pradesh/ India)	Demarcate wetland boundary with clear core and buffer areas which can be regulated Assign clear land tenure of wetland and surrounding area. Under take research studies for understanding impact of creation of new wetlands on local ecology, flora and fauna. Eject encroachment in coordination with relevant authorities e.g. BBMB which owns land in Pong but the catchment of Pong Dam is owned by the State of Himachal Pradesh. Identify clear roles and responsibilities of authorities related to wetland management. Undertake bathymetric mapping of wetlands. Conduct Regular Monitoring of physiochemical parameters. Water quality and land use of wetland.			√ √ √ √ √		Department HP State Council for Science, Technology and Environment (SCSTE) H.P. Forest Department	-Dept of Agriculture -Dept of Horticulture -Dept of Animal Husbandry -Dept of Tourism and Civil Aviation -Watershed Development Committees -CSOs, CBOs -Bhakra Beas Management Board and other concerned dam management authority/agency LADCs -Department of Revenue & HP State Council for Science, Technology and Environment -HP PCB -Dept of Agriculture -Dept of Horticulture -Dept of Animal Husbandry -Dept of Tourism and Civil Aviation -Watershed Development Committees -CSOs, CBOs -Bhakra Beas Management Board and other concerned dam management authority/agency LADCs -Department of Revenue & HP State Council for Science, Technology and Environment -HP Pollution control Board -Dept of Agriculture -Dept of Horticulture -Dept of Animal Husbandry -Dept of Tourism and Civil Aviation -Watershed Development Committees -CSOs, CBOs

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordination Agency	Collaboration Agency
									-Bhakra Beas Management Board and other concerned dam management authority/agency LADCs
								H.P. Forest Department	-Department of Revenue & HP State Council for Science, Technology and Environment -HP Pollution control Board -Dept of Agriculture -Dept of Horticulture -Dept of Animal Husbandry -Dept of Tourism and Civil Aviation -Watershed Development Committees -CSOs, CBOs -Bhakra Beas Management Board and other concerned dam management authority/agency LADCs
									HP Pollution Control Board
									HPSPCB, HPSCSTE, DEST
								H.P. Forest Department	

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordination Agency	Collaboration Agency
								H.P. Forest Department	
								H.P. Forest Department	
2. Catchment degradation is leading to soil erosion and siltation of the wetland	Continuous deforestation both legal & illegal in the catchment is leading to declining forest cover and productivity of forests and support lands. Further, uncontrolled grazing in meadows & pasture land is leading to increased pressure and reduced water holding capacity of forests and other lands. This is causing of continuous soil erosion & siltation. The combined effect of the visitors and graziers does contribute to increased siltation and organic influx into the wetland.	Loss of wetlands and their productive functions. Siltation leading to reduction in capacity of reservoir/dam. Loss of habitat Feeding and breeding of aquatic fauna and birds. Disturbance to breeding and nesting of birds. Ecological degradation due to the vast quantity of sediments that flow into water body from the degraded uplands.	ı of catchment area treatment plans Introduce fruit bearing trees in the CAT activities Ensure implementation of soil conservation measures should be taken to stop land slides. Create check points for controlling graziers/cattle/ livestock. Undertake carrying capacity study of the number of on at				√	H.P. Forest Department	-HPSEB, HPPCL/SJVNL/ZP/PS/GP/LADCs -Department of Agriculture Department of Horticulture -Department of Rural Development -Department of Animal Husbandry -Watershed Development Committees -HP SC STE -HP SPCB -IQPH -Dept of Tourism & Civil Aviation -ULBs -NGOs
						√		H.P. Forest Department	DEST Department of Animal Husbandry DESTE, HPSCST, Department of Animal Husbandry
							√	H.P. Forest Department	DEST HPSCSTE/ HPPCL, Department of Rural Development Department of Agriculture.
						√		H.P. Forest Department	DEST HPSCSTE/ HPPCL, Department of Rural Development Department of Agriculture

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordination Agency	Collaboration Agency
	High incidences of grazing pose serious threat to the biodiversity of the sanctuary area. The natural habitat linked by the migratory birds is thus destroyed by the hoofs of the cattle. The blasting of the hard rocks, deforestation of the area, throwing of muck in the water stream, etc. in the Hydel projects.	Silt on the edge of the lake subsequently provides fertile ground for the growth of the weeds.	Avoid blasting during exceeding/nesting season of birds.			√	√	H.P. Forest Department	DEST HPSCSTE/ HPPCL, Department of Rural Development Department of Agriculture PWD
3. Agricultural-Horticulture activities in the wetland buffer zone and fringe areas	Shift in land use and agricultural production patterns in the catchment, buffer zone and fringe areas. Shoreline of lakes/wetlands is farmed during the draw down phase.	Disturbance/ loss of feeding and breeding habitat of aquatic fauna and birds. Increased siltation due to tilling.	Identify and map wetlands where draw down areas are being farmed. Zonation and inclusion of draw down areas in core area. Regulate farming lakes, wetlands during draw down areas.			√ √	√	H.P. Forest Department	HP State Pollution control Board Bhakhra Management Board (BBMB) Department of Revenue Department of Agriculture
4. Unrestricted dumping of sewage, solid wastes	Infrastructure development and poor management of waste (municipal	Impairment of water quality	Prepare Wetland Management Plan for each wetland. As part of this plan, prepare & implement.				√	H.P. Forest Department	ULBs, IQPH, Department of Tourism & Civil Aviation,

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordination Agency	Collaboration Agency
and toxic chemicals from households, tourists destination, industries leads to pollution and eutrophication of wetlands, silting and weed infestation.	solid waste and waste water) in the catchment and vicinity of wetland leads to water pollution & eutrophication. Dumping of dung of horse and ponies near wetlands frequented by tourists (e.g. Khajjiar) also of organic influx into wetland. Increased runoff in the degraded catchment areas leading to siltation and weed growth. Excessive nutrient influx into wetlands contributes to water pollution & eutrophication. Littering of non-biodegradable materials by pilgrims and tourists increases pollution load in the wetland.	Loss of wetland and its productive function weed infestation and proliferation. Health risk to public & livestock. Decrease in value of public amenities (tourism, recreation)	Waste mater ial including solid waste management plan. Suitable camping sites should be identified. Walking trails should be constructed. Prevention of pollution from point sources by intercepting, diverting and treating the pollution loads entering the lake. The interception and diversion works may include sewerage & sewage treatment for the entire lake catchment area. Weed removal and wetland monitoring should be carried out.						HP State Pollution control Board
5. Increased health risk in the	Deteriorating water quality due to pollution led to the	Major health risk e.g. vector borne disease in the	Major health risk e.g. vector borne disease in the vicinity of wetland.				√	H.P. Forest Department	

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordination Agency	Collaboration Agency
surrounding area of wetland due to pollution	spawning of mosquitoes in the absence of predators, such as aambusia affinis & lulli fish, which prey on mosquito larvae.	vicinity of wetland.	Ensure integration & implementation of Awareness programme on health and sanitation of different line agencies e.g. IPH, health, tourism, forest & wild life.			√		H.P. Forest Department	IPH, Deptt. of Health & Family Welfare, Dept of Tourism & Civil Aviation NGO, CSOs
6. Depletion of wetland's flora and fauna due to pollution/ dredging / Introduced and Invasive plant species	Congestion of natural outdoor recreational sites aquatic by plant species such as e.g. eishhonis cnassipes, Azolla and Salvinia molesta which clog waterways and compete with native vegetation, leading to loss of wetland's flora and fauna. Further, natural species also assumes weedy proportions e.g. Typha, Trapa, Thalia, Echinodorus, etc. Removal of natural vegetation spurs spread of alien and invasive species e.g. Lantana, Adhatoda, etc. This leads to reduction of area	Damage to the function and health of wetlands by Introduced and Invasive species. Local or regional species extinctions and replacement by other species. Loss of biodiversity and reduced ecosystem stability. Loss of biodiversity and reduced ecosystem stability. Reduction in agricultural productivity, reduction in livestock	Study of ecosystem dynamics. Inventories biodiversity of the wetlands as part of Wetland Management plan. Carry out scientific study on wildlife and avifauna and its habitat and possible connectivity corridors with larger landscape as part of wetland management plan. Prevent and Control of introduced and invasive alien species specific to the wetland as part of wetland management plan.			√ √		H.P. Forest Department H.P. Forest Department H.P. Forest Department	-DEST -HP SCSTE -NGOs -Department of Fisheries -CSOs -Department of Fisheries -DEST -HP SCSTE -NGOs -Department of Fisheries -CSOs Department of Agriculture Department of Fisheries.

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordination Agency	Collaboration Agency
	under palatable grasses used by wild grazing animals. Indiscriminate introduction of new species of fishes for commercial exploitation, over harvesting of particular species and fishing methods are leading to depletion of wetland's native fauna. Commercial fisheries lead to change in composition of fisheries. The fertilizers and insecticide i.e. the chemicals such as CAN, Urea, 12-32-16, DAP, Super-Phosphate etc. and insecticide pollute water of the reservoir and this deteriorates aquatic flora and fauna.	productivity, disruption of ecosystem services and reduction in land values. Alteration in nutrient cycling. Change in habitat Alteration in water flow Decrease in water retention							
7. . Inadequate enforcement of regulatory-	Some of the unchecked activities include poaching of avifauna, illegal	Unabated poaching and wildlife trade can deplete flora and	Formulation and implementation of Wetland's Management Action Plan.				√	H.P. Forest Department	Department of Agriculture Department of Fisheries Specialist National Institutions

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordination Agency	Collaboration Agency
provision due to jurisdiction issues on account of unclear land tenure	harvesting of crops and commercial fishing e.g. Introduction of fish seeds/ varieties and commercial activities without permission with Chief Wildlife Warden. Further, remote and inaccessible areas, lack of trained enforcement staff, lack of coordination among institutions, lack of enforcement infrastructure	fauna and further threaten species. Extinction of species Disturb the balance of ecosystem.	Activities regarding conversion of wetlands to non- wetlands use, and reclamation and dredging. Enforce strict regulations related to poaching. Training of enforcement/ regulatory staff and augmentation of enforcement infrastructure. Seek collaboration with specialized National agencies in the area of wildlife monitoring and enforcement.						
8. Change in natural flow/ hydrology and water dynamics of the reservoir/ wetland	Hydropower projects and other infrastructure development projects requiring water diversion	Changes in Hydrological regime leading to variation in ecology of the small stream/ khud which in turn affects large streams and rivers and its aquatic flora, fauna and fisheries Impact on the ecology d/s reservoirs/ dams.	Assessment of the hydrology in the immediate catchment/ river basin for small hydro projects. Ensure coordination among concerned authorities on the timing and volume for release of water. Assessment of dredging needs be based on wetlands affected by siltation and not as a matter of annual management practice.			√	√ √	H.P. Forest Department H.P. Forest Department H.P. Forest Department	Himurja HPSEB, HPSEB, HPPCL, SJVNL Himurja HPSEB, HPSEB, HPPCL, SJVNL Himurja HPSEB, HPSEB, HPPCL, SJVNL

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordination Agency	Collaboration Agency
9. Uncontrolled / Unregulated tourism in the buffer zone loading to disturbance to the ecology and critical habitat	Introduction of fish in wetlands (e.g. Renuka and Khajjiar wetlands) led to fish feeding by Tourists with bread, biscuits, wheat flour dough, grains, nuts, etc resulting in organic pollution. Sports & Training activities disturbing the habitats of aquatic animals & plants.	Lowering of ground water table down stream dams/reservoirs. Water, air & noise pollution. Public health risk & safety High BOD level resulting in fish mortalility	Develop water bodies as tourist spots with adequate ecological protection independently or as part of tourism master plan.			√	H.P.	Forest Department	Department of Tourism & Civil Aviation PWD IPIA, ULB,

2.3 Fisheries

Proposed Actions, Type of Response and Intersectoral Responsibilities

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordination Agency	Collaboration Agency
1. Shrinking of Wet- land/ water body/ reservoirs area due to change in land use, human & live-stock activities	Anthropogenic activities, unplanned urban and agricultural development, industries, road construction, impoundment, resource extraction and dredge disposal. Illegal encroachment because of unclear land tenure and lack of property rights of the wetland/ water body/ reservoir and surrounding areas. Continuous deforestation both legal & illegal in the catchment is leading to declining forest cover and productivity of forests and support	Siltation leading to reduction of capacity of reservoir/dam/ wetland. Loss of habitat/ biodiversity/ productivity. Disturbance to feeding, breeding and nesting of birds including migratory birds. Loss of Eco-system function, fish species and productivity.	Assessment of baseline fisheries production in each wetland/ reservoir/ water body and conduct root cause analysis for decline in production and species. The baseline study should include the following: Inventories fish species as part of aquatic biodiversity of the wetlands/ water body/ reservoir and its Management plan. Breeding season and the spawning grounds of major fish species. Silt tolerance study of major fish species including species wise tolerance and duration. Study of effect of sediment and silt on benthic communities. Assist line department in identifying and implementing	√	√ √	√ √	√	Department of fisheries	-HP State Council for Science, Technology and Environment (HP SC STE) -hp State Pollution Control Board -Dept of Agriculture -Dept of Horticulture -Dept of Animal Husbandry -Dept of Tourism & Civil Aviation -Zila Parishad (ZP) -Panchayat Samiti (PS) -Gram Panchayat (GP) -Watershed Development Committees -CSOs, CBOs -Directorate of Energy (Power Utilities), PWD LADCs -Department of Revenue (H.P. State Council for Science,

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordination Agency	Collaboration Agency
	lands. Further, uncontrolled grazing in meadows & pasture land is leading to increased pressure and reduced water holding capacity o forests and other lands. This is causing continuous soil erosion & siltation		measure for dredge spoil stabilization as part of the reservoir/water body/wetland operation plan. Desilting as part of reservoir/water body/wetland operation plan e.g. timing of desilting vis a vis flooding (1st /2nd /3rd desilting with 1st, 2nd, and 3rd flood) Suggest improvement measures to address directly negative impacts on fish breeding and feeding grounds as part of the restoration of habitat while developing and implementing catchments area treatment plan and watershed development programmes. Assist line department to implement measures to reduce fish mortality by maintaining adequate depth all the year round as part of the operation plan. Water body/ wetland/ reservoir monitoring plan. Monitor the post project (catchment area treatment plan and watershed development programme) production to assess the efficacy of implemented				√		Technology & Environment)

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordination Agency	Collaboration Agency
			measures for replications. Coordinate with line departments to formulate multi stakeholder's action plan based on route cause analysis. Implementation other fish breeding programmes for Endangered/ indigenous species. Develop and implement pilot project to reduce fish mortality related to annual silt fishing linked to operational strategy of reservoir						
2. Agriculture-horticulture activities in the wetland/ reservoir/ water body buffer zone, fringe areas and catchments area	Shift in land use and agricultural production patterns in the catchment, buffer zone and fringe areas. It has been reported in Pong wet- land report of forest department that the chemicals such as CAN, Urea, 12-32-16, DAP, Sulpher Phosphate and insecticides such as nuvan, etc. pollute water for reservoir and deteriorates flora and fauna	Fish mortality and de- cline in productivity. Disturbance/loss of feedings nesting and breeding grounds of in-habitants including fish.	Undertake research studies on the impact of insecticides and fertilizer residues on biotic life of aquatic lotic ecosystems and prioritize water bodies based on the level of concern. Assist department of agriculture and horticulture in formulating action plan for the identified areas based on level of concern according to research studies. Promote bio-farming, IPM, IPNM, bio-fertilizer, bio-pesticide, etc.		√	√	√	Department of fisheries	-HP State Pollution Control Board - Directorate of Energy (utilities) - ZP/PS/GP -Department of Revenue -Department of Agriculture -Department of Horticulture -H.P. Forest Department
3. Poor surface	Infrastructure	Loss of aquatic	Assist the respective line		√	√	√	Department of	Deptt. of IQPH,

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordination Agency	Collaboration Agency
water quality due to unrestricted dumping of sewage, solid wastes and toxic chemicals from household, tourists destination and industries leads to water pollution and eutrophication of wetlands/water body/reservoir	development and poor management of waste (municipal solid waste, Construction and demolition waste and waste water) in the catchment and in vicinity of wetland/ water bodies/ reservoirs. Further, increased influx of organic waste which leads to water pollution & eutrophication. Increased runoff in the de- graded catchment areas of wetlands leads to siltation and weed growth, water pollution & eutrophication. Littering of non-biodegradable materials by pilgrims and tourists increases pollution load in the wetland.	flora and fauna. Fish mortality and de- cline in productivity. Decrease in value of public amenities (tourism, recreation).	departments to prepare wetland/ water body/ reservoi management plan (sewage, solic wastes, toxic chemicals, tourist destination and industries) fo each prioritized wetland/ wate body/ reservoir. As part of thi plan, take measures to protect anc rehabilitate spanning and feedin areas. Carry out regular monitoring o the prioritized wetland/ reservoir/ water body as part o wetland/ reservoir/ water bod management plan.			√		fisheries	Municipalities, Deptt. of Forrest, SPCB, Deptt. of Health, Deptt. of Urban Development, NGOs, CSOs, CBOs Directorate of Energy (Utilities)

