ZONAL MASTER PLAN OF BHAGIRATHI ECO-SENSITIVE ZONE

PART-I

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EXECUTIVE SUMMARY

The Bhagirathi Eco- sensitive region is of immense ecological & environmental significance and being the source of River Ganga and its tributaries, it harbors the indigenous and endemic flora & fauna as well as the important migratory species. With increasing human population, increase in anthropogenic pressure in the area is on the rise. Damage to the fragile ecosystem, including flow and character of the river is inevitable if proper attention is not given. So, with this intention and in exercise of its powers conferred under Sub-section (1) read with clause (v) and clause (xiv) of Sub-section (2) of Section (3) of the Environment (Protection) Act, 1986,Govt. of India vide its notification no. S.O. 2930(E) dated 18, December 2012 has decleared an area of 4179.56 sq. km. comprising a total stretch of about 100 km. of river Bhagirathi, covering its entire watershed from Gaumukh to Uttarkashi,as an Eco-sensitive Zone from Ecological and Environmental Conservation point-of-view. **(Annexure 1)**

BOUNDARIES OF ECO-SENSITIVE ZONE :

(a) The Eco-sensitive Zone is bounded by $31^0$05'46.54"N latitude and $79^0$25'11.65"E longitude towards east; $79^0$04'32.21"E longitude and $31^0$27'23.28"N latitude towards north; $30^0$51'03.95"N latitude and $78^0$22'57.78"E longitude towards west and $30^0$39'08.09"N latitude and $78^0$31'26.41"E longitude towards south.

(b) There are 88 villages falling within the Eco-sensitive Zone. One more village - *Harshil* has been proposed to be added in the Eco-sensitive Zone as per the directives of the GoI.

"ZONAL MASTER PLAN" FOR THE ECO-SENSITIVE ZONE:

As per the notification, the State Government was required to prepare a Zonal Master Plan for the Eco-sensitive Zone in consultation with local people particularly women with in a period of 2 years from the date of notification of the Eco-sensitive Zone in the Official Gazette. The purpose of having a Zonal Master Plan is to regulate the developmental activities in the region in such a way that it ensures:

- Environmental and Ecological protection of the entire endangered area, falling in the catchment of river *Bhagirathi* from *Gaumukh* to *Uttarkashi* town.
- Holistic development of the area ensuring livelihood security of the people living in the area including protection of their traditional rights and privileges.

The Zonal Master Plan so prepared shall become a reference point for all kinds of monitoring of the developmental activities by the Monitoring Committee. As per the Notification, such a Master Plan prepared by the State Government was to broadly incorporate the following important points:

1. Involvement of all concerned Departments of the State Govt. including Environment, Forest, Urban Development, Tourism, Municipal, Revenue, Public Works and Environment Protection and Pollution Control Board etc.
2. Border Area Development Plan and other plans prepared or to be prepared by the State or Central Government are to be formed as a part of the Zonal Master Plan.
3. The plan has to provide for the restoration of the denuded hill slopes, conservation of existing water bodies, management of catchment areas, watershed management, groundwater management, soil and moisture conservation, needs of the local community and such other aspects of the ecology and environment that need attention.
4. The plan has to be prepared based on watershed approach. Natural boundaries of the river are not to be tampered as far as possible.
5. While taking up construction of hotels, resorts or any other buildings, the traditional architecture concepts has to be adopted. The plan has to contain specific guidelines for the same. Under tourism and pilgrimage activities, development of walking paths has to be encouraged.
6. The plan has to be made taking care of the requirements of the local people including livelihood security. The rights and privileges of the local people are not to be tampered with. Consultations with the local people have been emphasized.
7. Change in land use from Green Areas (Horticulture, Agriculture, Forest, and Tea Gardens etc.) to Non-green Areas has to be regulated as per the notification.

   Detailed guidelines have also been prescribed for development and protection of hill slopes, development of tourism and hill roads and protection of natural and man-made heritage. The notification also detailed the activities prohibited/ regulated inside the Eco-sensitive Zone, like setting up of River Valley Projects, mining activities, establishment of polluting industries, discharge of sewage and industrial effluents, use of plastic bags and setting up of hazardous waste processing units and commercial felling of trees etc. It has also listed the activities to be regulated and eco-friendly activities, which are to be promoted.

