Green Growth Background Paper

Draft Final Report

Green Growth and Water in Himachal Pradesh

Prepared for

Department of Environment, Science and Technology
Government of Himachal Pradesh

Supported by

Global Green Growth Institute

The Energy and Resources Institute

...towards global sustainable development

Suggested format for citation

T E R I. 2015.
Green Growth and Water in Himachal Pradesh.
New Delhi: The Energy and Resources Institute. 14 pp.

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1. Introduction

Every year, about 1,200,000 million m^3 of water flows down from the Himalayan rivers. Himachal Pradesh forms a key and central part of the Indian Himalayan region (IHR). The IHR is home to nearly 4 per cent of the country's population, and provides opportunities directly or indirectly for their livelihoods. The state of Himachal Pradesh (HP) is distinguished by its geography which brings both challenges and opportunities for development. With altitudes ranging from 400 meters to almost 7000 meters above sea level, much of the state is inaccessible and inhabitable.

The state of HP is sparsely populated, and especially when compared to some other densely populated states of India. With 6.8 million people, the state's population density—at around 110 per sq. km.—is significantly lower than the national average of 320 per sq. km. There are twelve districts in the state.

Recognizing the geographic impediments to growth, the Government of India (GoI) has classified the state as a —special category, which gives Government of Himachal Pradesh (GoHP) access to special grants from the central government and other incentives that have been instrumental to its development. Himachal Pradesh has embarked on the path of green growth and sustainable development, keeping in view its location in the fragile western Himalayan region and the need to undertake development without disturbing the delicate ecological balance.

GoHP has developed an innovative environmental policy program, with the focus of promoting a paradigm shift towards an environmentally sustainable model of economic growth. This operation supports the following subset of enabling policies that are deemed catalytic and will provide the short term foundational changes that are needed to achieve this objective:

- Promotion of Climate Change Adaptation and Mitigation
- Development of Environmentally and Socially Sustainable Hydropower
- Empowering Local communities to Promote Watershed Management
- Environmentally Sustainable Industrial Development
- Environmentally Sustainable Tourism and
- Institutional Mechanism for Integration of GIS in Informed Decision Making.

The Department of Environment, Science and Technology (DEST) of the State has formulated an Environment Master Plan (EMP) to address its environmental issues. The EMP acts as a guiding tool to provide strategic direction and to address all environmental issues. It is designed as a means to engage the implementing agencies, development departments, and local governments to take action on priority issues that concern the local environment and include community interests.

2. Trends

The fragile Himalayan ecosystem in this State forms the catchment of major Indian rivers such as the Sutlej, Beas, Ravi and Yamuna that sustain economic livelihoods and industry in the plains below. It is an important source of water that support about 200 million people in Punjab, Haryana, Uttar Pradesh and Rajasthan. In addition, these rivers have bestowed an enormous endowment of hydropower potential and assuring food and water security across much of North India. The per cent catchment area of river basins in Himachal Pradesh is shown in Figure 1. Thus stewardship of HP's natural assets is critical to the well-being of a large segment of the population of India. Hence consideration of downstream impacts is critical to the State's development strategy.