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordination Agency	Collaboration Agency
4. Depletion of benthic flora and fauna in wetlands/ reservoir/ water body due to dredging/ desilting	Depletion of benthic flora and fauna in wetlands/ water body/ reservoir due to dredging/ desilting. Depletion of fisheries due to introduction of invasive plant and fish species. Congestion of natural outdoor recreational sites is leading to depletion of wetland flora & fauna. Indiscriminate introduction of new species of fishes for commercial exploitation, over harvesting of particular species and fishing methods are leading to depletion of wetlands/ reservoir/ water body fauna.	Damage to the function and health of wetlands by introduced and invasive species. Local or regional fish species extinctions and replacement by other fish species. Disturbance to wet-land/ ecology and food chain. Disruption of breeding and feeding of fish. Alteration in water flow and decrease in water retention which Leads to high TDS/ turbidity and decreased oxygen level thereby increasing fish mortality.	Ensure dredge spoils do not re-enter the water body/ wetland/ reservoir.		√	√		Department of Environment Science & Technology	-HP State Pollution Control Board -HP SCSTE -NGOs -Department of Fisheries -CSOs, CBOs -ZP/PS/GP -H.P. Forest Department
			Since the introduction of new species is fraught with certain risks as such the biotic material if necessary be imported as strict quarantine procedures be adopted prior to their release in natural waters		√	√	√	Department of Fisheries	-Department of Environment Science & Technology -HP State Pollution Control Board -HP SCSTE -NGOs -Department of Fisheries -CSOs, CBOs -ZP/PS/GP -H.P. Forest Department
. Poor	Indiscriminate	Loss of fish	Formulation and implementation		√		√	Department of	Department of

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordination Agency	Collaboration Agency
Enforcement of regulated activities due to jurisdiction issues on account of unclear land tenure and other aspect related to fisheries	hooking, netting, dynamiting and electrocuting have greatly affected the qualitative and quantitative availability of fishes in the rivers, streams, lakes and reservoirs. Further, due to reduction in the large-sized fishes, fishing pressure has shifted to the juveniles	species Ecological imbalance in aquatic flora and fauna including fisheries Loss of wetland/ water body/ reservoir area due to institutional gaps Deteriorate surface water quality	of Wetlands Management Action Plan Enforce strict regulations related to poaching and other issues. Enhance capacity of personnel & training of enforcement/ regulatory staff and augmentation of enforcement infrastructure. Develop awareness programmes for all the stakeholders for education on conservation of fish.		√	√ √		Fisheries, Department of Forests	Agriculture, NGO's, CSO's, Department of Tourism & Civil Aviation, Directorate of Energy (Utilities), ULBs, IPH and HPPCB
. Change in natural flow/hydrology and water dynamics of the reservoir/wet-land/ water body	Construction of a large number of reservoirs and dams; diversion of streams and rivers and hydro-electric projects lead to reduced flow into wetlands/ water bodies/ reservoir. Further, release of impounded water by dam/reservoir depends on the management authority. Small hydropower projects and other infrastructure development projects requiring water diversion also change the hydrology of the	Changes in Hydro-logical regime leading to variation in ecology of the small stream/khud which in turn affects large streams and rivers. Ecological imbalance in aquatic flora and fauna including fisheries	Assist line department in assessment of the hydrology in the immediate catchment/ river basin for small hydro projects. Assist line departments to ensure coordination between relevant authorities on the timing and volume for release of water. Assessment of sustainable environmental flow for each river and stream. Ensure release of minimum 15% of lean flow or environmental flow downstream. Assist line departments in developing, design and implementation of appropriate	√	√	√ √	√	HP State Council of Science, Technology & Environment	Deptt. of Fisheries, DEST, IPH, Himurja Directorate of Energy (Utilities).

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordination Agency	Collaboration Agency
	wetland/ water body/ river.		fish ladder or fish pass from diversion structure or additional measure to facilitate mini- mum downstream discharge in order to maintain aquatic longitudinal connectivity (At the moment sluice gate are not designed in a manner to release 15% of minimum flow). Ensure minimum downstream discharge to be maintained through fish pass.				√		
7. Uncontrolled / unregulated tourism in the buffer zone leads to disturbance of fish feeding and breeding habitat	Tourists feed fish and turtles with bread biscuits, wheat, flour, grains nuts etc. thereby disturbing and decline of habitat and fish productivity. Movement of high speed motorised boats of tourists, allied activities of water sports like training programmes and fishing vessels. Poor camp management and waste disposal	Water, air & noise pollution public health risk & safety. Disturbance in feeding and breeding of fish.	Identifying and advising on regulation on the number of motorized tourist vessels in water bodies. Ensure adequate ecological/fish habitat protection measures taken before development water bodies as tourist spots.	√		√		Department of Tourism & Civil Aviation, HP SPCB	Deptt. of Fisheries, PWD, IPIA, ULB, Zila parishad, Gram Panchayat

2.4 Horticulture

Proposed Actions, Type of Response and Inter-sectoral Responsibilities

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordination Agency	Collaboration Agency
1. Predominant rain fed horticultural crops	Irrigated Area is 19% 81% area is rain fed. Abnormal pattern of rainfall Hilly Terrain Limited Water Resources Improper Management of resources.	Low Productivity Increased incidences of disease and pest infestation	Introduction of water efficient micro-irrigation system. pproach on rainwater harvesting. Increased use of mulch, organic manures, drought tolerant crops, etc.			√	√	Horticulture	Agriculture, CSSRI, Horticulture/ Agriculture Universities, NGO's, PRI's, IPH
2. Shift in cropping pattern by market driven forces	Diversification to vegetable and Floriculture etc.	Dwindling Soil health due to intensive cultivation. Nutritional requirement of vegetable crops not properly met.	dherence to fruit and vegetable crops based cropping systems in line with soil fertility status in different agro climatic zones as per their suitability. Integrated Nutrient Management needs more emphasis mplementation. Package of practices for the horticultural crops to be developed and practiced accordingly	√	√	√		Agriculture	CSSRI, Horticulture/ Agriculture Universities, NGO's, PRI's, IPH
3. Threats of wildlife to horticultural crops	Enhancement in Fight for food	Reduction in crop production Degradation of water and soil.	Proper surveillance of wild animals. Protection of crops by					Forest	Agriculture, Horticulture deptt.

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordination Agency	Collaboration Agency
			advocating use of wired fencing.						
		Risk to Human and Domestic animals.	Enactment of some policy.	√	√	√	√		
			At least 10% forest plants to be wild fruits.						
4. Inadequate soil and water conservation measures	Soil and water erosion due to sloppy land and less depth.	Sheet, rill and gully erosion.	Promote soil conservation measures by people participation.					Agriculture	Horticulture / forest
		Loss of soil fertility.	Increasing vegetation underfruits with concerted efforts.						
	Lack of vegetation cover in catchment area.	Low productivity	Emphasis on water harvesting and water conservation.			√	√		
	Growing flood menace due to high intensity of rainfall		Propagation of micro irrigation system						
5. Use of Agro Chemicals in horticultural crops	Use of pesticides Inadequate awareness	Loss of useful microbial flora& fauna.	Promotion of Bio pesticides & Bio-fertilisers.					Horticulture	Agriculture
		Application of agrochemicals may result in ground water contamination.	Promotion of organic based farming			√	√		
		Risk to human and animal health.							
6. Threat from obnoxious weeds	Outflow of weeds through rain, wind, irrigation water, animals, birds, etc.	Adversely affecting yields of horticultural crops & soil fertility.	Identify and map areas infested with obnoxious weeds and prepare a plan with suitable interventions depending on the					Horticulture	Agriculture, Research Institutes and ICAR

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordination Agency	Collaboration Agency
		Reduction in cropped area. Increased disease and pest infestation by acting as alternate host.	species, extent of the area infested. Conduct techno economi feasibility study and marke based incentives for utilisation o products derived fron obnoxious weeds.		√		√		
7. Genetically modified seeds	Inadequate information. Large scale testing is not being carried out/conducted before recommending GM seeds	May affect existing germplasms	e thoroughly evaluated, tested and then promoted through R & D.			√	√	Agriculture	Horticulture
8. Low adoption of latest technology by farmers and deceleration in extension activities	Low purchasing power. Small land holding. Incompatibility of technology developed at research station vis-à-vis farmers field.	Low productivity of fruit and vegetable crops	Strengthening extension network Need to provide better communication network Investment in developing infrastructure			√	√	Horticulture	Agriculture
9. Generation of waste due to spoilage/disposal of horticultural produce because of lack of Road &	Lack of infrastructure facility particularly primary processing. Delay in access to	Reduced income due to loss of produce. Pollution due to disposal on land/	ccelerate / initiate action envisaged in projec mplementation plan fo management of infrastructur facilities like loca market/storage.					Horticulture	HPMC, APMB, Agriculture, PWD

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordination Agency	Collaboration Agency
Transportation/storage facility	the market due to lack of post harvest storage / transportation. Improper packaging. Losses in processing and handling Freezing/ chilling injury. Unsuitable transport containers	water. Increased public/ animal health risk.	Monitor climatic conditions, e.g. moisture content, temperature, relative humidity, etc. as part of post harvest management plan. Develop and implement MSW management Plan through APMC.			√	√		
10. Use of chemical s for enhancing the size, color and ripening of produce	For high revenue generation	For high revenue generation	Enforcement of regulation strictly. Creating awareness among farmers. Capacity Building of the Farmers.			√	√	Horticulture	Horticulture/ Agriculture Universities, ICAR
11. Inadequate use of hitech Horticulture	Poor purchasing power of the farmers. Ignorance of the farmers about adoption of such need based technology for generation of higher income	Failure of the high value crops due to unforeseen circumstances.	Promotion of Polyhouse/ Nethouse and micro- irrigation system. Awareness / training to the farmers about benefits of such technology and its full crop geometry. Promotion of Insurance Incentive schemes.			√	√	Horticulture	Horticulture/ Agriculture Universities, ICAR
12. Dwindling soil	Long duration fruit	Poor soil health	Integrated nutrient management					Agriculture	Horticulture/

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordination Agency	Collaboration Agency
health	crops and continuous cropping of vegetable crops. Replenishment of nutrient is less Soil erosion. Low use of organic matter.	leading to low productivity. Increase in cost of cultivation.	and technology need more emphasis. Soil testing and judicious use of fertilizers. Promotion of organic farming.		√	√	√		Agriculture Universities, ICAR
13. Suffering of farmers due to loss of crops on account of weather risk	Frequent occurrence of natural calamities like drought, cloud bursts, heavy rains, hailstorms and fluctuation in temperature	Result in lot of problems of soil and water erosion. Productive soil is lost. Lot of loss to crops. Impaired quality of produce.	Early warning of natural calamities of heavy rains, hailstorms, cloud burst and temperature variation to be given by IMD Crop insurance and contingency crop planning to be implemented. Integrated Natural Resource Management need to be implemented. Develop (through R & D) and promote varieties tolerant to fluctuations of weather Strong support for protected cultivation need to be implemented. GIS methods for detailed soil resource mapping and land use planning to be carried out.			√	√	Horticulture	Agriculture, IMD University/Research Institutes
14. Poor post harvest management	Lack of awareness about sanitary conditions to handle	Loss of produce/ loss of revenue.	Promote awareness and training programmes for post harvest management for farmers /					Horticulture	HPMC, Agriculture, APMB, Horticulture/ Agriculture

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordination Agency	Collaboration Agency
	produce. Lack of integrated handling system to manage produce. Improper storage, drying, grading practices at farm level. Lack of processing/ storage facilities/ orchard management.	Input Resource loss like fertilizer, pesticide, soil nutrients and water. Increased health risk.	handlers / warehouse managers / transporters. Develop and implement agriculture produce market management / solid waste management programme.			√	√		Universities and ICAR
15. Inadequate marketing and post harvest infrastructure	Inadequate investment	Unremunerative price. Low returns and losses Unorganized producers	Creation of better marketing infrastructure facilities like marketing yards, transportation, collection, storage, grading and packing near the production area. Need to develop and promote efficient post harvesting technologies like primary processing units. Need to establish rural connectivity by constructing farm access roads. Need to develop sound market intelligence network.			√	√	Horticulture	HPMC, Agriculture, APMB, Horticulture/ Agriculture Universities and ICAR
16. Impact of Climate	Global Warming.	Introduction /	Need to strengthen R & D to	√				Horticulture	Agriculture,

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordination Agency	Collaboration Agency
change on horticultural crop	Aberration in weather	extinction of new flora and fauna. More Biotic and Abiotic stresses on crops. Uncertainty in yields of horticultural crops.	develop varieties / techniques/ technologies to mitigate the adverse impact of climate change. Conservation of germplasm strengthening of IMD to forewarning about weather up to micro level in hilly areas. Creating awareness among farmers						Horticulture/ Agriculture Universities, IMD and ICAR

2.5 Agriculture

Proposed Actions, Type of Response and Inter-sectoral Responsibilities

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordination Agency	Collaboration Agency
1. Predominant rain fed agriculture	Irrigated Area is 19 % only Abnormal pattern of rainfall Non-availability of water sources hilly terrain	Frequent Crop failures. Vegetable low productivity.	Introduction of water efficient micro- irrigation system. Approach on a large scale rainwater harvesting Increase use of mulch, organic manures, drought tolerant crops, etc. Watershed development approach for rain fed agriculture.			√	√	Agriculture	Horticulture, SAU's and R.& D Institutes, NGO's, PRI's, IPH, Rural Development, I&PH
2. Shift in cropping system by market driven forces	Cereal- legume cropping system being shifted to vegetable crop due to increased income. Increased availability of irrigation water. Climate Change	Soil health dwindling. Reduction of area under Food Crops.	Adherence to crops and cropping systems in line with soil fertility status in different agro climatic zones as per their suitability. Need to identify crops which can adapt to climate change suitability. Package of practices for the crops to be developed and practiced accordingly	√	√	√		Agriculture	SAU's & HPMB
3. Inadequate soil and water conservation measures	Soil and water erosion due to sloppy land, poor textured and less soil depth. Lack of vegetation cover in catchment area.	Sheet, rill and gully erosion. Low productivity. Washing away of cultivable area. Cultivation of crops	Promote soil conservation measures by people participation Increase vegetation and vegetative conservation. Emphasis on rain water harvesting and conservation. Promotion of contour terracing on sloppy fields. Follow watershed development			√	√	Agriculture	Horticulture, Forest, IPH, Rural Development, SAU's, R & D Institute, I&PH

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordination Agency	Collaboration Agency
	Growing flood menace due to high intensity of rainfall.	on high slope (> 30 %)	approach						
4. . Use of Agro Chemicals in agriculture	Indiscriminate use of pesticides. Inadequate awareness.	Loss of useful microbial flora in soil. Adverse impact on environment. Ground water contamination and risk to human health due to residual effect.	Promotion of Bio pesticides. Promotion of organic farming. Promotion of IPM technology. Awareness campaigns to educate farmers.			√	√	Agriculture	Horticulture
5. Threat from obnoxious weeds	Outflow of weeds through rain, wind, irrigation water, cattle, birds, etc.	Adversely affecting crop yields, pasture lands & soil fertility. Damage in crop area. Poisonous to human & animals. Environmental degradation	Identity and map areas infested with obnoxious weeds and prepare an action plan with suitable interventions depending on the species and extent of the areas infested, through community involvements. Conduct techno – economic feasibility study and market based incentives for utilization of products derived from obnoxious weeds		√		√	Agriculture	Forest & Rural Development, SAU's & A.H.
6. Low adoption of latest technology by the	Incompatibility of technology developed at research station vis-à-vis farmer's field.	Low crop productivity and farm income.	Strengthening extension network. Need to provide better extension and communication network.					Agriculture	Horticulture, SAU's and R&D institute.

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordination Agency	Collaboration Agency
farmers	Lack of awareness. Poor financial conditions.		Need based and location specific R&D.			√	√		
7. Dwindling soil health	Continuous cropping, high intensity. Replenishment of nutrient is less. Soil erosion. Low use of organic matter.	Poor soil health leading to low productivity. Increase in cost of production.	Integrated nutrient management. Soil testing and judicious use of nutrients Promotion of organic farming		√	√	√	Agriculture	Horticulture, SAU's and R&D institute.
8. Suffering of farmers due to losses of crops on account of weather risk	Frequent occurrence of natural calamities like drought, cloud bursts, heavy rains, hailstorms, temperature fluctuations, hailstorm, frost etc.	Result in lot of problems of soil and water erosion. Productive soil is lost. Loss to the crops and quality of produce is affected. Loss to productive Soil	Early warning of natural calamities of heavy rains, hailstorms, cloud burst and temperature to be given by IMD. Crop insurance and contingency crop planning Integrated. Natural Resource Management. Develop and promote varieties tolerant to fluctuations of weather. Strong support for protected cultivation. GIS methods for detailed soil resource mapping and land use planning.			√	√	Agriculture	Horticulture, IMD, SAU's & R&D Institutes
9. Inadequate marketing and post	Inadequate investment.	Unremunerative price to farmers.	Market led production System. Sensitization of farming					Agriculture	HPMC, Horticulture HPMB, SAU's and R&D Institutes

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordination Agency	Collaboration Agency
harvest infrastructure	Inaccessibility of production area. Difficult topography. Lack of knowledge about modern system of marketing.	Low returns due to inefficient marketing. Loss in quality of produce. Damage/ rottage.	community regarding efficient marketing & post Harvest technology. Creation of better marketing infrastructure facilities like marketing yard, transportation, collection, storage, grading and packing near the production area. Need to develop and promote efficient post harvesting technologies. Need to establish rural connectivity by constructing farm access roads. Needs to develop sound market intelligence network. Organize farmers into commodity groups & their capacity building. Contract farming.						
10. Increasingly small holdings may lead to non-cultivable land	Average size of land holding is 1.1 ha and may further go down in view of fragmentation of holdings	Subsistence farming results in unemployment. Low crop yields. Increase in current fallows.	Promotion of precision farming. Increasing cropping intensity. Promotion of high value crops. Bringing fallow land under cultivation.	√	√	√	√	Agriculture	Horticulture, Revenue, & I&PH

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Programme	Project	Coordination Agency	Collaboration Agency
			Bringing more area under efficient irrigation through rain water harvesting. Consolidation of holdings.						
11. . Impact of climate change on agriculture	Global Warming. Aberration in weather Industrialization.	Introduction/ extension of new flora and fauna. Change in crop/cropping seasons. More biotic and abiotic stresses on crops.	Need to strengthen R&D to develop varieties/ techniques/technologies to mitigate the adverse impact of climate change. Conservation of germplasm. Strengthening of IMD to forewarning about weather up to micro level in hilly areas. Creating awareness among farmers.	√	√			Agriculture	Horticulture, SAU's and R&D Institute

2.6 Animal Husbandry & Livestock

Proposed Actions, Type of Response and Inter-sectoral Responsibilities

Issues	Causes	Impact/Risks	Proposed Actions	Policy	Plan	Programme	Project	Coordination Agency	Collaborating Agency
1. Degradation of all kind of land (Alpine pastures vegetation, forest area).	• Overgrazing	• Increase in soil erosion due to over- grazing. • Decrease in soil fertility. • Increase soil compaction.	• Prepare and implement community level projects to overcome overgrazing. • Demarcate boundaries of grazing land and prepare grazing plans. • Make people aware about harmful effects of overgrazing/soil erosion. • Ensure participation of villages/ PRI. • Departments should act as facilitators. • Improvement of Indigenous live- stocks.	√		√		Forest	Agriculture, Animal Husbandry/ Allied Departments
2. Shrinkage of private grasslands and village common lands due to over grazing by livestock, Construction of Roads, Buildings, Government Institutions.	• Unscientific grazing practices/ Lack of proper grazing management practices.			√		√		PRI's	Agriculture, Animal Husbandry/ Patvaaris/ Gram Sewaks/ Forest Guards
3. Research on effect of climate change on animal health.	• Climate change is being witnessed every where and so is the case in HP.	• May lead to many problems related to adaptability and occurrence of diseases (Zoonotic). • Lowering of Production.	• Plan need to be prepared to monitor the effect of climate change on animal health • Livestock breeds to be developed, which can adapt to a particular climate.	√		√		Research Institutes	Animal Husbandry/ allied (village level workers)
4. Public and animal health risk due to inadequate animal/ Public health Infrastructure.	• Inadequate drugs availability and distribution. • Inadequate capacity of health infrastructure/facili	• Increased burden of disease/mortality • Consumption of milk,	• It is proposed to have polyclinics in the remaining districts of the State to provide • better diagnostic services to the • People. • Constant monitoring of					Animal Husbandry	PRI's and stakeholders concerned.