MONITORING COMMITTEE

A 12 member monitoring committee as per section 4 of the notification was constituted vide office memorandum 25/3.2010-RE dated October 10 2013 **(Annexure 2)**. Initially the committee was constituted for a period of two year, the tenure of which was extended by the Honorable National Green Tribunal in original application no. 151/2013 (Legal Aid Committee, National Green Tribunal Bar Association vs. Union of India& Others) and 80/2015, (Kesar Singh Panwar & Others vs. Union of India & Others) by various orders from time to time till 17 may 2017. On the request of State government, Ministry of Environment and Forest & Climate Change, GoI vide its Office Memorandum 25/3.2010-RE-ESZ dated April 05, 2018 reconstituted 12 members monitoring committee under the chairmanship of Chief Secretary, Government of Uttarakhand for a period of 3 year or till its reconstitution. **(Annexure 3).**

Composition of the Monitoring Committee is as follows:

Sl. No.	Constituents	Designation
1	Chief Secretary, Government of Uttarakhand.	Chairman
2	Dr. Hem Pande, IAS (Retired)	Member
3	Representative of Regional Office Ministry of Environment and Forest and Climate Change	Member
4	Shri Mahendar Singh Kunwar Himalayan Action Research Center	Member
5	Smt Shanti Parmar Sankalp Samajik Sanstha Goyala	Member
6	Ms. Mallika Bhanot Ganga Ahwan	Member
7	Senior Town Planner Department of Town and Country Planning	Member
8	Chief Conservator of Forest, Garhwal	Member
9	Representative, Department of Irrigation, Government of Uttarakhand	Member
10	Director or his nominee Wildlife Institute of India	Member
11	District Magistrate, Uttarakashi	Member Secretary

CONSTITUTION OF ZONAL MASTER PLAN

Background

The state was required to prepare the Zonal Master Plan within two years and supposed to submit it to Ministry of Environment Forest & Climate Change, Government of India for approval. However, the plan could not be finalized within the stipulated period due to certain reasons. However, work on plan started and each department prepared its component of the plan as per the guidelines of the notification.

1. Honorable National Green Tribunal in original application no. 151/2013 (Legal Aid Committee, National Green Tribunal Bar Association vs. Union of India& Others) and 80/2015, (Kesar Singh Panwar & Others vs. Union of India & Others) directed the state government to urgently prepare the plan (Zonal Mater Plan) and implement the notification in letter & spirit.

2. Wide range of consultations was organized with local people and especially with women. However, the response of local people, by and large was not cooperative as they were not in favor of constitution of Bhagirathi Eco-sensitive Zone. The respective departments made their plans and submitted to the Monitoring Committee. The plans of all the departments were then compiled into the draft Zonal Master Plan for the Bhagirathi Eco-sensitive Zone.
3. Comments of the Monitoring Committee with respect to the individual plans submitted by Individual departments were also incorporated wherever necessary at the end of the plan.
4. The draft Zonal Master Plan so prepared was submitted to the Ministry of Environment Forest & Climate Change, Government of India in March 2016 for approval. MoEF & CC, vide letter dated 8th July 2016 however asked the state government to incorporate the comments received from Ministry of Water Resources, River Development & Ganga rejuvenation and Indian institute of Remote sensing **(Annexure 4)**. The state government after making necessary amendments revised the draft zonal master plan and presented it before the 21st Expert committee in its meeting dated 31st August, 2016, held under the chairmanship of Additional Secretary, Ministry of Environment Forest & Climate Change, Government of India in which various concerned departments participated to discuss at length the Zonal Master Plan. After detailed discussions, the expert committee gave certain important directives to the state government to be incorporated in the plan. The reservations of the state government with regard to the amendments in some of the provisions of the notification were acknowledged by the expert committee and necessary amendments were recommended accordingly **(Annexure 5).**
5. The state government vide its office Memorandum No. 545/X-3-16-05(01)2014 dated 21 September, 2016 constituted a state -level Committee under the Chairmanship of the Principal Conservator of Forest (Projects), Uttarakhand to finalize the plan as per the directives given by the Expert Committee, Government of India in its meeting dated 31st August 2016**.** The committee at the state level immediately reviewed the plan in consultation with the various departments and finalized it in view of the directives of the Expert Committee, Government of India. The main consideration in the review was inclusion of cross department linkage, prospective consideration for future, skill development of people in the area, greater thrust on wildlife management etc.
6. The revised Zonal Master Plan was submitted to Ministry of Environment Forest & Climate Change, Government of India on 24/10/2016. The revised zonal master plan was neither accepted nor rejected by the ministry; However, Ministry of Water Resources filed a joint affidavit on behalf of Ministry of Environment Forest & Climate Change in the Honorable National Green Tribunal on 21.12.2016 highlighting the shortcomings in the Zonal Master Plan submitted by state of Uttarakhand. Ministry of Environment Forest & Climate Change through its counsel also acknowledged in the Honorable National Green Tribunal ,about its non- acceptance of Zonal Master Plan **(Annexure 6).**
7. On the joint request of Government of Uttarakhand, Ministry of Environment Forest & Climate Change, GOI, Ministry of Water Resources, river development & Ganga Rejuvenation GOI & the applealent, the National Green Tribunal in OA no. 151/2013 & 80/2015,passed an order dated 26/07/2017 (amendment at serial no.8 vide order dated 23/10/2017) **(Annexure 7)** and directed to constitute a committee for the preparation of Zonal Master Plan of Bhagirathi Eco- sensitive Zone as following:

S.No.	Name / Designation	Position
1	Additional Chief Secretary, Environment and Forest, State of Uttarakhand.	Chairman
2	Director or his nominee, Wadia Institute of Himalayan Geology, Dehradun, Uttarakhand	Member
3	Dr. Vinod Tare, Professor in Indian Institute of Technology, Kanpur.	Member
4	Director or his nominee, National Institute of Hydrology, Rorkee	Member
5	Representative of the Ministry of Environment, Forest and Climate Change, Regional Office of Dehradun.	Member
6	Director or his nominee, Wildlife Institute of India, Dehradun	Member

S.No.	Name / Designation	Position
7	Representative of Ministry of Water Resources, River Development&Ganga Rejuvenation (Joint Secretary Level or above)	Member
8	Dr. A.B. Akolkar, Member Secretary, Central Pollution Control Board (in his personal capacity) (**replaced by Dr. Ravi Chopra**)	Member
9	Padma Shri Chandi Prasad Bhatt, Environmentalist, Uttarakhand.	Member

NEW ZONAL MASTER PLAN

The Committee constituted by the Honorable National Green Tribunal here, after called as "**NGT Committee"** conducted four meetings to finalize the Zonal Master Plan. The suggestions and recommendation given by the honorable members in all the meetings of the NGT Committee were considered & accordingly incorporated in the Zonal Master Plan.

1. The NGT committee held its first meeting on 20th November 2017 in which the committee was briefed about various provisions of the Bhagirathi Eco-Sensitive Zone notification along with the background and development of the Zonal Master Plan so for. A copy of the minutes of the meeting of the NGT committee dated 20 Nov, 2017 has been annexed as **Annexure-8**. The committee was also apprised about different orders issued by the honorable NGT from time to time, in **Original Application No. 151/2013** (Legal Aid Committee, NGT Bar Association vs Union of India & Others) **and 80/2015** (Keshar Singh Panwar and others). Recommendations of the 21st Expert Committee and the stand of the Ministry of Environment and Forest & Climate Change & Ministry of Water Resources, RD&GR, Government of India, on the Zonal Master Plan submitted by the state in December 2016, was also brought to the notice of the NGT committee. The NGT Committee however felt the need to provide sufficient time to all the members so as to get aware with the facts and figures related to the matter. The next meeting was decided to be held on 9th December 2017. The suggestions received in the first meeting of the committee were incorporated in the Zonal Master Plan and presented in the second meeting of the committee accordingly.