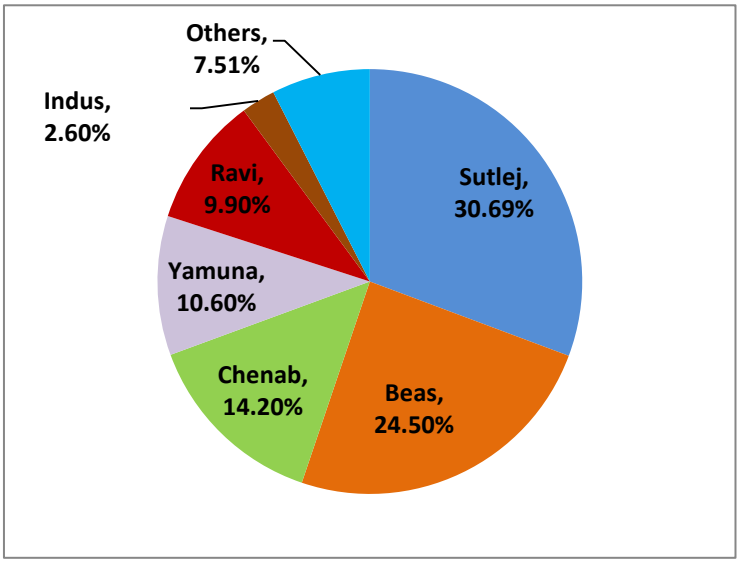

Figure 1 Percent Catchment Area of River Basin in Himachal Pradesh-2010

Source: ADB Report, 2010

The annual ground water draft for all purposes in 2010-11 was 120 million cubic meter (CGWB Report, 2012). It is estimated that water requirement will increase by approximately 14% by the year 2020 (Planning Commission Report, 2005) and water availability, access to water and water quality will be the key issues to look at. The overall groundwater development is estimated to be 31% of the potential. In District Sirmaur, development is 138 % and in District Una, it is up to 82.5 (CGWB Report, 2011) per cent of the potential (Figure 2). Estimates by the Central Groundwater Board indicate that groundwater extraction remain below the maximum sustainable level.

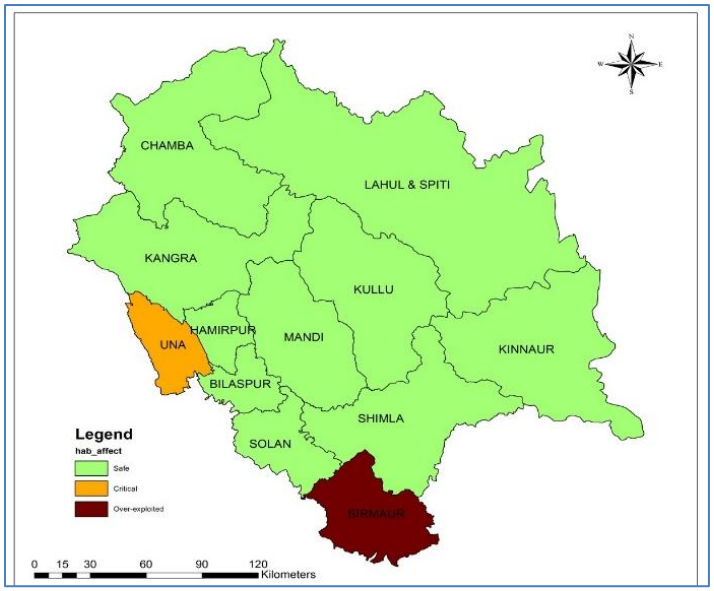

Figure 2 Groundwater Development in Himachal Pradesh

Source: (CGWB Report, 2011)

The projected water requirement in Himachal Pradesh (Domestic and Industrial) as per an internal analysis conducted by TERI is depicted in Figure 3. The projection has been made using the projected population number (Y–axis) brought out by the Census of India, and by using the BAU projection of the number of factories and their possible water requirement as per the *Indian Standard, Code of Basic Requirements for Water Supply, Drainage And Sanitation.*