Issues	Causes	Impact/Risks	Proposed Actions	Policy	Plan	Programme	Project	Coordination Agency	Collaborating Agency
	ties including buildings & equipment	• Milk products and meat of infected livestock may affect on human health.	surveillance of livestock diseases and mortality. • Specialised diagnostic centres to be established like laboratories at Sub-division and block levels. • Create awareness among masses about consumption of only non- infected milk and meat products.	√		√			
5. Transfer of diseases from animals to human & vice versa (Zoonotic diseases).	• Inadequate awareness and dissemination of knowledge pertaining to Zoonotic diseases.	• Human health risk due to transfer of communicable diseases from animals and vice versa.	• Animal health care centres/labs to be properly equipped for diagnosing various diseases in animals • Information to be disseminated of such communicable diseases to people • Increased collaboration between Veterinarians and Medicos regarding public health issues.	√		√		Animal Husbandry	Health & Family welfare.
6. Inadequate awareness about animal health issues leading to higher public and animal health risk.	• Inadequate awareness due to peculiar topographical conditions in hilly terrain • Use of banned drugs e.g. Oxytocin.	• Health risks on livestock population • Increased burden of disease/mortality • Consumption of milk, milk products and		√		√		Animal Husbandry.	Health & Family welfare PRI's and Local Bodies.

Issues	Causes	Impact/Risks	Proposed Actions	Policy	Plan	Programme	Project	Coordination Agency	Collaborating Agency
	• Lack of NGO/CSO participation.	meat of infected livestock may lead to human health problems.							
7. Public health and animal health risk due to increase in animal disease	• Unscientific livestock's management practices	• Increase in morbidity and mortality of Livestock. • Human health risk due to spread of diseases (Zoonotic).	• • Awareness regarding scientific livestock's management • Establishment of registered slaughter houses at hospital level and amendment of laws for enforcing compulsory meat inspection at the slaughter houses before selling in the market even in the rural areas. • Upgradation of Veterinary dispensaries to Veterinary Hospital so that the ratio of hospital: dispensary is not more than 1:8. • Enhancing awareness of livestock diseases which adversely impact public health.	√	√	√		Animal Husbandry.	Health & Family welfare, PRI's, Local bodies and NGO's.
8. Increasing pressure on forest area/other land use.	• Due to peculiar geographical and hilly terrain transportation of fodder becomes difficult. • Due to shrinkage of common grass-lands and waste-	• Depletion of vegetation in the forest area. • Soil Erosion. • Loss of soil fertility.	• Encourage stall feeding of live- stock by farmers. • Promoting fodder cultivation. • Establishment of fodder banks at Panchayat level. • To increase the nutritive values of roughages by Urea	√		√		Forest/ PRI's	Animal Husbandry, Agriculture, Rural Development

Issues	Causes	Impact/Risks	Proposed Actions	Policy	Plan	Programme	Project	Coordination Agency	Collaborating Agency
	land in the residing villages.		treatment. Molasses treatment of rice crops/wheat straw, rice straw & poor nutrient value grasses etc. • Promote fodder (grass & trees) species in JFM and community forest projects.						
9. Environmental pollution due to animal waste.	• Unscientific livestock waste disposal practices. (Faeces, urine, carcasses etc.)	• Emission of green house gasses (CO2, CH4, N2O). • Water pollution. • Offensive odour.	• Encourage biogas plants. • Encourage the use of organic manure. • Proper scientific disposal of dead animals' carcasses.	√		√		PRI's	Agriculture, HPPCB, Local Bodies, Rural Development
10. Impact of migrating animals on the environment.	• Availability of Grazing Area • Centuries old migrating system of rearing animals by communities like Gaddies and Gujjars.	• Degradation of soil quality/fertility. • Decrease in vegetative cover. • Increase pressure on common land, wasteland and Forest.	• Steps to monitor and allow the migration of animals according to carrying capacity/availability of grazing lands/grazing facility. • Rearing of high yield improved breeds of animals • Promoting fodder cultivation. • Encouraging plantation of fodder trees/improved fodder grasses etc.	√		√		Forest	Animal Husbandry, Agriculture, PRI's, Representatives of migratory com- munity like Gaddies and Gujjars.
11. Threat of obnoxious weeds affecting fodder availability for animals.	• Rapid spread of obnoxious weeds like Parthenium, Lantana, Ageratum etc in	• Fodder production adversely affected.	• Extensive mass campaign to eradicate obnoxious weeds. • Re-plantation of fodder trees, grass etc on a massive scale.	√		√		Forest/ PRI's	Animal Husbandry, Rural Development

Issues	Causes	Impact/Risks	Proposed Actions	Policy	Plan	Programme	Project	Coordination Agency	Collaborating Agency
	the grasslands/ wastelands/forest area.		• Plantation of improved variety of fodder roots.						, Public Health department and HP,PCB.
12. Water, soil and air pollution due to lack of dead animal management.	• No scientific animal management practices.	• Release of Green house gasses. • Increased offensive odour problem in nearby area. • Pollution of water bodies spread of diseases to animals and human beings.	• Development of community level dead animal carcasses management system. • Identification of proper sites/ places for the disposal of carcasses .	√		√		PRI's	Animal Husbandry, Rural Development , Public health, HPPCB.
13. Increase in environment and public health (Effect on human/ animal health.) risk due to unscientific management of slaughter houses.	• Inadequate awareness among people working at slaughter houses • Improper slaughter waste disposal practices • Lack of treatment facilities for slaughter house effluents.	• Effect on human health, animals/birds • Increased water and land pollution • Increased foul odour. • Adverse Effect on quality of meat and meat by-products.	• Establishment of modern slaughter houses at appropriate locations. • Strict monitoring of slaughter houses' waste generation and its proper disposal.	√		√		Local Bodies	Animal Husbandry, Public health, PRI's, IPH and HP SPCB.
14. Menace of stray cattle/dogs	• Lack of compassion to domestic animals	• Spread of live-stock animal disease	• Policy encouraging compassion towards animals in the society	√		√		PRI's	Local bodies, Animal Husbandry,

Issues	Causes	Impact/Risks	Proposed Actions	Policy	Plan	Programme	Project	Coordination Agency	Collaborating Agency
	• Inadequate identification of owner of the livestock	• Traffic hazards • Pollution of Environment (Water bodies etc).	• Improved animal husbandry infrastructure i.e. provision for operation theatre facilities, medicines and kennels at sub-division level and imparting training to more Vets/Para Vets in sterilisation techniques. • Compulsory registration of live- stock with the panchayats. • Provision of penalty for letting their animal stray. • Implementation of animal birth control programme. • Strengthening of existing Go sadans and opening of new ones.						NGO's
15. Menace of wild animals like monkeys, bears, Nilgai, pigs etc.	• Encroachment by human beings on the habitat of wild animals.	• Destroying crops horticulture /agriculture etc. • Endangering human beings. • Spread of zoonotic diseases.	• Scientific culling of monkeys • Provision of encouraging plantation of wild fruits trees etc in the forest area, promotion of water bodies etc. • Policies that aim at minimum encroachment of human activities in the forest area. • Policies encouraging exports of monkeys etc.	√		√		Forest (wild- life wings)	PRI's, Animal Husbandry, NGO's

3.0 SERVICES SECTOR

3.1 Education & Vocational Training

Proposed Actions, Type of Response and Inter sectoral Responsibilities

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Program	Project	Coordination Agency	Collaborating Agency
1. Inadequacy of environmental science/engineering main subject at secondary and tertiary level, inadequate no. of specific courses in the domain of environment sciences and environment management and inadequate employment opportunity after completion of existing courses	Inadequacy of awareness/ understanding to mainstreaming of environmental education in secondary and tertiary education	Inadequacy of mainstreaming of environmental safeguards in development	Development and implementation of environmental education program as main subject at secondary and tertiary level in the state	√		√		Department of secondary/higher education	State Universities NGOs, CSOs, MNRE, MoEF, NCERT
2. Inadequacy of environmental science/ engineering main subject at secondary and tertiary level, inadequate no. of	Subject coverage either distributed or non existent	Inadequate capacity to address environmental pollution Low sensitivity among youth	Development of curriculum for environmental education at different levels (Primary, Secondary/Tertiary/Technical education) as part of environment education program.			√		Department of secondary/higher education	State Universities NGOs, CSOs, MNRE, MoEF, NCERT

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Program	Project	Coordination Agency	Collaborating Agency
specific courses in the domain of environment sciences and environment management and inadequate employment opportunity after completion of existing courses		towards environment & consequences of their actions	Assess and develop curriculum for specific courses for e.g. energy conservation, Effluent treatment (operation and maintenance) as per needs of the business and industries group sand other agencies						
3. Inadequacy of trained teachers/staff for environmental education in the state at primary, secondary and tertiary levels	Non availability/ shortage of trained teachers staff for environmental education	Inadequacy of capacity to address environmental pollution. In capability of creating a generation of youth who understand the need to protect the environment				√		MoHRD UGC	State Universities MnRE, MoEF, nCERT Department of Secondary / Higher Education Department of Technical Education
4. Adequate funding for environmental education infrastructure	More financial support needed to establish new/augment	Inadequacy of capacity to address environmental		√				Department of Education and Government of HP	State Universities and Higher Education

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Program	Project	Coordination Agency	Collaborating Agency
	the capacity of existing education and vocational training institutes for imparting environmental education	pollution. Limited skill development/ knowledgebase inadequate infrastructure & faculty for Studies/ Research							
5. Inadequate awareness/capacity and training for new/emerging environmental issues e.g. waste from ICT/IT sector, climate change mitigation and adaptation.	Limited skill/ knowledge base	Inadequate plan, program, project policy to address new issues	Training needs assessment with respect to Emergin gareasin environment e.g. clean technology/ cleaner production, climate change, ICT etc			√		Department of Education Department of Technical Education	DEST HPPCB, State Universities, nGos, CSos, MnRE, MoEF, nCER'T
6.			Development of training programs for stakeholders as per needs assessment. Assess and develop vocational long term/short term training courses, it is, etc. to address environmental issues. Introduce special papers/ certificate			√	√	HPPCB	DEST, State Universities, nGos, CSos, MnRE, MoEF, nCERT, AICTE, NABET

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Program	Project	Coordination Agency	Collaborating Agency
			courses (15 days to 3 months) in existing Vocational courses and training						
	Mismatch between skills requirement and skill imparted. Inadequacy of specific skill qualified people. In adequate involvement of stakeholders	Impact on environmental services provided by education and vocational training	Development and implement of vocational training programs especially on resource conservation, cleaner technologies, cleaner production and pollution control			√	√	Department of technical education	State Universities, nGos, CSos, MnRE, MoEF, nCERT
7. Insufficient allocation of funds for upgradation of vocational training/ secondary and tertiary education institutions	More financial support needed to upgrade diploma and engineering college/ upgrade environmental education system	Impact on education and vocational training Poor Standard of Education	Ensure budgetary allocation for vocational training programs			√	√	Government of Himachal Pradesh	State Universities, nGos, CSos, MnRE, MoEF, nCERT
8. Inadequate Research and Development linking environment and industries:	Mismatch of Research and Development needs/priorities of the Business	Non mainstreaming of needs of business and industries groups	Assess and identify research and development needs of business and Industries. Mainstream and introduce			√		Department of Higher and Department of Technical Education	UGC AICTE State research and development

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Program	Project	Coordination Agency	Collaborating Agency
Research at Post graduate and Doctoral and Post Doctoral studies	and Industries groups with that of academic institutions and Research and Development activities being pursued in Himachal Pradesh	with academic institutions. Inadequate facility for research work. Insignificant job security associated with academic & research work	the identified needs into research and development priorities. Award Research fellowships and scholarships to pursue research and development priorities. Set up Special chairs and Centres of Excellence in existing institutions to pursue research and development priorities. Seek research grants and aids from business and industries groups in the state						institutions CII Business and Industries Groups and associations

3.2 IT & Telecom

Proposed Actions, Type of Response and inter sectoral Responsibilities

				Policy	Plan	Program	Project	Coordination Agency	Collaborating Agency
1. Generation of e- waste with increased penetration/Growth of ICT products	E-waste emerging due to high obsolescence rate. Lack of e-waste management programs. Lack of infrastructure for collection treatment & disposal of e-waste.	Public health risks due to hazardous nature of e-waste. Loss of recoverable resources. Higher risk of air, water & soil contamination	Development of e-waste inventory for the state.				√	DEST	HPPCB ,Department of IT , ULBs, Department of industry, nGos, CSo
			Development of e-waste management (collection, transportation & disposal) and principles of business model (take back) based on principles of 3 R's/EPR in the state			√		DEST / HPPCB	DoIT , ULBs, Department of industry, nGos, CSo
			Strict implementation of e-waste rules.	√		√		HPPCB	DEST, DoIT, Department of industry, ULBs, nGos, CSo
			EIA clearance of BPo should be conditional with a mandatory-waste management plan	√				State EIA operational committee	DEST, HPPCB
2. Public health Issues related to telecommunication e.g. electromagnetic radiation	Long term continuous use of cell phones, mobiles, Bluetooth etc. Lack of R&D Lack of awareness among people to use the telecommunication instruments Lack of	Public health risk Possible impact due long term exposure to EMF & radiation	Accelerate/Initiate programs to raise awareness of the consumers			√	√	State EIA operational committee	DEST, HPPCB

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Program	Project	Coordination Agency	Collaborating Agency
	monitoring of radiation.								
			Strict compliance to safety standards as per industry best practices / codes			√		DoT, DoIT	DEST, HPPCB, ULBs, NGOs, CSO
			Regulatory monitoring of radiation near telecom tower.			√		Operator	DEST, HPPCB, DoIT, Department of Health, University, R & D institutes nIT, HPPCB, DEST
			Development of R & D projects focusing on impact of radiation of human health.			√		IT Department	
3. Occupational health risks due to informal sector (rag pickers/dismantlers/recyclers) recycling of e-waste	Exposure to hazardous chemicals Lack of awareness about harmful effects of formal sector recycling Lack of usage of safe/clean technology	Public health risk due to emissions, e.g. exposure to hazardous chemicals. Water and air pollution	Complete ban on informal sector recycling (if any) of e-waste in the state	√				Dept. of industries	HPPCB, IT Department
			Identify and quantify occupational			√		Dept. of Industries	HPPCB, DEST, ULBs/ nGos/CSos

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Program	Project	Coordination Agency	Collaborating Agency
			health risks due to e-waste recycling. Develop programs for integration of informal recycling in the state			√		Producers	
4. Environmental, Land and Building related issues including sitting of IT infrastructure areas, unauthorized establishment of telecom towers etc	Inadequate capacity of IT Infrastructure / facilities including building & equipment. Non availability of land Diversification of forest land	Loss of forest land Loss of flora & fauna	Development of state level manual for IT based industries	√			√	HPPCB	Infrastructure Developer/DEST, SEIAA operators, nGos, DoIT / DoT
			Implementation of IT industry's environmental best practice			√		DEST	Infrastructure Developer/HPPCB/Operators, NGOs, IT
5. Development of Energy Intensive IT Infrastructure as well as unauthorized usage of DG set	Higher consumption of electricity which could be saved Lack of Technological Upgradation	Global warming due to usage of imported electricity from the grid during lean season	Implementation of Bureau of Energy Efficiency of the star rating BPO program			√		DoIT, DoT/operator	DEST/HPPCB, Infrastructure Developer
			Implementation of Energy Conservation Building Code	√				HP State Electricity	Board
	Limited reach & extent of public awareness campaign Lack of	High energy consumption Waste generation	Awareness generation to promote awareness about environmental			√	√	DoIT, DoT	NGOs/CSOs

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Program	Project	Coordination Agency	Collaborating Agency
	NGO/CSO participation	Public health risk	issues related to IT/ ICT products						

3.3 Livelihood

Proposed Actions, Type of Response and Inter-sectoral Responsibilities

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Program	Project	Coordination Agency	Collaborating Agency
1. .Depleting natural resource base leading to loss of livelihood	Reduce water availability. Reduce forest area / cover. Change in landuse.	Loss of livelihood	Development of alternative livelihood programs based on sub sector development under infrastructure, natural reservoirs			√		Office of the Chief Secretary	Committee of Secretaries