2. In the 2nd meeting of the NGT Committee dated 9th December 2017, various departments presented a detailed chapter wise presentation of the Zonal Master Plan. The members had a detailed chapter wise discussion on Zonal Master Plan and suggestions were recommended to improve and revise the Zonal master plan. Departments were asked to maintain uniformity along with cross sectoral interlinking in different chapters in the Zonal Master Plan. It was also directed to incorporate the finding of various studies & reports of different Regional and National institutes working in the area. The minutes of the meeting dated 9th Dec, 2017 has been annexed as **Annexure-9**. Accordingly, comprehensive exercise to rewrite and redraft the ZMP, as per the directions of the committee was done at the district level by the concerned departments. Chapters were redrafted and reframed on a **"Theme based approach"** in which similar sectors of different departments were clubbed and included in same chapter so as to bring uniformity in the Zonal Master Plan. National Institutes like Wildlife Institute of India, Wadia Institute of Himalayan Geology, National Institute of Hydrology, Indian Institute of Remote Sensing and Indian Institute of Soil and Water Conservation were requested to provide relevant studies and reports to be incorporated in the draft Zonal Master Plan. Accordingly following reports were incorporated in the revised ZMP.
   (a) State of Glacier report- By Wadia institute of Himalayan Geology **(Annexure 10)**
   (b) Report by NIH Roorkee, on Gangotri glacier. **(Annexure 11)**
   (c) Chapter 1 "Forest & Wildlife" was checked by Wildlife Institute of India, Dehradun and necessary improvements suggested were incorporated in the draft Zonal Master Plan.
   (d) Soil Erosion classification map of district Uttarkashi along with relevant data was provided by *Central Soil & Water Conservation, Research and Training Institute Dehradun*. A report named **"Soil Erosion in Uttarakhand"** published

jointly by *National Bureau of Soil Survey and Land use Planning & Central Soil and water Conservations Research and Training Institute Dehradun* was considered and important recommendations were incorporated in Chapter-2.

Earlier, the NGT Committee in its Second Meeting suggested State government to move a proposal to MoEF & CC, GoI for necessary amendments in the Notification. Accordingly, the State Government's amendment proposal was discussed in detail by the 28th expert committee of ZMP in its meeting dated 18th December 2017, in MoEF & CC, New Delhi **(Annexure 12A)**. The expert committee recommended the amendment in some provisions of the notification whereas it was decided that the decision regarding others will be taken after receiving the comments of MoWR, RD & GR, GoI. The MoEF & CC, GoI thereafter amended 2(12), 2(14), 2(16), 2-19 (i), 3a (v), 3b (i), 3b (vii) and 3b (viii) the BESZ notification vide notification no. S.O 1656 (E) dated 16th April 2018. **(Annexure 12B).**

3. Committee conducted its 3rd meeting on 9/01/2018 in which the committee had a brief discussion on the revised draft Zonal Master Plan. The honorable members were requested to go through the revised draft Zonal Master Plan and submit chapter wise written recommendations for its improvements, by 27th January 2018. The committee also suggested for the constitution of a high-level drafting committee, who shall finalize the Zonal Master Plan in light of the written suggestions to be provided by the NGT Committee members. A copy of the minutes of the meeting dated 9 January, 2018 has been annexed an **Annexure-13**. Accordingly, a 5-member "**Drafting Committee"** was constituted vide govt. order dated 10/01/2018 under the chairmanship of Mr. Rajeev Bhartari, PCCF Van Panchayat, Uttarakhand. **(Annexure 14).**

4. The written comments of the members of NGT committee were received by the drafting committee from time to time. The chapter wise compliance of the recommendations of the members on technical issues was incorporated by the concerned departments. The drafting committee held various meeting to finalize the draft Zonal Master Plan by verifying the chapter wise compliance status of the comments of the committee members and the state of its incorporation in Zonal Master Plan. The drafting committee finalized the revised Zonal Master Plan and forwarded the same to all the members of the NGT committee for necessary consideration, before 4th meeting of the committee dated 2nd may, 2018.

The timeline of the comments received from members of the NGT committee and its compliance status is as follows:

S. No.	Name of the Member	Date of comments received	Chapters covered	Remarks
1.	Shri Chandi Prasad Bhatt	25/01/2018	Chapter 1,2,3,7,9,10	Copy of comments has been Annexed as **Annexure-15(A).**
		27/01/2018	Chapter 10: Road Infrastructure Development	Copy of comments has been Annexed as **Annexure-15(B).**
2.	Dr. P. S. Negi, Scientist Wadia Institute of Himalayan Geology	17/01/2018	Chapter 10: Road Infrastructure Development	Copy of E-mail & comments have been respectively annexed as **Annexure - (16A & 16B).**
3.	Dr. S.C. Katiyar, Additional Director (S), MoEF& CC, Regional Office, Dehradun	24/01/2018	General Overview Chapter 1: Forest & Wildlife Chapter 7: Energy	Copy of E-mail & comments have been respectively annexed as **Annexure- (17A &17B).**
4	Dr. Sharad Jain, Director, National Institute of Hydrology, Roorkee	26/01/2018	Chapter 2 : Watershed Management	Copy of E-mail & comments have been respectively annexed as **Annexure-(18A & 18B).**
5.	Prof. Vinod Tare, IIT Kanpur	29/01/2018	General Overview & Chapter 1, 2, 3, 4, 5, 6, 7, 8 & 10	Copy of E-mail & comments have been respectively annexed as **Annexure-(19A & 19B).**
6.	Dr S. Sathya kumar, Scientist G, Wildlife Institute of India.	04/02/2018	Chapter 1: Forest & Wildlife	Copy of E-mail & comments has been Annexed as **Annexure-20.**