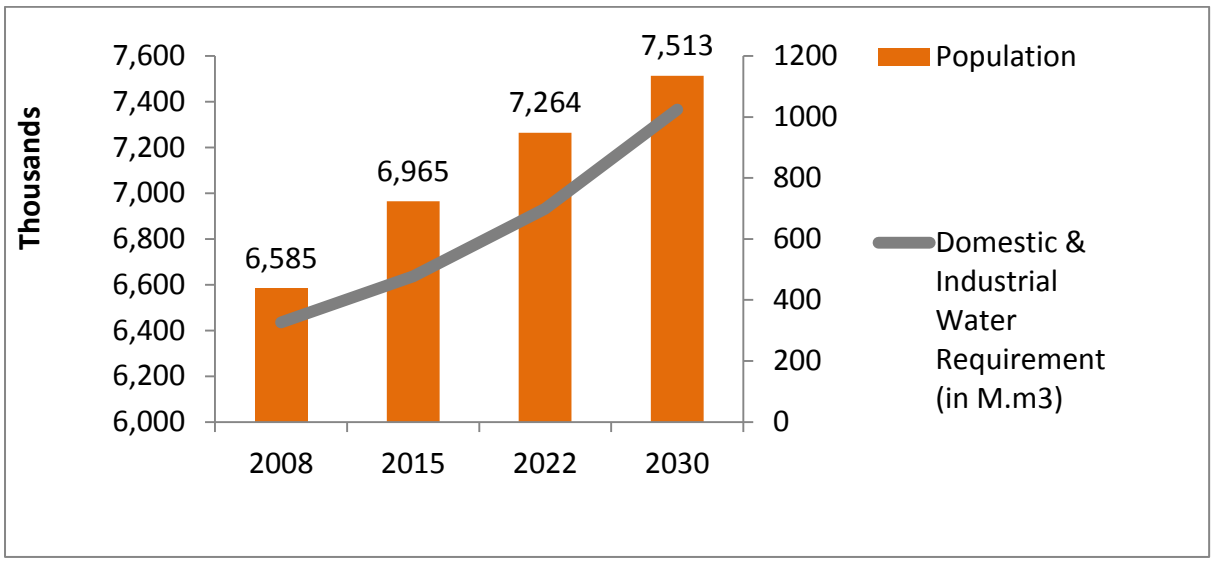

Figure 3 Projected water requirement in Himachal Pradesh: Domestic and Industrial

Source: Internal analysis based on data from Census of India, 2011

Himachal Pradesh is one of the few states, which has come out with their state water policy, as early as in 2005. It presents a set of general guidelines towards the planning and management of water resources and the key points state a need for:

- An action plan for implementation of the policy.
- A participatory approach.

- Information systems for water related data in its entirety.
- Integrated water resources planning based on hydrological units.
- Management through multipurpose and multidiscipline approaches.
- Utmost efficiency in water utilisation.
- Financial and physical sustainability through collection of operations and management costs from consumers and a paradigm shift from expansion towards improving performance of existing schemes.
- A client Citizens' Charter to be established to guarantee efficiency and transparency and accountability.

The Water Policy of 2005 provides a good basis for sustainable water resources management. However, the application of the water resources policy on the ground remains limited and hence it was amended in 2012 for sustainable management of State's water resources.

The Government of Himachal Pradesh has undertaken a series of initiatives designed to address environmental concerns such as:

- The establishment of a Directorate of Environment;
- Broadening the scope of the State Pollution Control Board's regulatory roles;
- Establishing a Special Area Development Authority for carrying out approved development plans and;
- Commitments to make Himachal Pradesh a carbon-free state.

The State is moving towards a river basin approach to the development and implementation of Integrated Basin wide Catchment Area Treatment (CAT) Plans–deemed global best-practice for managing impacts. The State has already prepared and finalized an integrated CAT Plan for the Sutlej basin (initiated under the previous World Bank assisted Development Policy Loan (DPL)) and similar work is in progress for three other river basins based on high quality disaggregated baseline data on forest cover and quality, erosion intensity, and silt load. A monitoring framework has been put in place to ensure the proper disposal of muck and debris – a visible concern in previous hydropower developments.

The State took the first steps by formulating its own Hydropower Policy in 2006. The policy explicitly recognizes the importance of environmental management. Lessons from the implementation of this Policy have enabled the State to iteratively adopt appropriate policy measures to meet environmental and social objectives. To address environmental risks, the government has taken the first steps towards comprehensive river basin management. The State has also constituted a Hydropower Producers Forum, starting with the Sutlej basin, to facilitate coordination on social, environmental, water flow and catchment area treatment related issues. There is now a wide recognition of the need for assuring environmental flows and HP is the only state in India to have mandated environmental flows of a minimum of 15 percent (of the average lean flow) in all hydropower developments for eco-systems, and to provide for the riparian rights of downstream communities. To assure compliance with this policy, the installation of real time online e-flow monitoring instruments in all new projects is being mandated. This operation supports policies to strengthen these and other related environmental monitoring initiatives.