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Program	Project	Coordination Agency	Collaborating Agency
			and services						
			Close monitoring of livelihood programs especially of BPL families under existing central and state government schemes			√		Office of the Chief Secretary	Committee of Secretaries/ Department Heads
			Development and mplement sectoral development plans/ programs/projects already identified under each sub sector to optimize natural resource use		√	√	√	Sub- sector line Department	PRIs, nGos, ULBs, CSos, CBos other departments
2. Unremunerative agriculture in certain areas leading to loss of livelihood	Rain dependent agriculture. Inadequacy of crop diversification. Poor yield	Loss of resources. Reduced remuneration. Abandoning agriculture as a source of livelihood	Preparation and mplementation of state wide water harvesting structure/drip rrigation programs for multipurpose usage			√		Department of agriculture, department of horticulture	DEST, IPH, Department of Rural Development, HPPCB, Department of Planning
			Preparation and mplementation of agriculture productivity improvement program through technology e.g.			√		Department of agriculture, department of horticulture	DEST, IPH, Department of Rural Development, HPPCB, Department of Planning,

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Program	Project	Coordination Agency	Collaborating Agency
			biotechnology						Agriculture/ Universities, CSKHPKV Palampur
3. Change in environmental conditions leading to loss of livelihood	Erratic rains and snowfall. Increased air and water pollution. Increased soil erosion	Failure of agriculture/ horticulture crops. Public health risks leading to loss of working hours. Loss of agriculture/ horticulture productivity.	Preparation and mplementation of crop diversification programs adapting to climate change			√		Department of Agriculture, Department of Horticulture	DEST, IPH, Department of Rural Development, Department of Planning
			Strict implantation and monitoring of air and water pollution control programs and projects			√	√	DEST	HPPCB, IPH, ULBs, PRIs, Department of Urban Development, Department of Rural Development of Industries, Department of Transportation, Department of Health and Family Welfare

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Program	Project	Coordination Agency	Collaborating Agency
			Strict implementation and monitoring of CAT/watershed development / other soil erosion programs and projects			√	√	Department of forest	Department of Agriculture, Department of Horticulture, Department of Rural Development, IPH, Utilities, PRIs, CSos, nGos
4. Inadequacy of access/delayed market access and market infrastructure leading to avoidable / wasteful expenditure and livelihood loss	Inadequate road and transport infrastructure. Inadequate market infrastructure. Inadequate horticulture/ agriculture facility	Loss of remuneration due to loss of product. Resources loss	Strict implementation and monitoring of state road / rural road /highway development and upgradation program/ master plan			√		Office of the Chief Secretary	PWD, ULBs, PRIs, Department of Rural Development, Department of Urban Development, IPH, DEST
			Strict implementation and monitoring of market infrastructure development / upgradation program			√		Office of Principal Secretary/ Agriculture/ Horticulture	Department of Agriculture, Department of Horticulture, HPAPMC,

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Program	Project	Coordination Agency	Collaborating Agency
									ULBs, PRIs, Department of Rural Development
5. Inadequacy of diversified portfolio of subsistence livelihood	Inadequacy of awareness. Inadequacy of replication of successful demonstration	Income/loss of livelihood of alternatives	Development and mplementation of district wise portfolio of subsistence livelihood program			√		Department of Panchayati Raj	Department of Rural Development Department of Agriculture, Department of Horticulture, Department of Industries, PRIs, ULBs, CSos, CBos
			Preparation and mplementation of awareness campaign for replication of successful projects under subsistence livelihood programs			√		Department of Panchayati Raj	Department of Rural Development Department of Agriculture, Department of Horticulture, Department

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Program	Project	Coordination Agency	Collaborating Agency
									of Industries, PRIs, ULBs, CSos, CBos
6. Inadequacy of assessment of market /variation in demand and supply of major agriculture/ horticulture produce leading to loss of livelihood	Inadequacy of assessment of demand and supply; its variation. Inadequacy of operational strategy to address variation in demand and supply	Overproduction leading to wastage of agriculture/ horticulture produce leading to resource loss and livelihood loss	Implementation and monitoring of recommendations of market research study recommended as part of market infrastructure development program. 2. Market related study to assess consumers choice/behavior for diversification of livelihoods			√	√	Office of Principle Secretary, Department of Agriculture/Horticulture	HPAMC, Department of agriculture, department of horticulture, department of rural development, PRIs, nGos, CSos
7. Public health risk leading to loss of livelihood due to inadequacy of sewage/safe drinking water infrastructure	Discharge of untreated sewage. Increased occurrence of water and air borne disease. Inadequacy of availability of health services. Occupational health risks in factories	Reduced / loss of working hours leading to livelihood loss	Strict implementation and monitoring of proposed actions recommended under guidelines for water supply and sewage			√		Office of the Chief Secretary	Office of Principle Secretary, IPH, HPAMC, Department of Agriculture, Department of Horticulture, Department

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Program	Project	Coordination Agency	Collaborating Agency
									of Rural Development, PRIs, nGos, CSos, CBos
			Strict implementation and monitoring of proposed actions recommended under guidelines for health sector			√		Office of the Chief Secretary	Office of Principle Secretary, Department of Health, and Family Welfare, DEST, IPH, Department of Rural Development, ULBs, PRIs, Department of Industries, Directorate of factories, CSos, nGos
8. Unexplored prospects of participation of private sector participation/entrepreneurship for diversification of livelihood	Inadequacy of capital. Inadequacy of skill upgradation. Dependence on the government	Loss of opportunities	Implementation and monitoring of infrastructure development under PPP. Tourism. Roads/highway. Water supply/sewage.					Office of the Chief Secretary	office of Principle Secretary (Tourism), office of Principle Secretary (PWD), office

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Program	Project	Coordination Agency	Collaborating Agency
			Urban infrastructure development. Rural infrastructure development. Hydropower/Non-conventional energy source. Market infrastructure						of Principle Secretary (IPH), office of Principle Secretary (Urban Development), office of Principle Secretary (Rural Development), office of Principle Secretary (Energy), office of Principle Secretary (Hydropower / non-conventional energy), Department of Agriculture & Horticulture, DEST, All line

Issues	Causes	Impacts/Risks	Proposed Actions	Response				Institutional Responsibility	
				Policy	Plan	Program	Project	Coordination Agency	Collaborating Agency
									Departments
9. .Inadequate integrated landuse planning	Land Use Board not adequately involved in integrated land use planning. Inadequate land use planning at the department level. Inadequate Institutional structure for integrated land use planning in the state.	Sustained degradation of land resources due to exploitative and competing demand on finite land resources from various departments/ sectors	Strengthen Himachal Pradesh State Land Use and Wasteland Development Board reconstituted in 2007 for three years. Set up an institutional mechanism to foster Integrated Land Use Planning Authority in the state		√			Head of the Integrated Land Use Planning Authority/ Himachal Pradesh State Land Use and Wasteland Development Board	Department of Planning and Head of Department

Annexure – 2

Organizational Structure of Line Departments

1.0 Infrastructure Sector

1.1 Tourism, Art, Architecture & Cultural Heritage

1.2 Potable Water Supply and Sewage

1.3 Health

1.4 Road & Transport

1.5 Industries, Mining & Geology

1.6 Energy

1.7 Market Infrastructure

1.8 Rural Planning

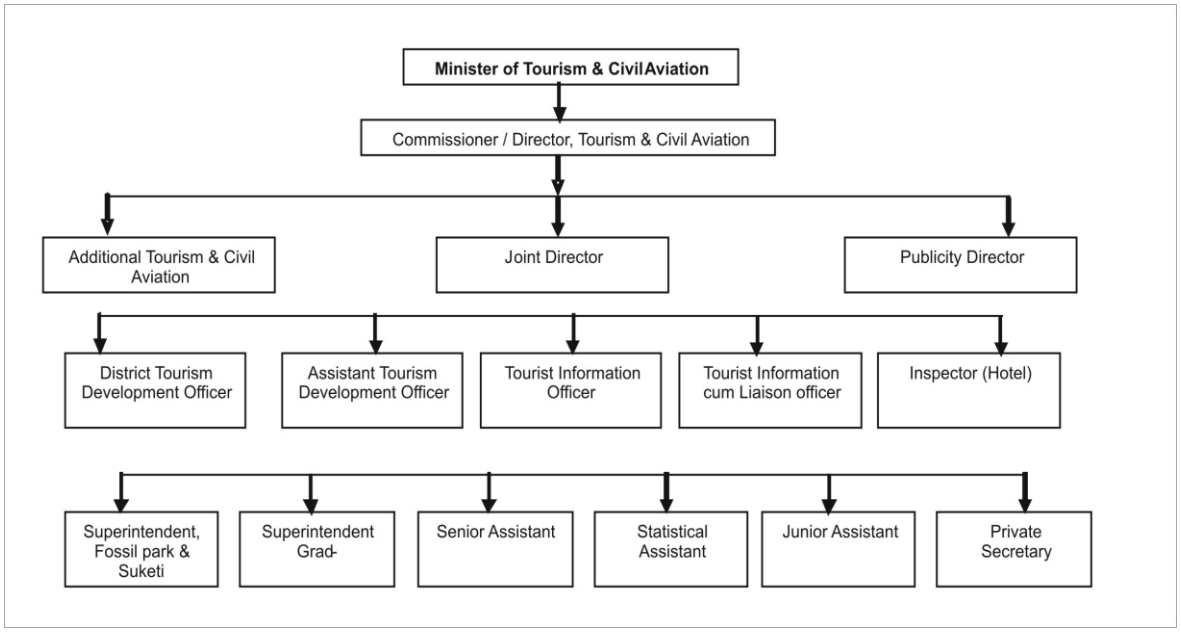
1.9 Urban Planning

1.10 Municipal Solid Waste (MSW)

1.11 Hazardous Waste

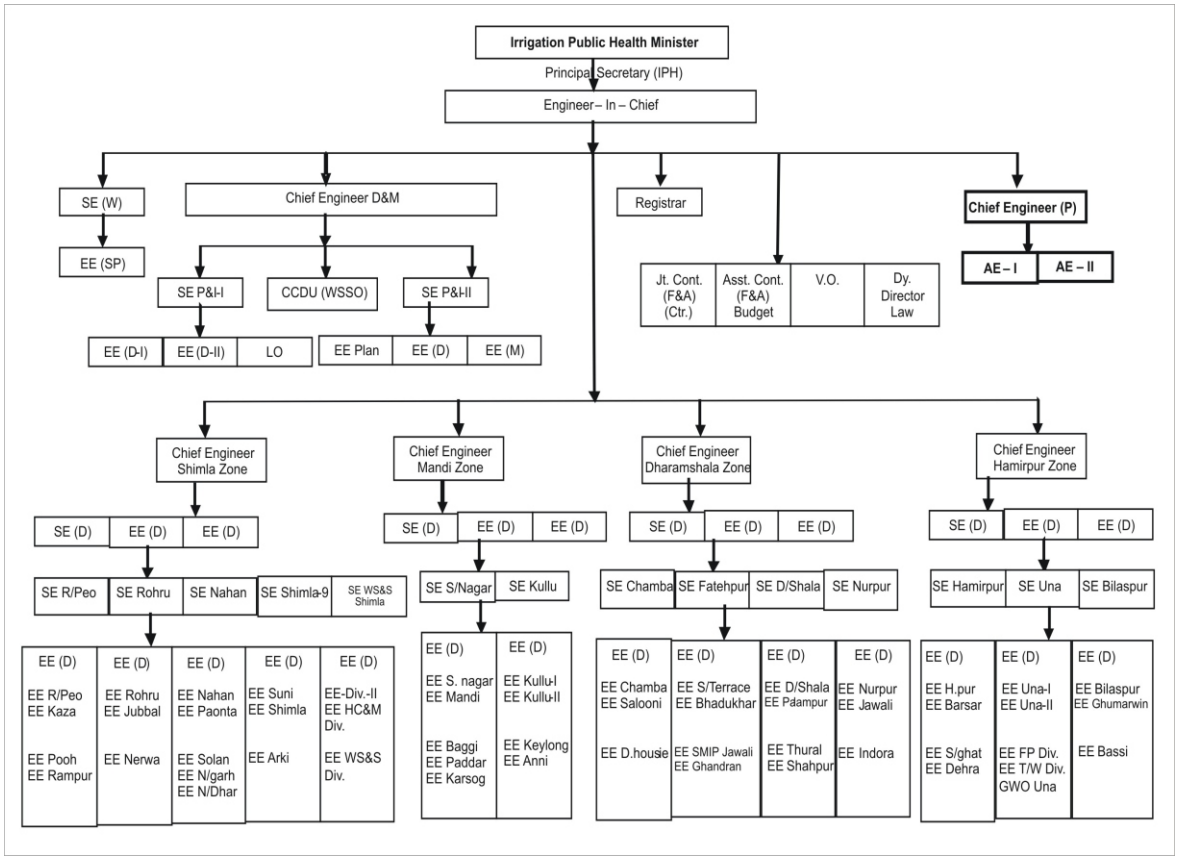
1.1 Tourism, Art, Architecture & Cultural Heritage

Organisational Chart of Department of Tourism, Art, Architecture & Cultural Heritage