GoHP has also committed to increase productivity through participatory watershed management to meet the dual challenges of poverty reduction and sustainable natural resource management. Watershed development is viewed as a means of sustainably increasing the productivity of rain-fed agriculture, as well as providing forest (natural habitat) protection. In addition, protecting the watersheds is essential to maintain livelihoods beyond the state of HP where the rivers play an important economic role in providing water for industry and agriculture.

The HP State government is targeting to tap over 70% of the hydropower potential of the State by 2020, essentially adding 10 GW to the current potential. The State has already identified projects for commissioning on Satluj, Yamuna, Beas, Chenab and Ravi (Table 1) basins during 12th and 13th Five year Plans which will add 5,621 MW to the existing capacity. Hydropower of about 8,000 MW against the potential of 23,000 MW in the five river basins has been harnessed:

Table 1 Hydropower potential in Himachal Pradesh

River Basin	Assessed Potential (MW)
Yamuna	811
Satluj	10,355
Beas	5,339
Ravi	2,952
Chenab	2,973
Others	570
Total	23,000

Source: GoHP Report, 2012

Himachal Pradesh is the only state to have mandated the release and maintenance of 15% minimum lean flows downstream of diversion structure to maintain riverine ecology. It has established real time online continuous flow measurement & data logging devices for the implementation of ecological flows and managing erosion, sedimentation & catchment degradation. Furthermore, it has a Global positioning System (GPS) based photo monitoring of muck dumping of the hydel projects.

The State Government of Himachal Pradesh has accorded top priority for setting up of a Common Effluent Treatment Plant (CETP) through a Special Purpose Vehicle (SPV) namely M/S Baddi Infrastructure Ltd, formed by Baddi Barotiwala Nalagarh Industrial Association located in District Solan. The CETP can serve 990 industries present in 9 industrial areas. This is a step towards reducing and abating environmental pollution in the area and because of this more and more industrial units are coming up in this area and are in the development process and ensuring cleaner environment.

In Himachal Pradesh, the surface water quality monitoring is conducted four times a year for 189 locations selected on major rivers viz. Satluj, Beas, Ravi, Yamuna, Parvati, Sirsa, Markanda and Sukhna and their tributaries. These locations include 116 points on major rivers and its tributaries, 18 locations in major industrial towns for monitoring groundwater and 55 locations on Hydel projects. The industries practice zero discharge and 100% of the plant waste water is treated on site and used for gardening in a Baddi Plant. In addition to conventional treatment comprising of physio-chemical and biological treatment, initiative

has been taken to introduce tertiary level of treatment in the industrial units particularly those in Baddi-Barotiwala area. More than 35 sewage treatment plants with cumulative treatment capacity of 79.66 MLD have been commissioned and provided. In all, 10 municipal solid waste processing facilities are being set up at different towns for better disposal and management of sewage and municipal solid waste in the State.

3. Key issues

Amongst the Indian states, Himachal Pradesh was the 10th most visited state by international tourists and 12th most visited state by domestic tourists in the year 2008 (WB Report 2012). Between 2001 and 2008, visits by domestic tourists grew by 8.9% and those of international tourists grew by 20.88%. The tourism sector's potential growth is intricately linked with environmental quality. Tourism in HP is characterized by significant seasonal variations (with a clear peak during the summer months) and the agglomeration of visitors in a few locations (with over 55% of tourists concentrated in Shimla, Kullu, and Kangra) has led to high levels of congestion and tremendous pressure on the natural resources of the state. There is a huge stress in the urban drinking water sector due to tourist influx during the summer months.

The available information to support effective water resources planning and management in the State is spread over a number of departments and institutes both, at state and central level. For Himachal Pradesh, water resource systems are very complex, and an integrated water resource data system is required, including information on rainfall, snow, glacier storages, melt volumes, river flows, groundwater, land use, land conservation (forest, agricultural and other), and climatic parameters (temperature, evapotranspiration etc.). The information system must incorporate data on water projects, water use, extractions, return flows, and locations of different types of catchment protection.. The data system could be quite useful if it is a GIS based system and will require to be planned and managed on a well-funded and highly professional basis. The data and information system will form the basis to assess present and future risks and to perform vulnerability assessments. Improvements in the information database of water resources can lead to improvements in environment management as it would provide a view on the potential of natural resources in the location, as well as the limits and carrying capacity of the resources.

A lot needs to be done on integrated cross sector water resource planning. The existing projects are mainly implemented on a piecemeal basis. The need for better coordination between the water agencies has been frequently raised as a pertinent issue by government departments and non-government stakeholders. The need for an apex nodal agency to coordinate water resources planning has been widely seen as an important requirement. The government has already taken some important steps in this direction through the establishment of the State Water Management Board. The Board however, has no direct line department to work through. The role of such a nodal agency must be to coordinate and balance resources and issues. It could however, be independent of any regulatory functions. There is a need to establish workable planning processes where projects are identified and planned rationally, judiciously, incorporating the needs of the various sectors and the environment.

Hydropower forms a major contributor to energy needs and state revenues. Climate change could impact the long-term viability and sustainability of hydropower projects due to the change in flow regimes and increase in silt loadings. There are an increasing number of concerns on the social and environmental impacts of the projects. Irrigation is seen as a key tool to address increasing rainfall irregularities but most irrigation schemes are performing poorly. Improved planning by optimization of projects should be an iterative process with refinements gradually developed as more information becomes available.

There is a need to improve the institutional approach to water management, particularly by promoting inter-departmental coordination to ensure convergence of environmental objectives and minimize inter-sectoral conflicts. Furthermore, strengthening the Department of Environment with sufficient capacity and powers could help capitalize on the state's comparative advantages and use the environmental resources as the drivers to sustainable development. However, beyond organizational structures, there is a greater need for more innovative reforms in environment management. An area based environment management approach could provide one way of clustering the pollution footprint of industries, and could be a valuable tool for the state. Encouraging community involvement in development projects, and building the capacity of government agencies for more effective public consultation—is another avenue that GoHP must explore, since public participation in decision making is typically low in the state.

4. Institutional framework

Integrated water resources and catchment planning is a key requirement towards sustainable water resources management. Sector agencies must interact, and there is a requirement for a cross-sectoral department to coordinate the sector interventions. Planning and management is centralized with a scope for significantly increased levels of stakeholder participation. A summary of the Himachal Pradesh Government's water institutions is provided in Table 2 below:

Table 2 Department wise responsibilities of Government of Himachal Pradesh

No	Sectors	Departments Responsible	Responsibilities / Issues
A	SECTORS		
1.	Agriculture	Department of Agriculture	Import latest technologies; provide timely supply of inputs; educate farmers in economic use of irrigation facilities, soil, and water; post-harvest management; diversified farming; marketing construct minor; tank irrigation (<50ha).
2	Horticulture	Department of Horticulture	Support diversification of farming systems; promote environment friendly farming; create conditions and infrastructure to improve farm incomes; encourage use of technologies for optimal utilization of potential; facilitate participative planning.