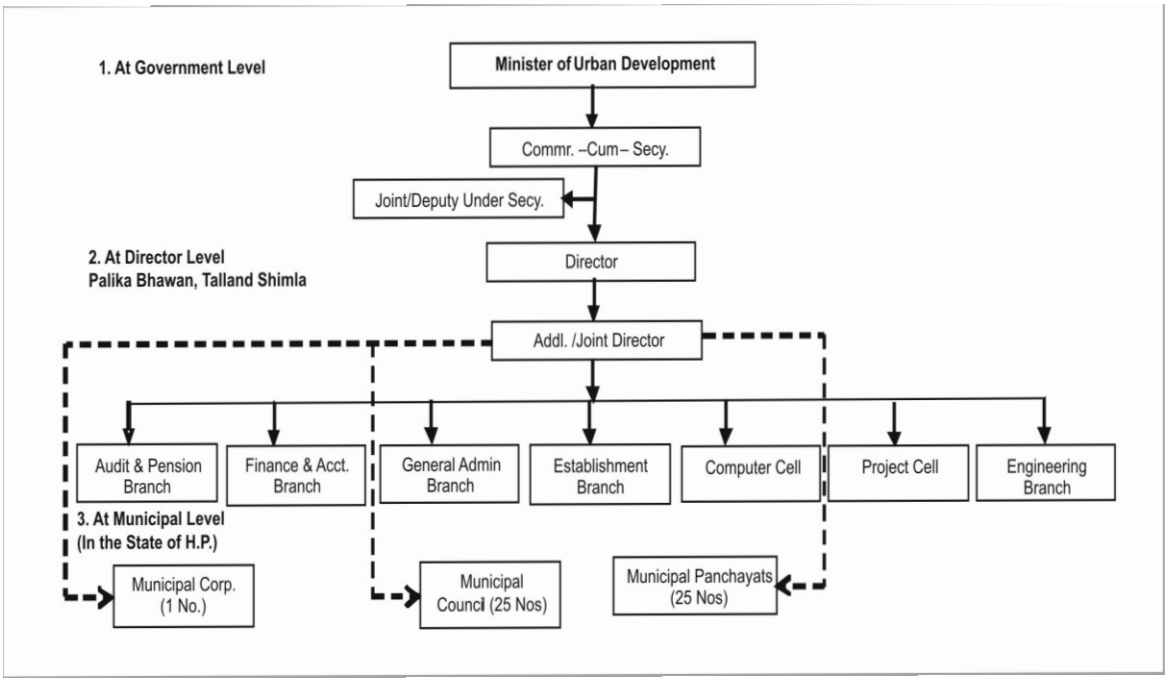


1.2 Potable Water Supply

Organisational Chart of Irrigation and Public Health Department

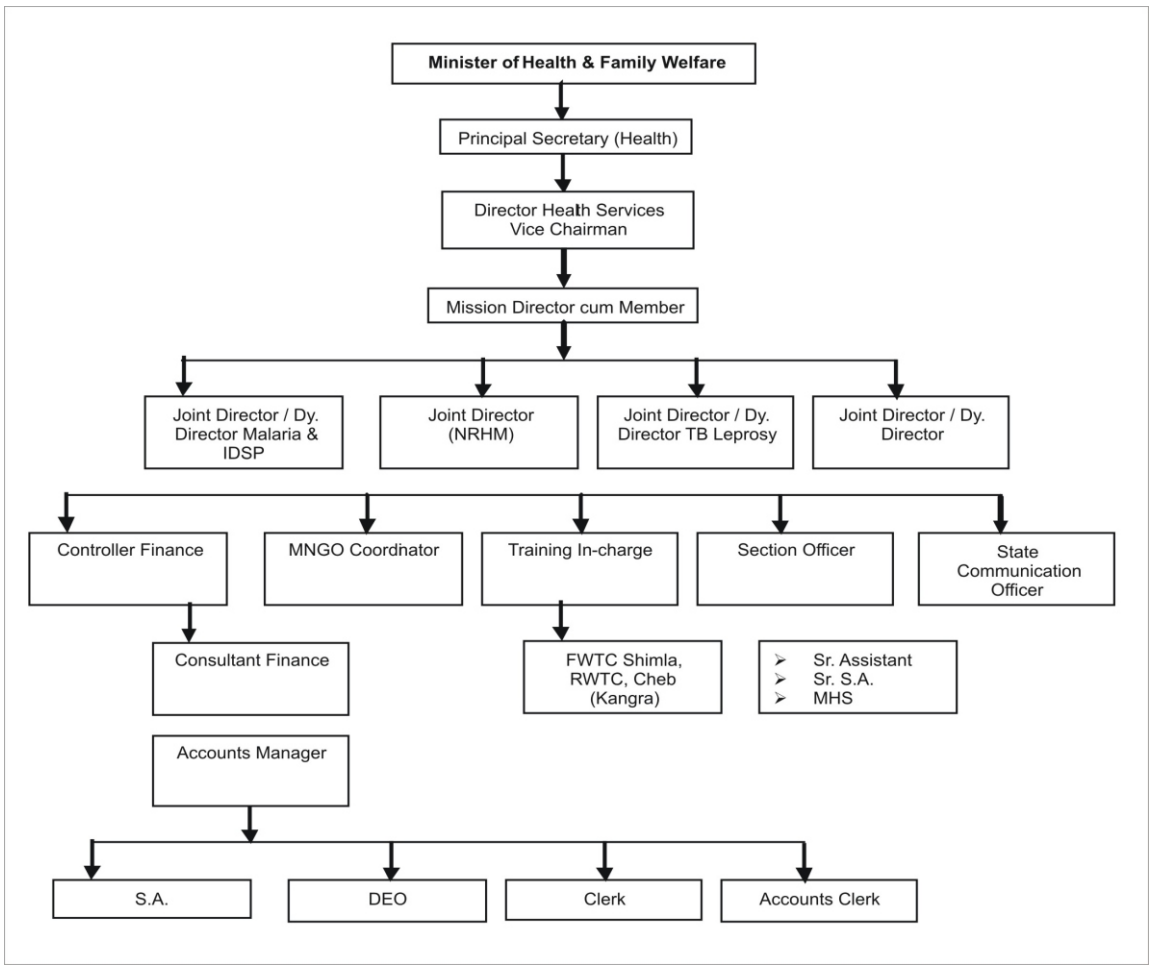


Organisational Chart of Urban Development Department

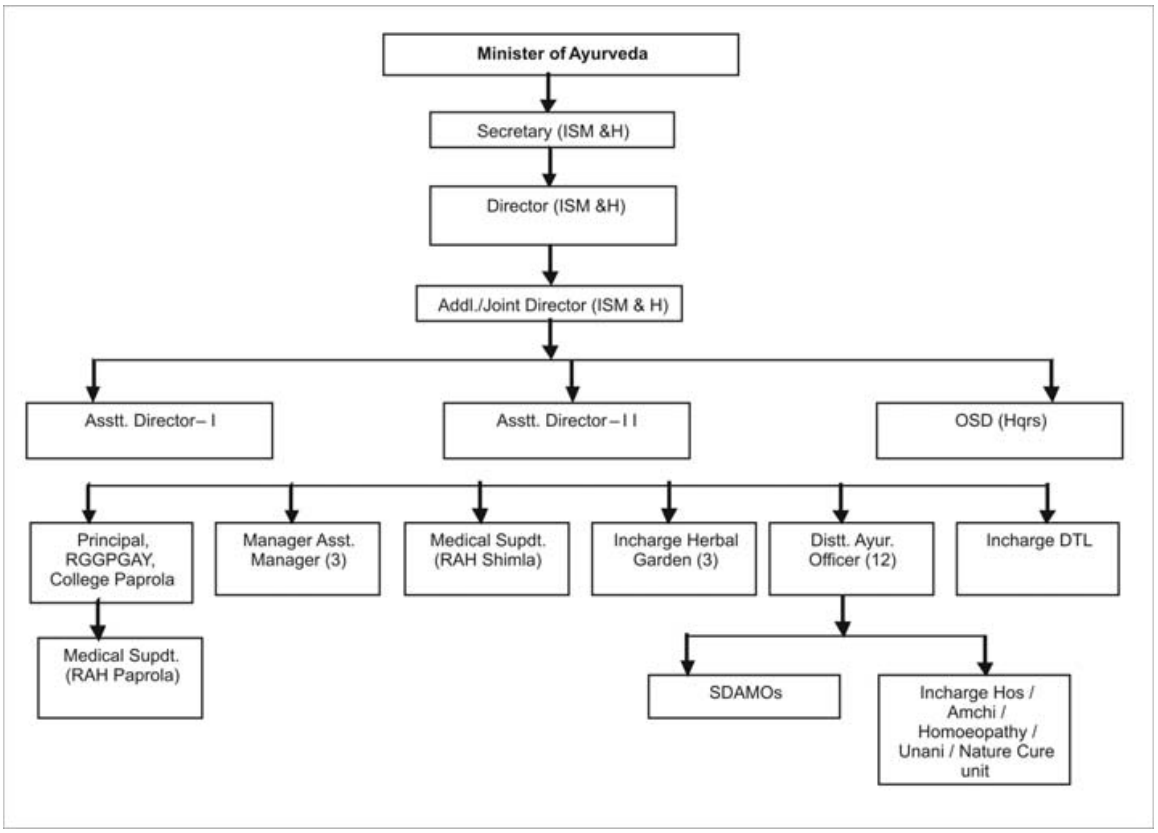


1.3 Health

Organisational Chart of Health and Family Welfare Department

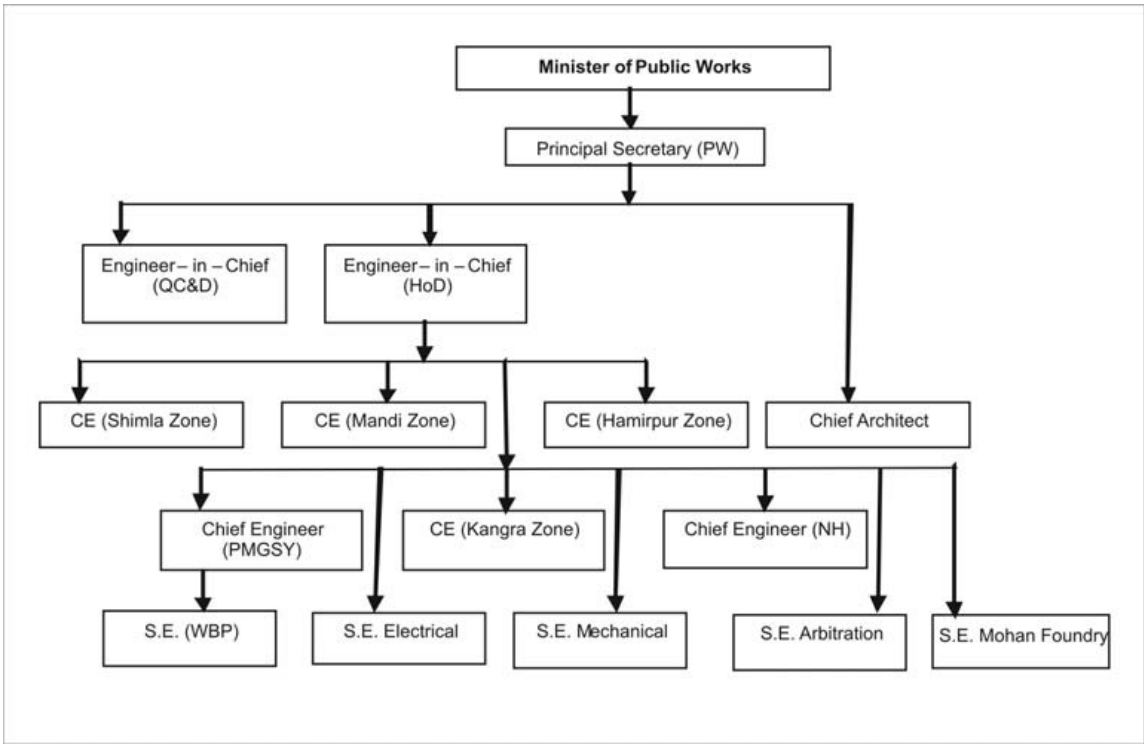


Organisational Chart of Ayurveda Department

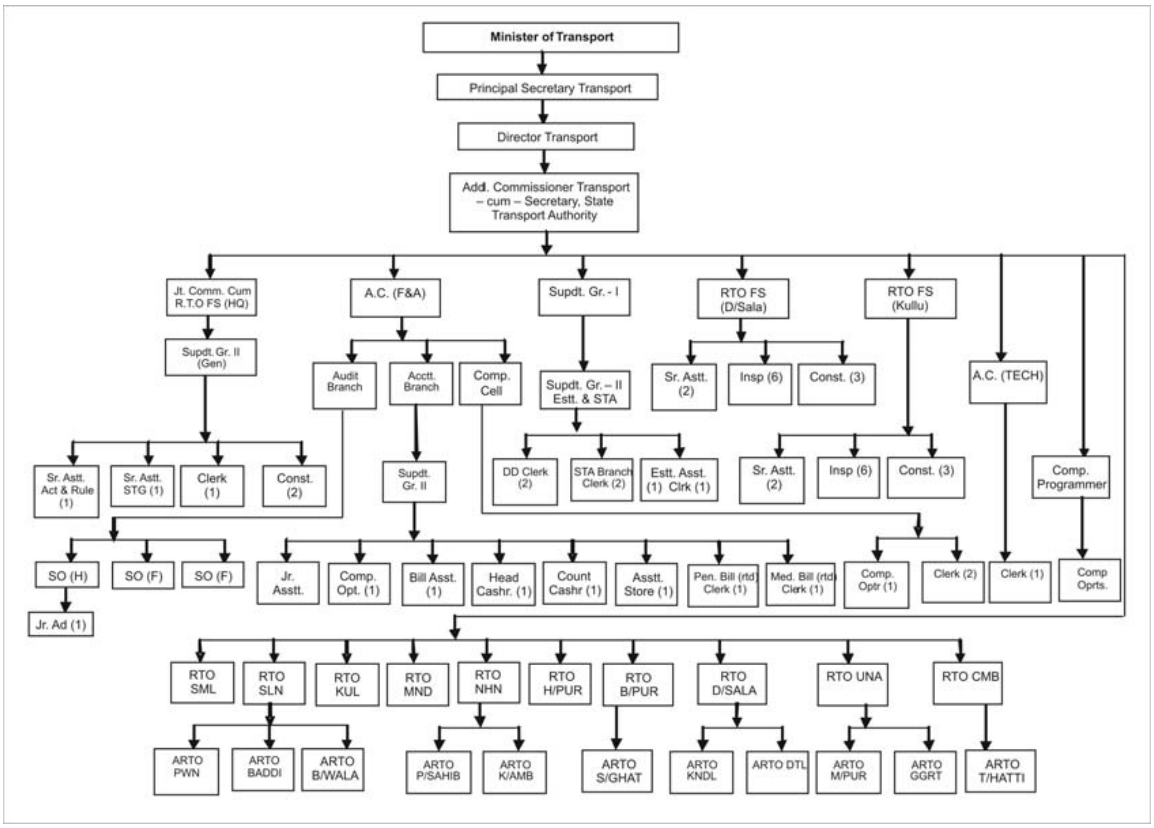


1.4 Road & Transport

Organisational Chart of Public Works Department

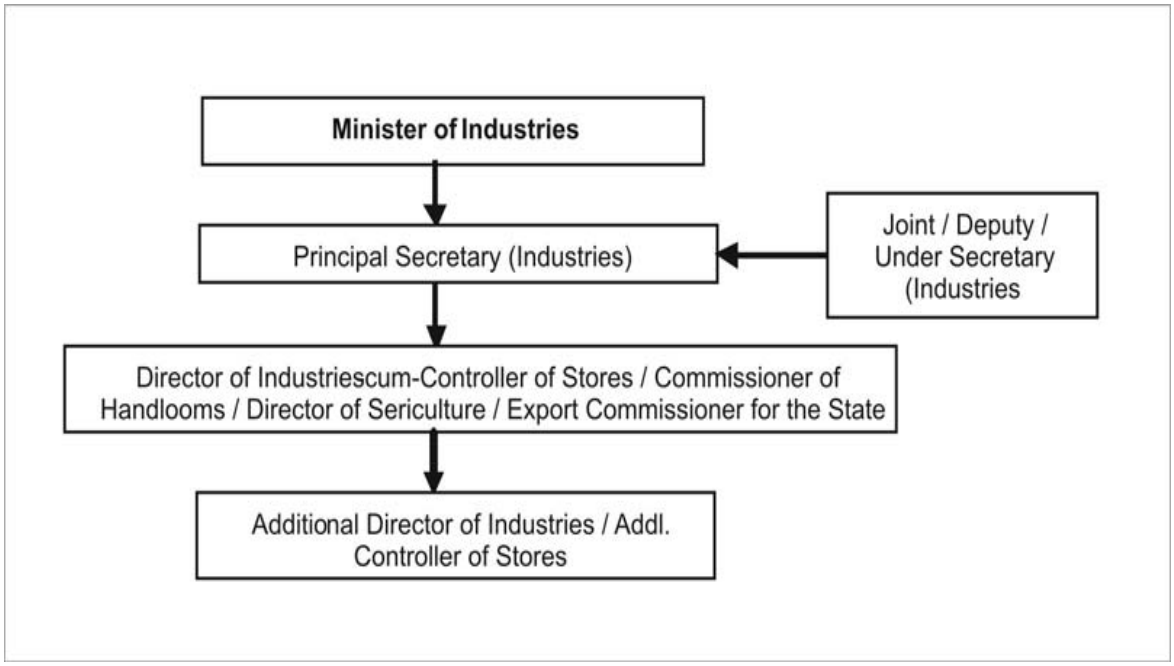


Organisational Chart of Transport Department



1.5 Industries, Mining & Geology

Organisational Chart of Industries, Mining & Geology



Store Purchase Organisation	Administration	Industrial Development
Additional. Controller of Stores Joint Director of Industries Tehsildar Naib Tehsildar Store Inspection Officers Superintendent Gr.-I S.O. (Audit)	Addl. Director of Industries (Admn.) Assistant Controller (F&A) Superintendent Gr.-I	Industrial Advisor Joint Director of Industries Project Co-ordinator Deputy Directors of Industries Manager

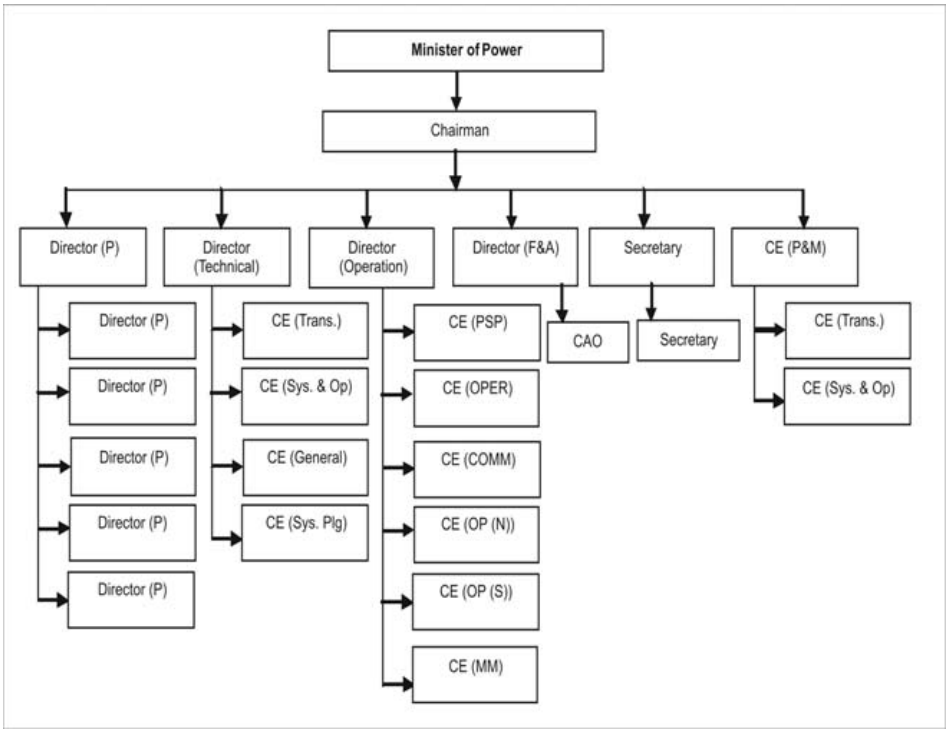
Geological & Mining	Sericulture	Handloom
State Geologist Geologists Assistant Geologists Driller Superintendent Gr.-I S.O (Audit) Assistant Driller Lab Assistant	Project Co-ordinator	Dy. Director of Industries

Field Offices

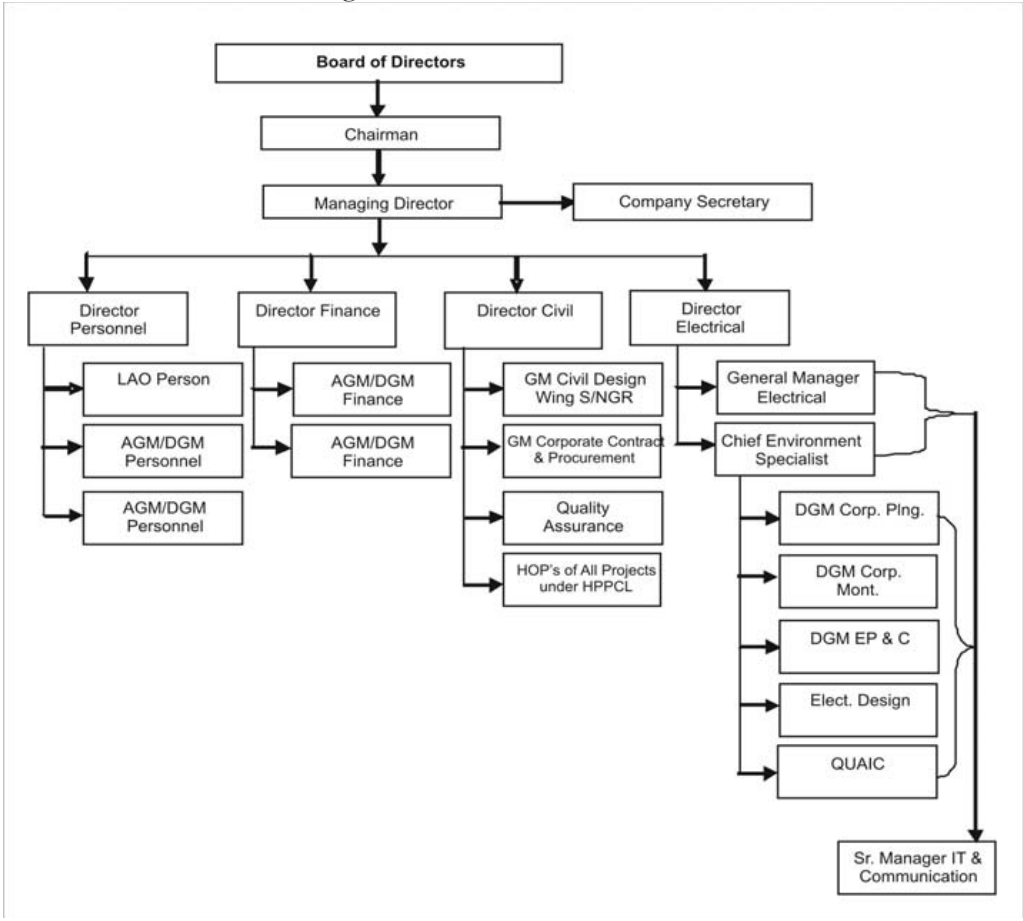
District Industries Centre	Mining
General Managers Managers/ Member Secretaries, SWCAs, Parwanoo, Baddi, Nalagarh,Paonta Sahib, Kala Amb,Sansarpur Terrace, Gwalthai,& Damtal Industrial Promotion Officers Economic Investigators Extension Officer (Industries) (Block Level)	Mining Officers Mining Inspectors Assistant Mining Inspectors Mining Guards