No	Sectors	Departments Responsible	Responsibilities / Issues
3	Fisheries	Department of Fisheries	Increase fish production; develop reservoir fishery; fish breeding for seed stocking in reservoirs and revers; promote reservoir and lake fish protection; promote game fishery; promote agriculture including rainbow trout at high altitude; create employment.
4	Irrigation and Water Supply	Department of Irrigation and Public Health (DIPH) (for schemes >50 ha)	Responsible for drinking water systems, sewerage systems, irrigation systems for areas larger than 50 ha, and flood protection. Management is bureaucratic and centralized, efficient and flexible management is required to ensure sustainability. Handover of operation of schemes is recommended. DIPH lacks parallel support for agriculture in irrigation schemes.
5	Forestry	Department of Forestry, Joint Forest Management (with Panchayats).	Responsible for afforestation, timber distribution, grazing, fuel wood production, watershed management, forest harvesting, supporting community needs and conservation.
6	Soil and Water Conservation	Department of Rural Development along with Departments of Agriculture and Forestry described above.	Implement different rural development and poverty alleviation programs, water programs (watershed development, desert development) and integrated wasteland development. Many projects are funded through the Mahatma Gandhi National Rural Employment Guarantee Scheme (NREGA). Soil and water conservation and rainwater harvesting is one of the main adaptation mechanisms. The needs and likely levels of investment required to meet the targets for climate change adaptation are significant. The importance of soil and water conservation would appear to justify the creation of a separate Department of Directorate of Soil and Water Conservation to better coordinate and plan SWC activities.
7	Hydropower	Himachal State Electricity Board, HIMURJA, Public Sector Developers, Private Sector Developers	Responsible for power generation and execution of hydro projects with an aim for uninterrupted power to all consumers. The Board is primarily a development agency and lacks the mandate to control and manage the myriad of hydropower producers. HIMURJA is responsible for all mini and micro-hydro schemes less than 5 MW.
B	CROSS CUTTING SECTORS		

No	Sectors	Departments Responsible	Responsibilities / Issues
1	Economic Development and Planning	State Planning Board (apex planning organization chaired by the Chief Minister) State Planning Department, National Planning Commission	Objective is to determine real priorities, identify development strategy to raise living standards. Compiles 5 year and annual plans. Lacks the capacity and mandate to plan and effectively manage water resources and water resources projects.
2	Surface Water Resources: hydrology, climate, flood risk	State Water Management Board. No defined line departments	The State Water Management Board is newly established and can potentially be the apex body for integrated water resources management and control. The Board however, without a dedicated modal department to support the activities, will not achieve the desired result. Capacity in hydrology is presently being developed in DIPH.
3	Groundwater Resources	Central Groundwater Management Board (State Unit)	The Board has limited capacity in groundwater management in the state
4	Environment	Department of Environment and Scientific Technologies (includes the State Pollution Control Board)	Responsibility is to improve effectiveness of environmental management, protect vulnerable ecosystems and enhance sustainable development
5	Rural Development	Department of Rural Development	The department is engaged in the implementation of different rural development and poverty alleviation programs. Development blocks are the pivot for planning and implementation of various rural development schemes. Projects include soil and water conservation and implementation of NREGA activities.

A number of initiatives have been taken to support integration of sectors in Himachal Pradesh. In August 2009, a State Water Management Board was set up to tap synergies across line departments, as well as coordinate with central ministries. The purpose and constitution of the Board, directly under the Chief Minister, is to improve coordination across all the government departments, and the development of a multidisciplinary approach to the management of water resources. Another initiative is the recently established forum for hydropower producers and other stakeholders in the Sutlej basin. With these initiatives, the State is gearing up towards green growth and sustainable development.

The three most relevant parts of the NAPCC from the perspective of water are mentioned in Table 3 with respective departments dealing with these missions in the State:

Table 3 National Missions aligned to corresponding State Departments

Missions at the Centre	Department in the State
National Missions for Water	Urban Development, DIPH
National missions for Sustaining the Himalayan Ecosystem	Environment, Science and Technology
National Missions for Sustainable Agriculture	Agriculture, Horticulture and Rural Development
National Missions for Green India	Forest, Rural Development

There have been efforts made towards water conservation and management by rain water harvesting, which are aimed at popularizing and demonstrating the state of the art technology for construction of rain water harvesting structures and for the conservation of rain water in the water scarce and drought prone areas. The 12th five year plan proposes demonstration of the Ferro Cement Technology /LDPE lined pond and other technologies including rain water harvesting by constructing structures in the villages where water shortage is experienced. The construction of these structures will be carried-out through district administration /NGOs /societies/ Gram Panchayats and councils. There are initiatives towards establishment of additional number of water harvesting and storage structures, vermicompost units and green houses.