1.6 Energy

Organisational Chart of State Electricity Board Limited

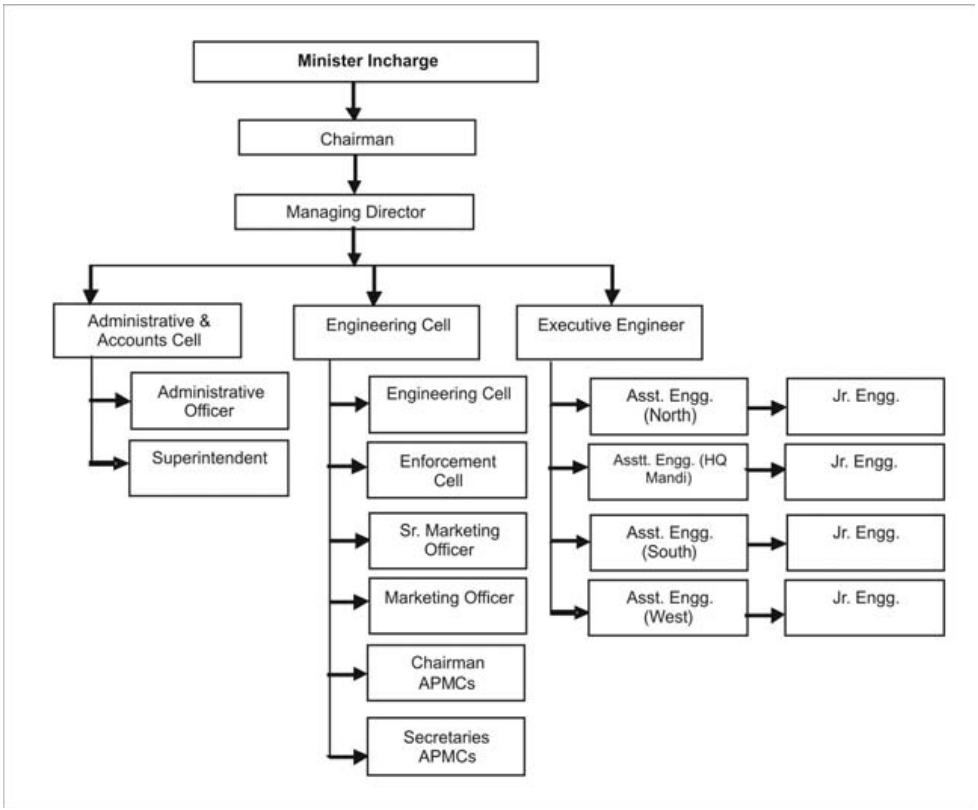


Organisational Chart of HPPCL



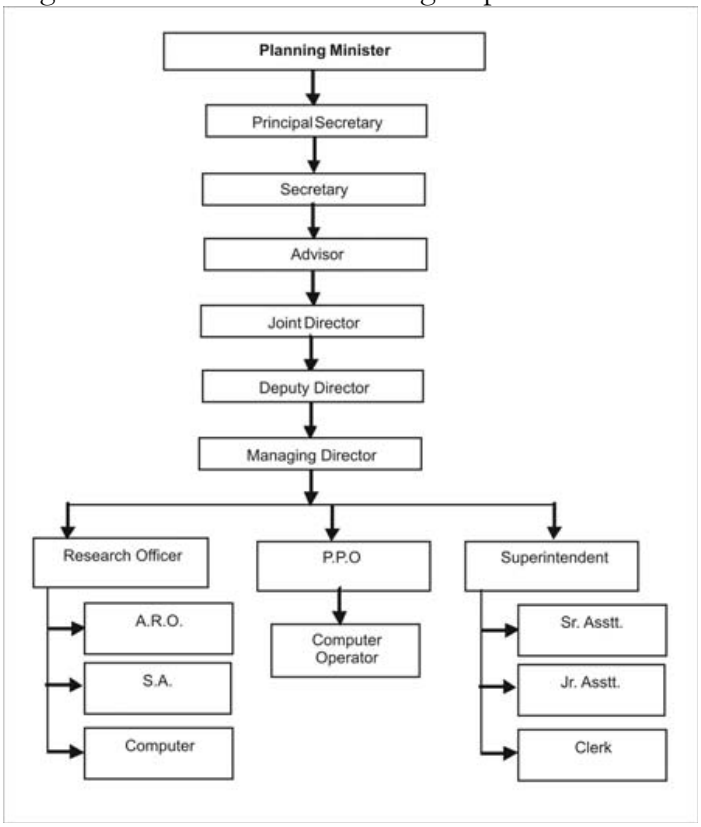
1.7 Market Infrastructure

Organisational Chart of HP Agriculture Marketing Board

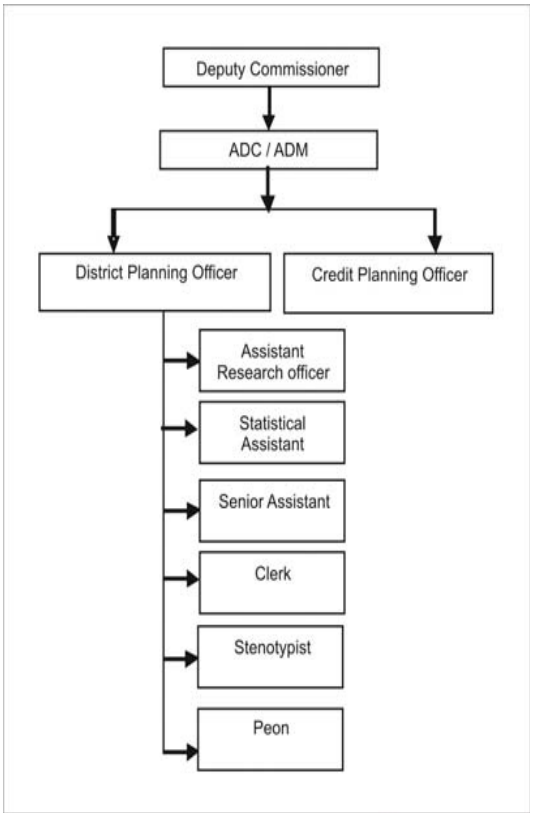


1.8 Rural Planning

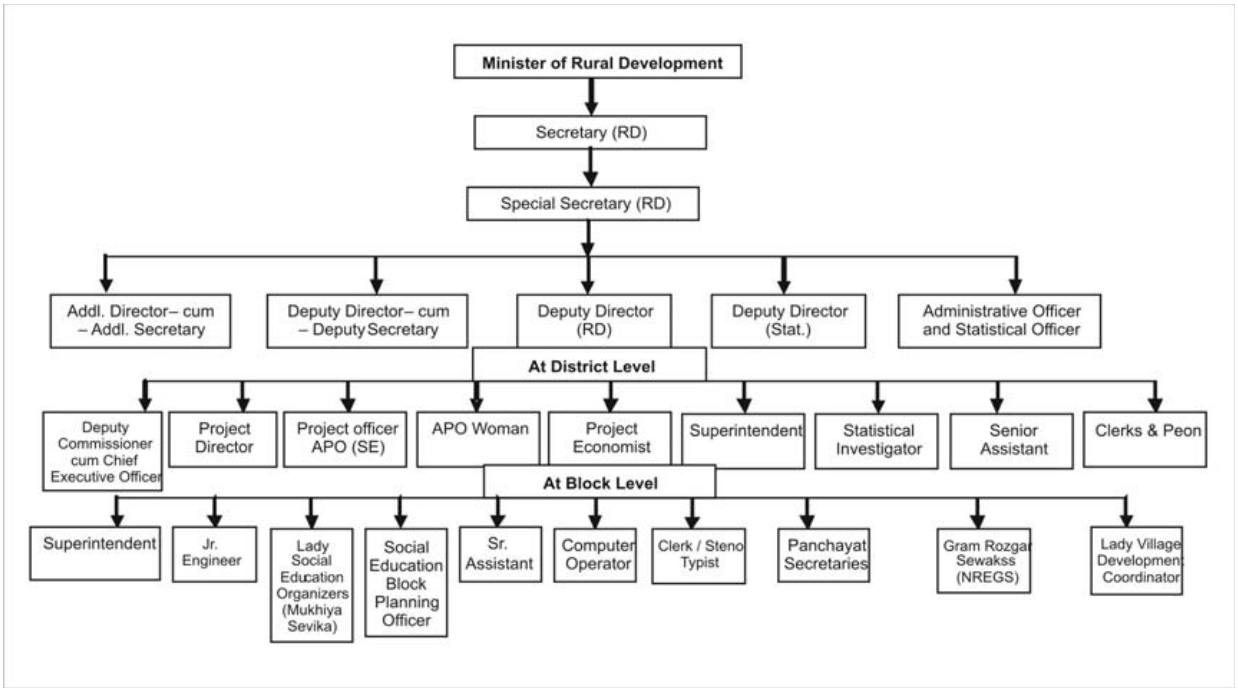
Organizational Chart of Planning Department



District Planning Cell

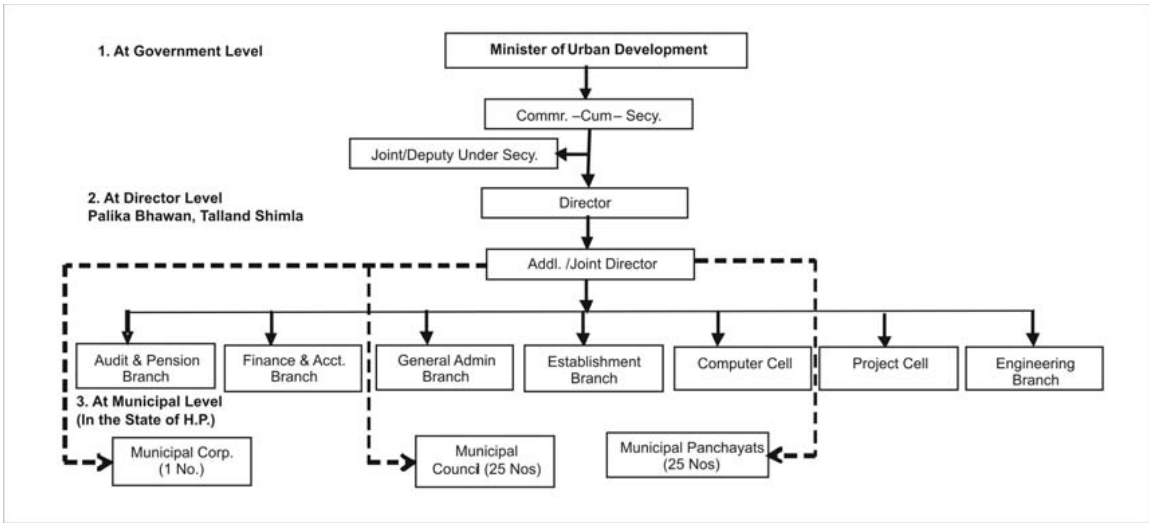


Organisational Chart of Rural Development Department

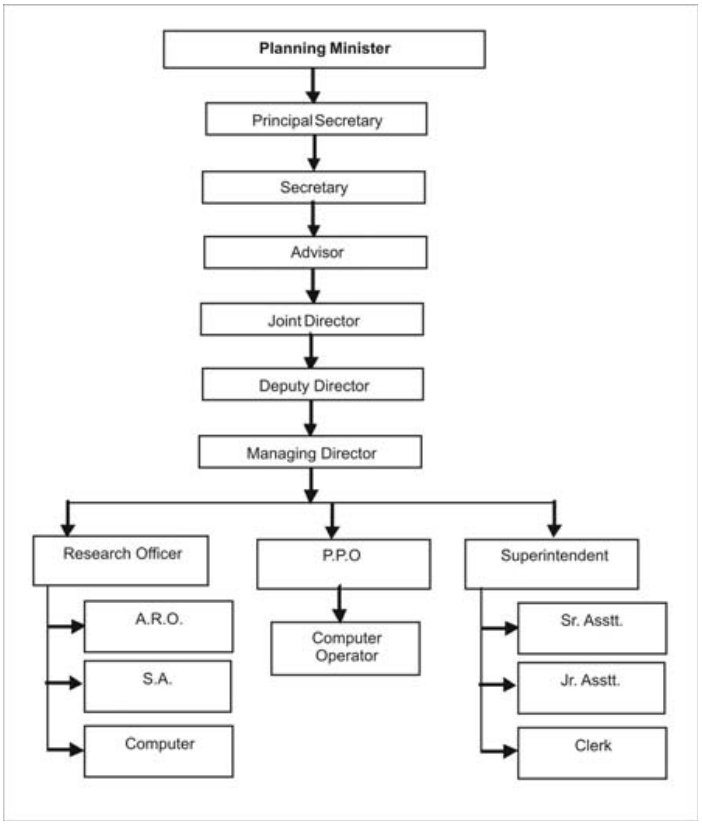


1.9 Urban Planning

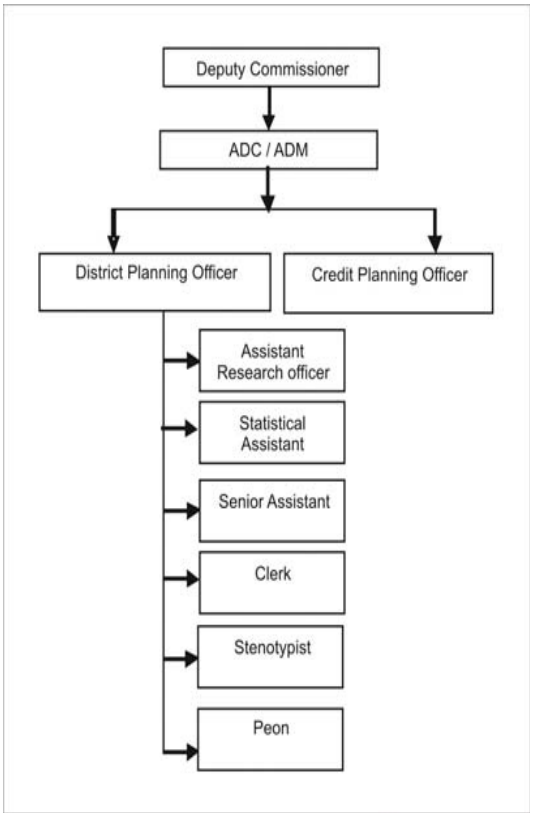
Organisational Chart of Urban Development Department



Organizational Chart of Planning Department



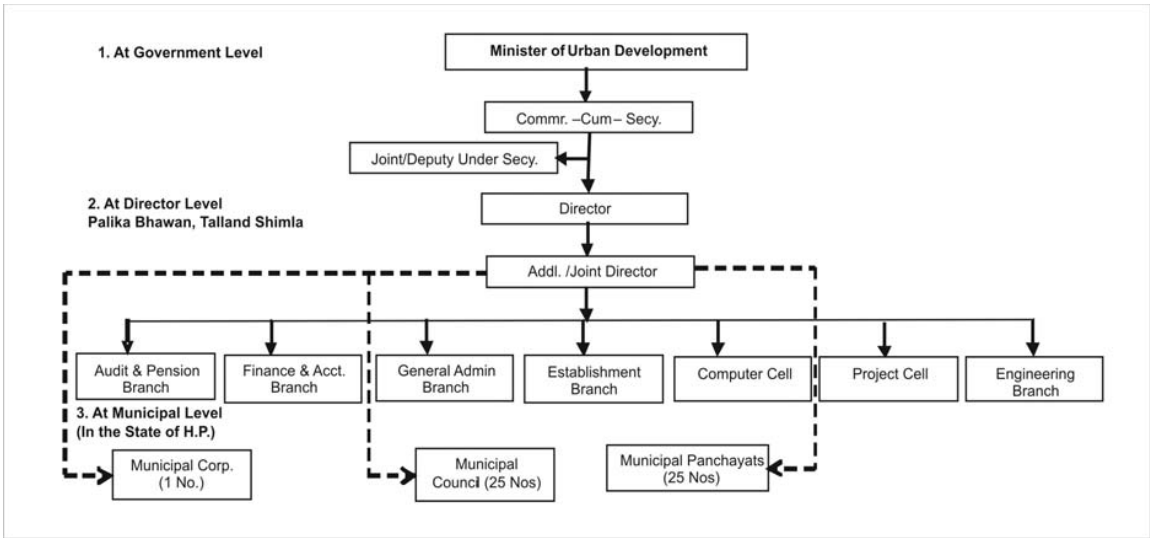
Planning Cell



District

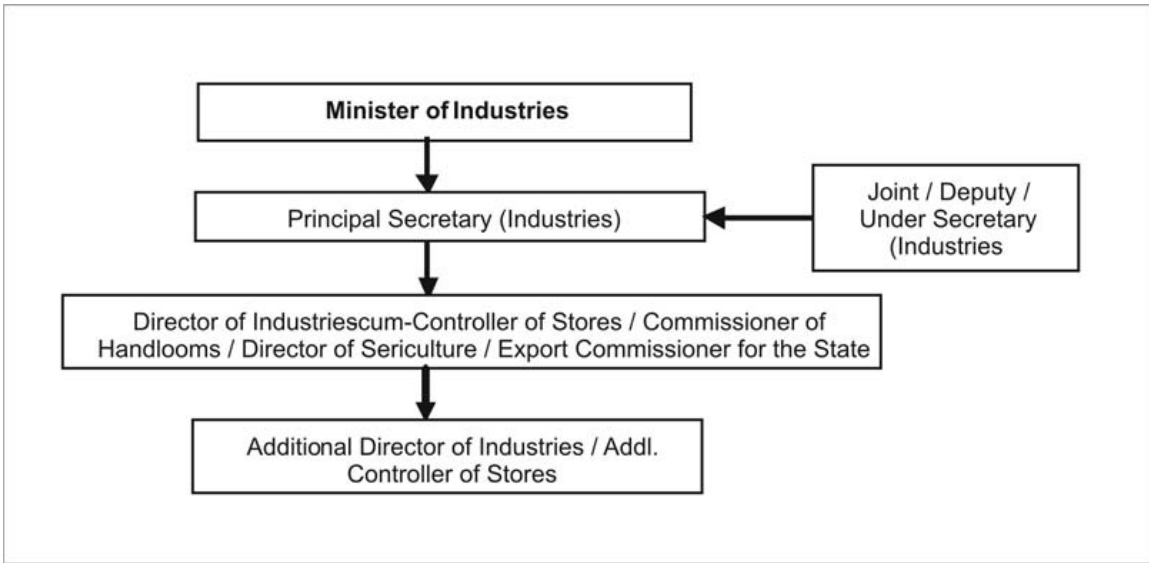
1.10 Municipal Solid Waste (MSW)

Organisational Chart of Urban Development Department



1.11 Hazardous Waste

Organisational Chart of Industries



Store Purchase Organization	Administration	Industrial Development
Additional. Controller of Stores Joint Director of Industries Tehsildar Naib Tehsildar Store Inspection Officers. Superintendent Gr. –I S.O. (Audit)	Addl. Director of Industries (Admn.) Assistant Controller (F & A) Superintendent Gr. -1	Industrial Advisor Joint Director of Industries Project Co-ordinator Deputy Directors of Industries Manager

Field Offices

District Industries Centre	Mining	Sericulture
General Managers, Managers/Members, Secretaries,	Mining officers Mining Inspectors	Deputy Director (Seri)/ GMDICs / Managers Silk Seed

SWCAs, Parwanoo, Baddi, Nalagarh, Paonta Sahib, Kala Amb, Sansarpur Terrace, Gwalthai, & Damtal Industrial Promotion Officers Economic Investigators Extension Officer (Industries) (Block Level)	Assistant Mining Inspectors Mining Guards	Production Officers Sericulture Officers Development Officers Technical Officer (Tassar) Sr. Sericulture Inspectors Extension Officer (Tassar) Technical Assistant (Tassar)/Sericulture Inspector.

2.0 NATURAL RESOURCE SECTOR (NRM)

2.1 Forest & Wildlife and Wetland

2.2 Fisheries

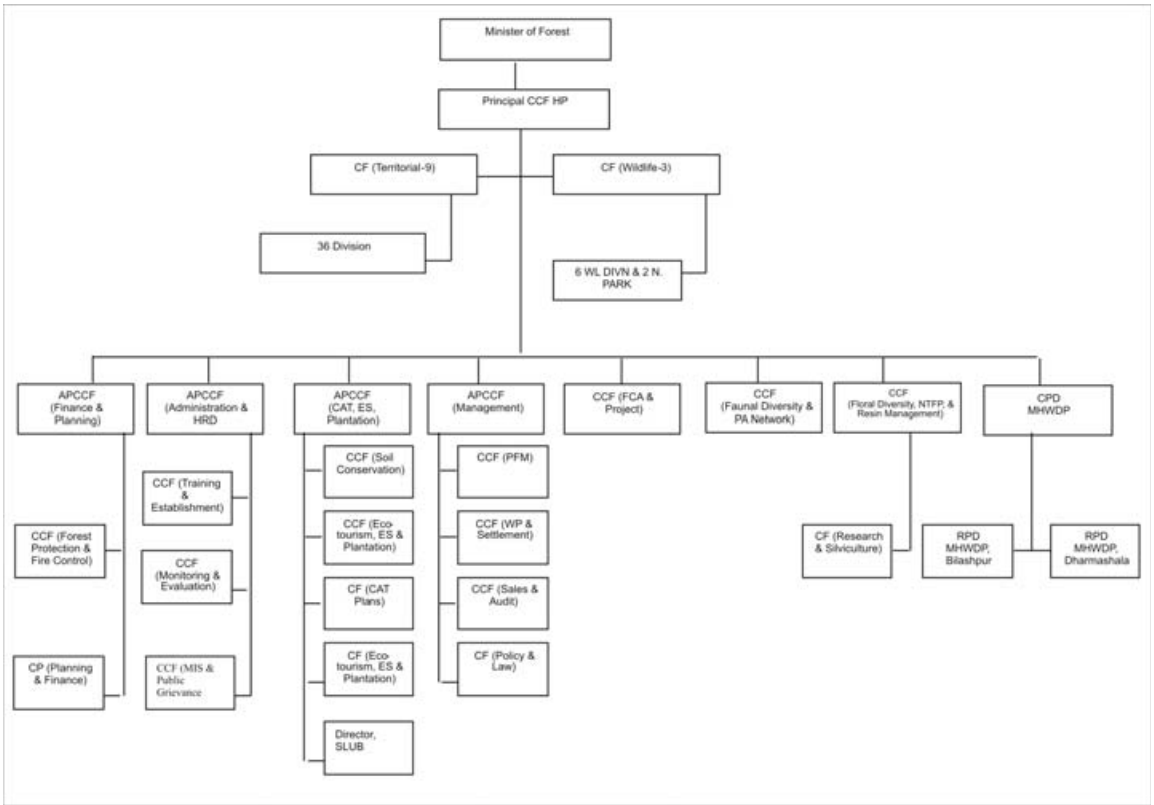
2.3 Horticulture

2.4 Agriculture

2.5 Animal Husbandry

2.1 Forest, Wildlife & Wetland

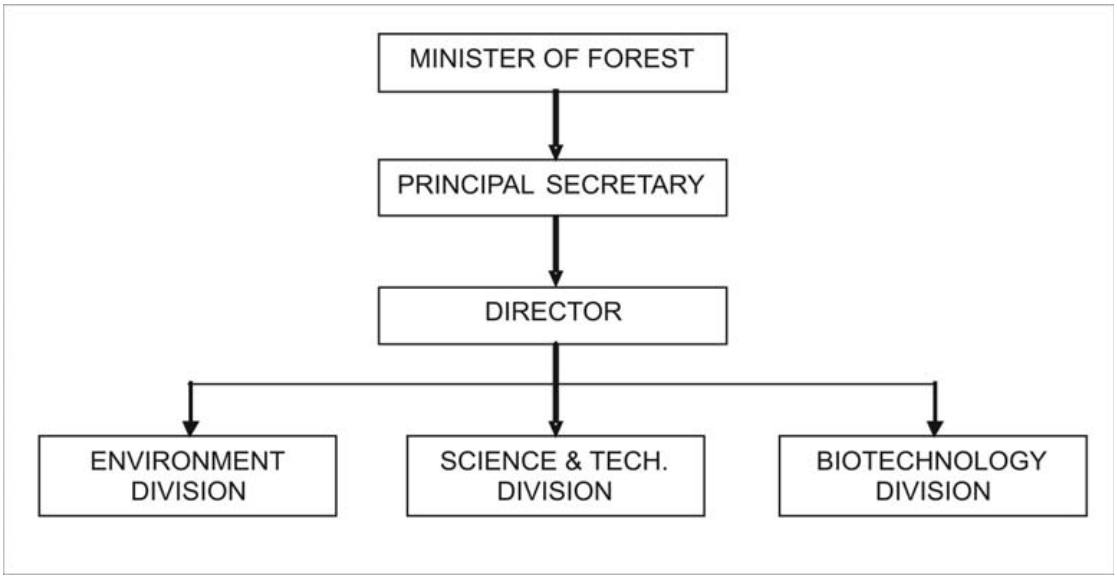
Organisational Chart of Forest, Wildlife



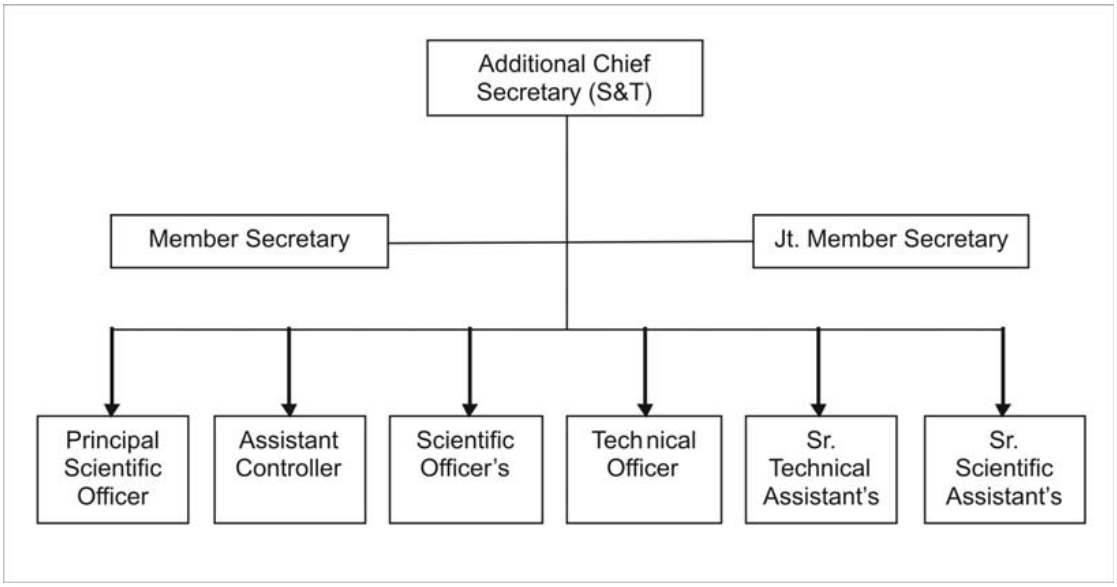
Biodiversity Management Committee in Himachal Pradesh

Name of the SBB [State Biodiversity Board]	No. of BMC [Biodiversity Management Committee]	Biodiversity Management Committee				
		District	Taluk	Panchayat	Village	BMC Committee
Himachal Pradesh	2	Sirmaur	Naina-Tikker Gram Panchayat			
		Kullu	Toong Gram Panchayat			