Among other green growth development programmes, the Soil and Water Conservation projects are notable. Approximately, 3000 hectares/annum of the forest area is treated for soil and water conservation under the State Plan schemes. The department shall treat 15000 hectares of forest land during the plan period depending upon the allocation. There have been schemes of convergence with MGNREGA, under which productive economic assets like water conservation, irrigation schemes, horticulture, plantation and land development have been created on community land and private land belonging to the target group families. Creation of rain water harvesting structure also has been carried out for each household in rural areas.

5. Ways forward

The Government of Himachal Pradesh is committed to reverse the process of degradation of natural resources and improve the productive potential of natural resources and incomes of rural households (Govt. of Himachal Pradesh, 2012). The mid-Himalayan watershed development project supports policy and institutional development to harmonize watershed development projects and policies across the state in accordance with best practices. There are three components:

(i) Institutional strengthening and capacity buildings of communities and local governments to effectively manage watershed development;

(ii) Watershed development and management, financing of soil and water conservation, non-arable land treatments, crop and livestock production, and rural infrastructure; and

(iii) Enhancing mountain livelihoods and promotion of value added in agriculture and income generating activities, particularly for tribal and vulnerable groups.

A road map has been developed in Himachal Pradesh to move forward from ideas and concepts to actions. There could be some short to medium term and medium to long term strategies for green growth in the sector for the state, such as:

5.1 Short to Medium Term

- Integrated water resource management (IWRM) for water conservation using rainwater harvesting, groundwater recharge and rejuvenation of lakes and ponds in the river basin catchment could help a great deal. It may be useful to include an approach based on the principle of agro climatic planning where the State can be divided into 3 zones, with the high areas in Lahaul, Kullu, Chamba and the mid-hills in Kinnaur and Shimla, and the valley areas of Una, Bilaspur, Hamirpur, Solan and Kangra. It is required to establish new initiatives for water reuse and rainwater harvesting and building capacity of the various stakeholders for handover.
- Service delivery of water supply and sanitation schemes in both rural and urban areas is low and cost recovery is negligible. In the rural drinking water supply and sanitation sector, there are issues of community ownership and maintenance. In urban water supply, there are issues of funding improvements, and rationalising the network to meet expansion of urban areas. Cost recovery is also an issue which needs to be addressed. Hence, upgrading levels of service delivery and sustainability of potable water is urgently required.
- Increasing water use efficiency in all sectors is essential and development of strategies to improve the performance and efficiency of irrigation is pivotal. Assessment of the issues and options including their technical, social, and financial aspects, is necessary. Review of the options of surface, drip, sprinkler and low cost hybrid systems to be carried out in consultation with the stakeholders. Cost comparison combining capital and operational costs for different systems should be prepared.
- Watershed management by design and construction of watershed structures such as farm bund, farm ponds, check dams, contour bunding, irrigation scheduling, keeping in mind the needs of the community at all stages of discussion, planning, implementation, management and maintenance. A shift in approach for water resource management from purely engineering works to systems that incorporate traditional practices and local materials. The Gram Panchayat as well as the local community must be involved at all stages.
- Review the limiting factors and existing gaps in wastewater treatment in river basin (w.r.t. technical, social, financial, institutional or regulatory aspects) in order to reduce future challenges.
- The state government of Himachal Pradesh is committed towards capacity building of the farmers in sustainable use of irrigation water, soil and water conservation technologies, and training on irrigation facilities schemes so as to obtain maximum yields. The capacity building programmes are to be customized and extended to include training workshops, strengthening of self-help groups, and strategic alliances between the government and research organisations.
- Capacity building of engineers and other personnel in the water sector is also required.

5.2 Medium to Long Term

Designating institutions as nodal agencies for IWRM would be helpful as there in no single-point institution in the state at this time to guide, coordinate, control, and support IWRM for both surface and groundwater. IWRM initiatives functioning by the present institutions are fragmented and there exists major gap in integration of efforts. There is also a need for establishment of an autonomous water regulator and strengthening of surface and groundwater authorities to address issues of tariffs, stakeholder participation, and other regulatory functions.

- Mining of sand and boulders for building materials is a major problem in many stretches, which needs to be addressed.
- Integrated wastewater management through treatment, recycle and re-use by identifying and designing innovative solutions for domestic and/or industrial sectors with appropriate use of decentralised and/or centralised options is necessary. Developing mechanisms and MIS platform with innovative information and communication technology (ICT) tools and technologies for an integrated and efficient monitoring, informed systemic responses and decision making could smoothen major processes.
- Development of water quality database management by using real time monitoring and information systems in order to develop tools, methods and capacities to analyse climate information must be considered. There is a need to place available data in public domain and to establish integrated sharing of information between sectors, state and central government and national institutes with modern state of the art computer systems. This would help to identify data gaps and monitoring requirements including rainfall, river, snow, and glacial data as required.
- Irrigation water use efficiency and uptake is quite low - especially critical for pumped irrigation. Upgrading the existing system for long-term sustainability of pumped irrigation is vital.
- Integrated water resource planning could be useful to ensure environmentally sustainable water resources management. Integrated studies are required as existing studies have been directed primarily at hydropower with less consideration of other sectors. Integrated water resource plan for Satluj river using latest information sources of project water availabilities. The plan would include all water sectors including hydropower, irrigation, rural and urban water supplies and sanitation. Plan would incorporate outputs of strategies for 'effective institutions' and 'catchment planning' including applications of high efficiency precision agriculture, irrigation, cost effective soil and water conservation.
- Developing an implementation framework for policies & mechanisms to strengthen interstate water management should be vital and useful as many climate issues in Himachal Pradesh catchments will impact states that are downstream. Water resource strategies of Himachal Pradesh must be coordinated with downstream states keeping in mind that in the age of resource sub-nationalism, the hill states could be compensated for keeping their forest cover so that the lower riparian states can have improved water resource security.

- Regulatory/ institutional intervention by identification of existing gaps and bottlenecks in functional performance of the institutions and developing an effective management framework with requisite reforms should be a priority.
- Research studies in water sector in various academic and research institutions should be strongly encouraged.

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About TERI

A unique developing country institution, TERI is deeply committed to every aspect of sustainable development. From providing environment-friendly solutions to rural energy problems to helping shape the development of the Indian oil and gas sector; from tackling global climate change issues across many continents to enhancing forest conservation efforts among local communities; from advancing solutions to growing urban transport and air pollution problems to promoting energy efficiency in the Indian industry, the emphasis has always been on finding innovative solutions to make the world a better place to live in. However, while TERI's vision is global, its roots are firmly entrenched in Indian soil. All activities in TERI move from formulating local- and national-level strategies to suggesting global solutions to critical energy and environment-related issues. TERI has grown to establish a presence in not only different corners and regions of India, but is perhaps the only developing country institution to have established a presence in North America and Europe and on the Asian continent in Japan, Malaysia, and the Gulf.

TERI possesses rich and varied experience in the electricity/energy sector in India and abroad, and has been providing assistance on a range of activities to public, private, and international clients. It offers invaluable expertise in the fields of power, coal and hydrocarbons and has extensive experience on regulatory and tariff issues, policy and institutional issues. TERI has been at the forefront in providing expertise and professional services to national and international clients. TERI has been closely working with utilities, regulatory commissions, government, bilateral and multilateral organizations (The World Bank, ADB, JBIC, DFID, and USAID, among many others) in the past. This has been possible since TERI has multidisciplinary expertise comprising of economist, technical, social, environmental, and management.

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