Organisational Chart of Department of Environment, Science & Technology

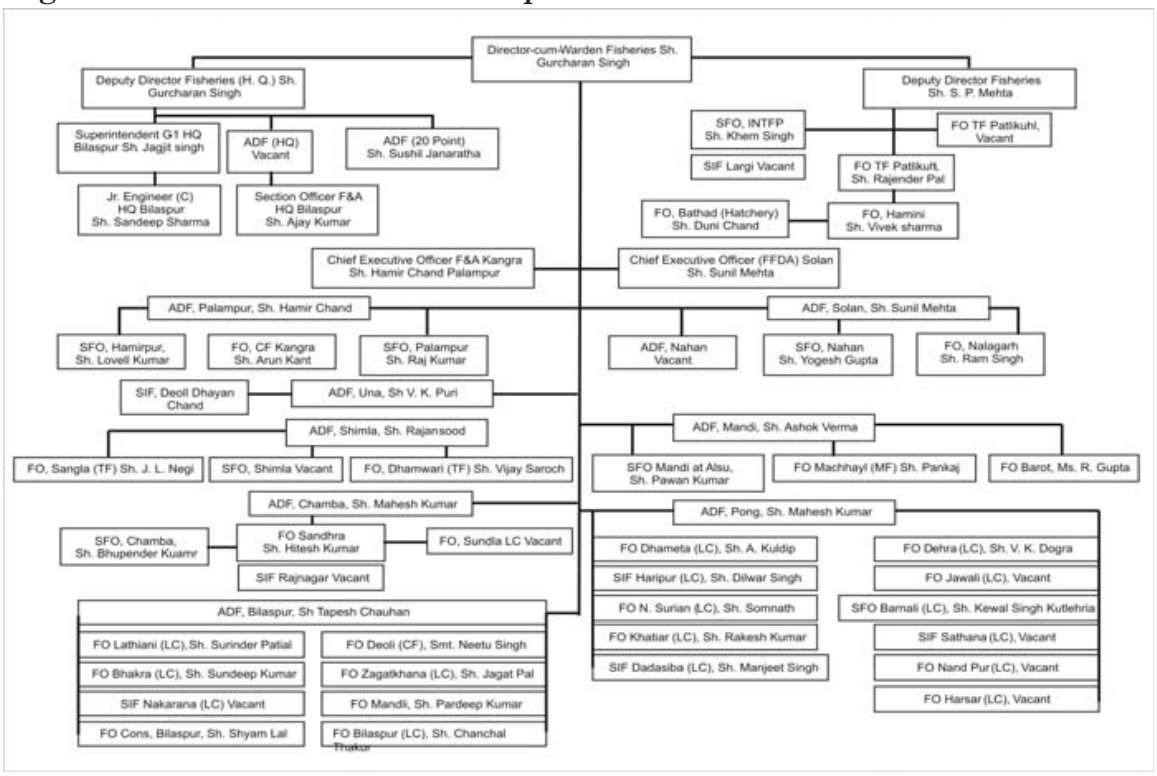


Organisational Chart of HP State Science, Technology & Environment



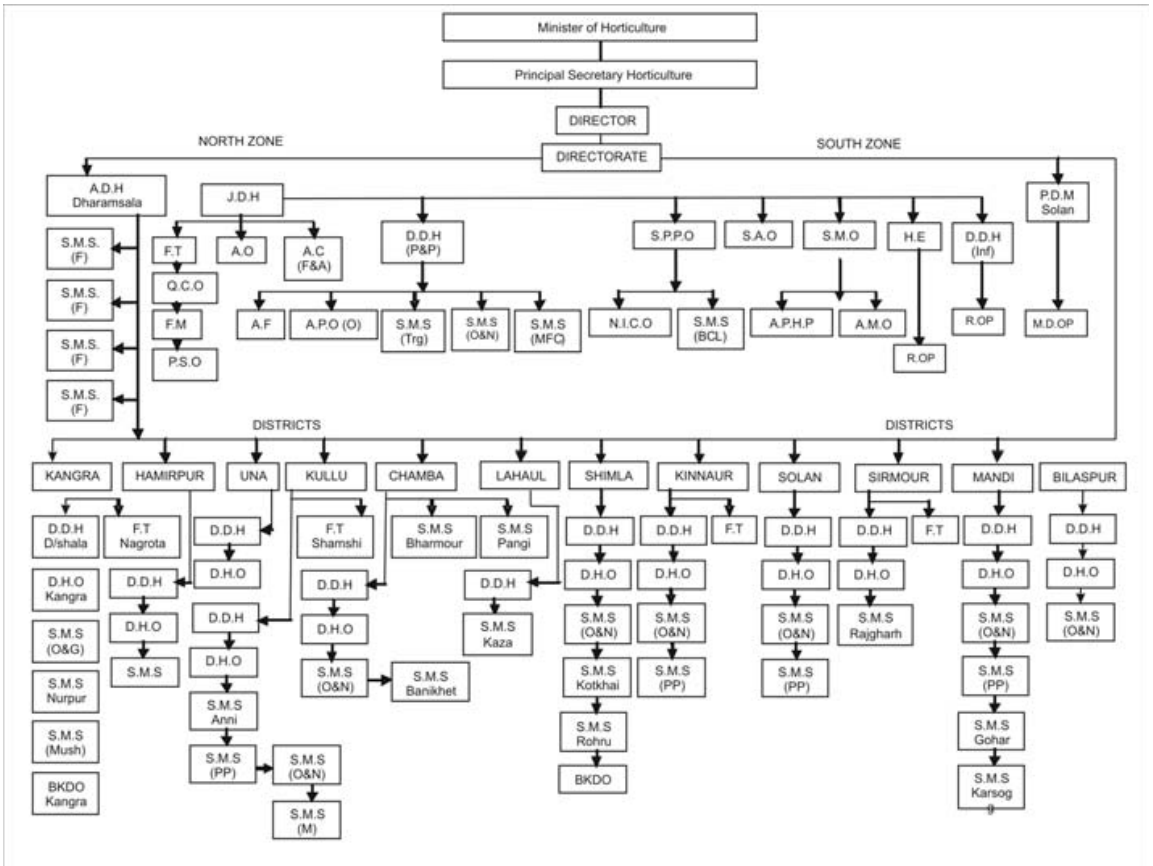
2.2 Fisheries

Organisational Chart of Fisheries Department



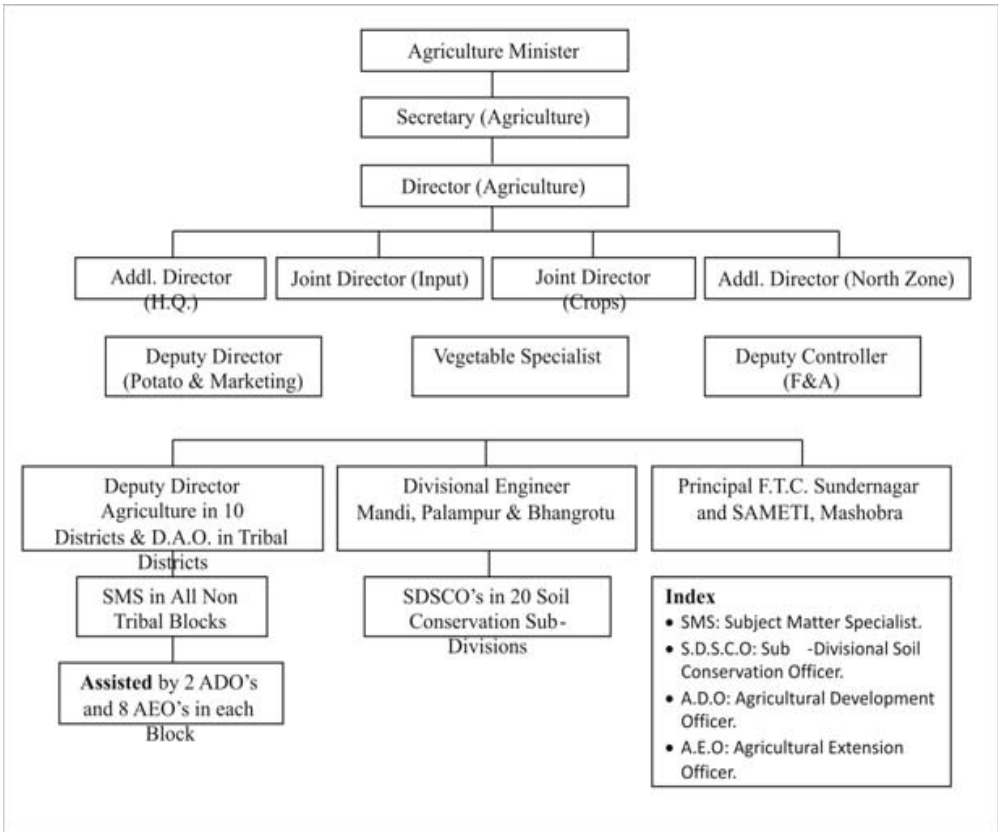
2.3 Horticulture

Organisational Chart of Horticulture Department

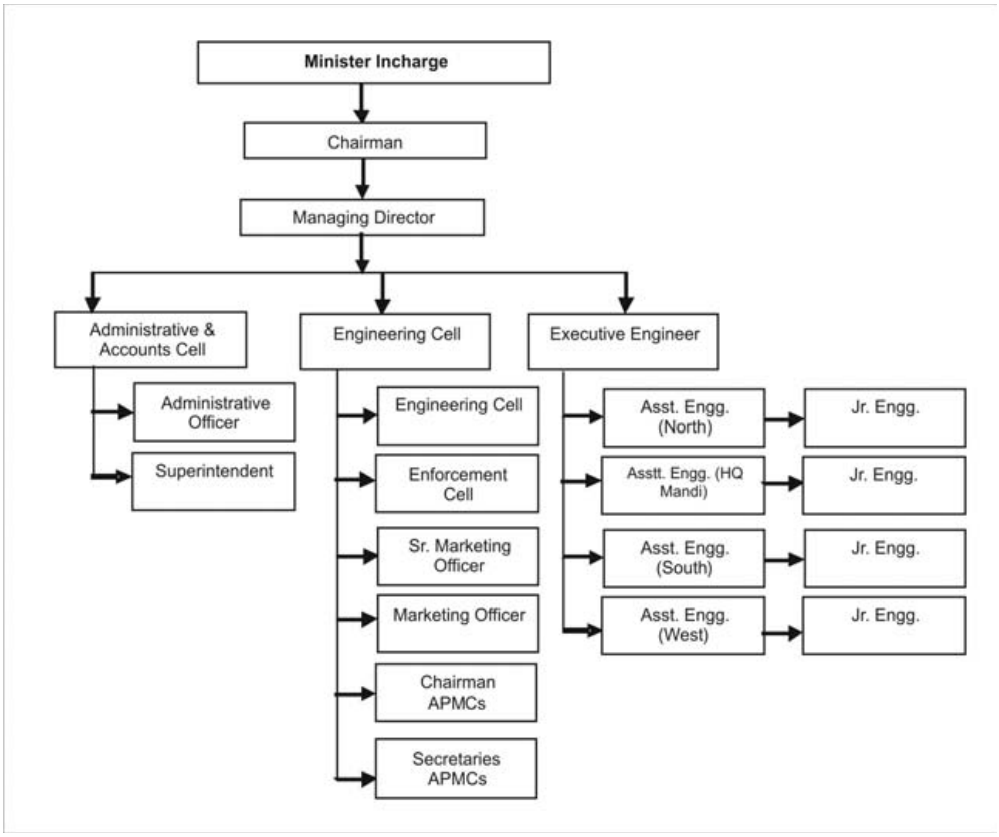


2.4 Agriculture

Organisational Chart of Agriculture Department

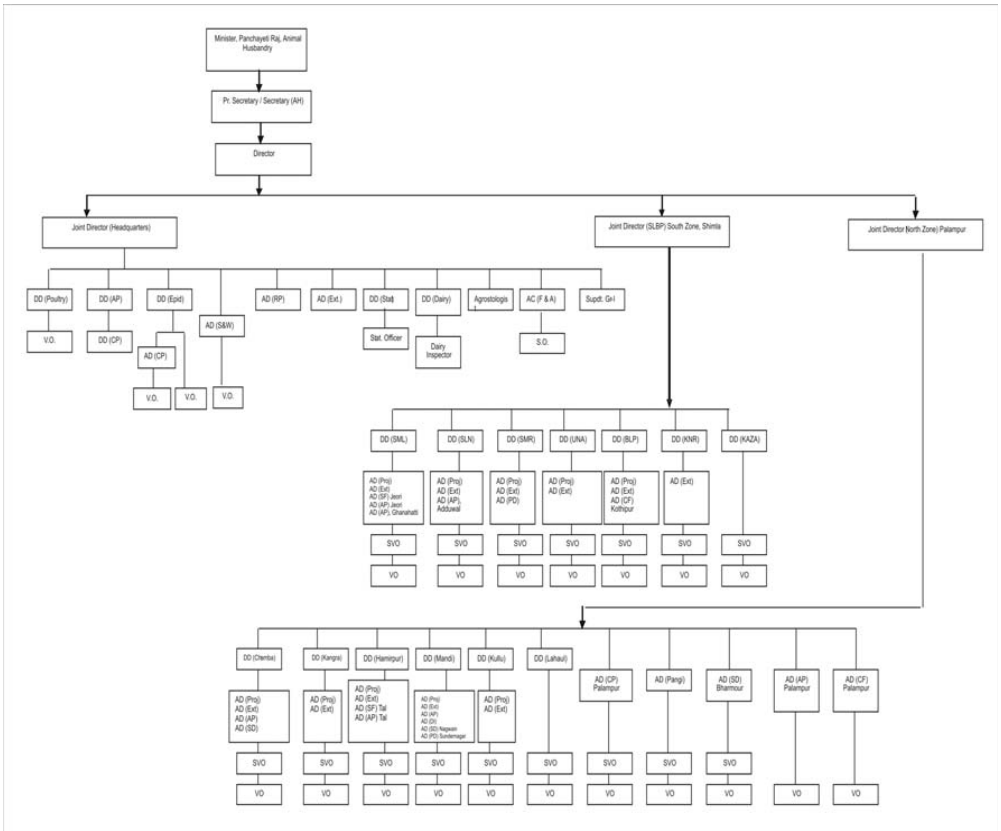


Organisational Char t of HP Agriculture Marketing Board



2.5 Animal Husbandry

Organisational Chart of Animal Husbandry



3.0 SERVICES SECTOR

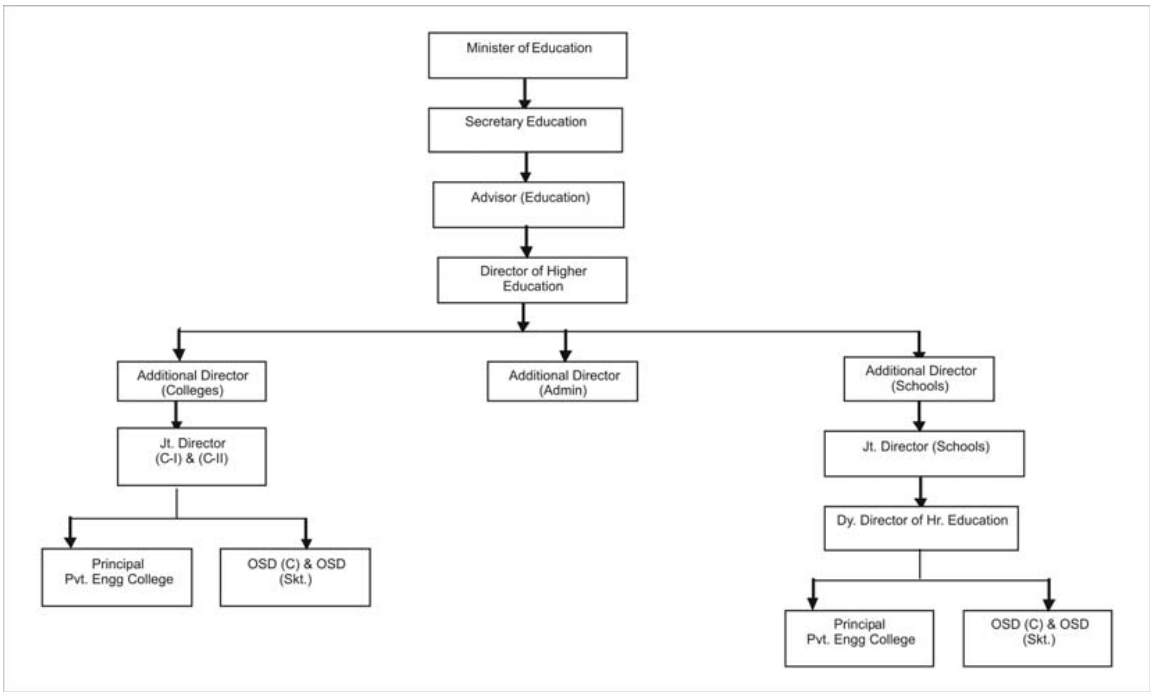
3.1 Education & Vocational Training

3.2 IT & Telecom

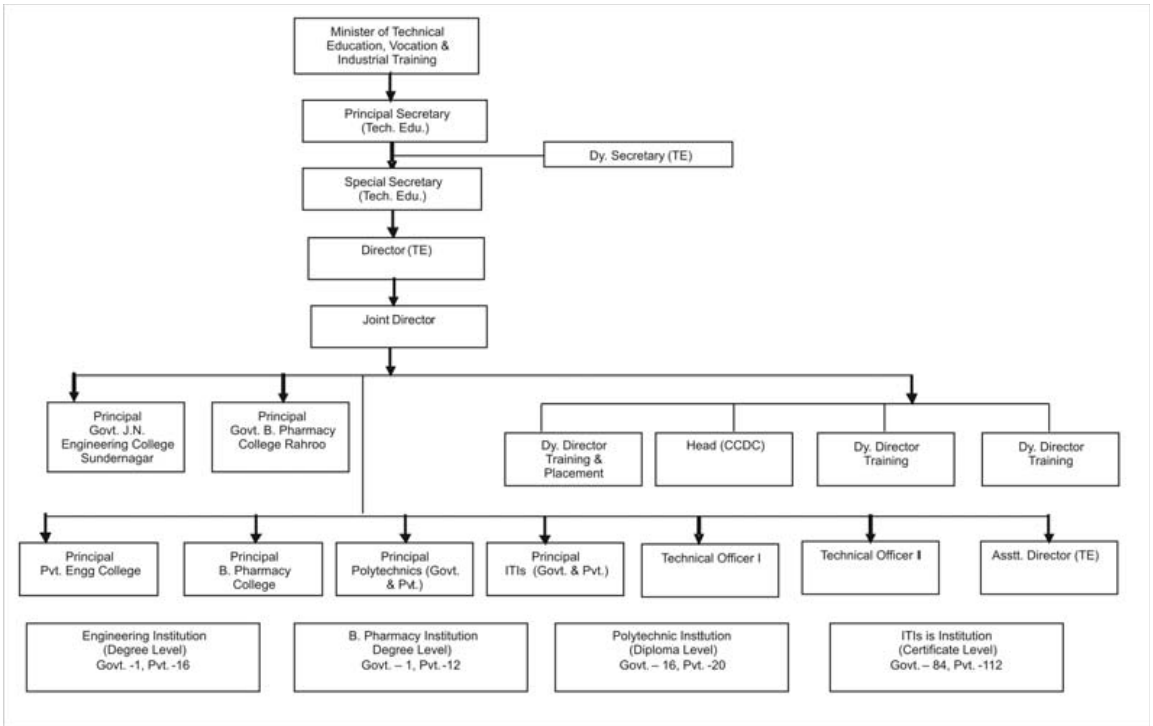
3.3 Livelihood

3.1 Education & Vocational Training

Organisational Chart of Higher Education Department

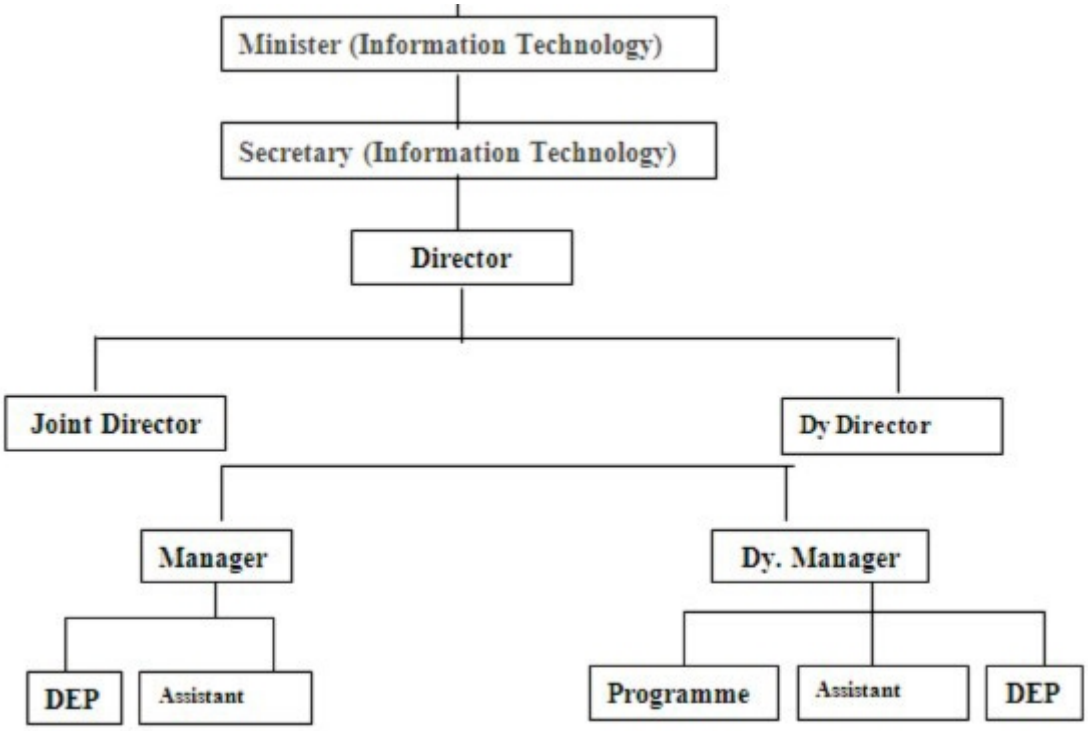


Organisational Chart of Technical Education & Vocational Training Department



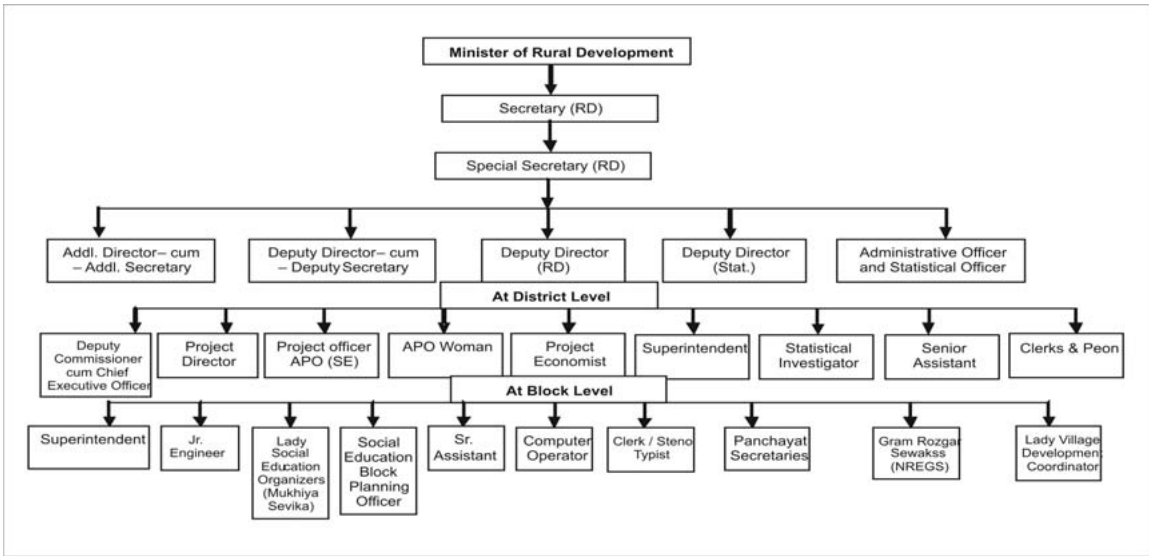
3.2 IT & Telecom

Organisational Chart of Information Technology and Telecom



3.3 Livelihood

Organisational Chart of Rural Development Department



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