7.	Dr. Ravi Chopra Director People's Science Institute	06/02/2018	Chapter 1, 2, 3, 4, 5, 6	Copy of E-mail & comments have been respectively annexed as **Annexure- (21A & 21B).**
		13/02/2018	Chapter 8: Public Health and Sanitation	
		14/02/2018	Chapter 9: Tourism	
		15/02/2018	Chapter 11: District Disaster Management Authority, Uttarkashi	
		17/02/2018	Chapter 10: Road Infrastructure Development	

5. The Zonal Master Plan so prepared was presented by the drafting committee along with the chapter wise "Compliance report" before the NGT committee in its meeting dated 02/05/2018. The copy of the minutes of the meeting dated 02.05.2018 has been annexed as **Annexure-22**.

6. The NGT Committee after detailed discussion and deliberation in the meeting, approved chapter 1 "**Forest & Wildlife**", Chapter 5 **"Urban Development",** chapter 9 **"Tourism",** Chapter 12 **"Skill development".** The drafting committee was directed to incorporate certain amendments in the remaining chapters. It was decided by the NGT committee that after due revision, the Zonal Master Plan shall be forwarded to Ministry of Environment and Forest & Climate Change, Government of India for its approval. However, the members of the NGT committee were agreed upon to submit their suggestions in writing, if any, within a period of 20 days. The drafting committee was directed to revise and finalize the Zonal Master Plan in light of the written suggestions of the Hon'ble members, if received, within 20 days.

7. The drafting committee with the help of concerned departments, revised the zonal master plan in light of the directions of the NGT Committee received in the meeting dated 2/5/2018. Detailed chapter wise comments were received from Dr Ravi Chopra, off late by, email dated 17th June 2018. A copy of email and comments have been annexed as **Annexure 23(A) & 23(B)** respectively. The above suggestions were considered and incorporated in the zonal master plan for necessary improvement.

8. Dr. S.C. Katiyar vide e-mail dated 15 may 2018 and 17th July 2018 submitted his concerns regarding installation of hydro power projects above 2 MW capacity. A copy of each has been annexed as **Annexure 24 (A) and Annexure 24 (B).**

9. Prof. Vinod Tare, IIT Kanpur vide e-mails dated 16th July, 2018 raised certain concerns regarding ZMP which have been included and annexed in part III of Zonal Master Plan as **Annexure 25** respectively.

10. Dr. Pradeep Srivastava, Scientist, Wadia Institute of Himalayan Geology vide email dated 16th July 2018 **(Annexure 26)** raised certain issues regarding dam construction, road widening and tourism. The same have been considered and necessary amendments done in the Zonal Master Plan as far as possible.

The **"Compliance Report"** of 4 meetings of the NGT committee dated 20th Nov, 2017, 9th Dec, 2017, 9th Jan, 2018, and 02/05/2018 has been annexed as **Annexures-27(A), 27(B), 27(C) & 27(D)** respectively. Similarly, the "**Compliance Report"** of the written comments of the members of NGT committee received from time to time has been annexed as **Annexure-28**.

The drafting Committee has also taken into account the following suggestions and recommendations of different Ministries, National institutions, the orders of the Hon'ble NGT etc. received from time to time, while drafting and revising the zonal master plan.

- The minutes of the meeting of 21st expert committee dated 31st August 2016
- Objections raised in the joint affidavit dated 21.12.2016 submitted by MoEF & CC, GoI and MoWR, RD & GR, Govt. of India in Hon'ble National Green Tribunal in OA no. 80 of 2015, Keshar Singh Panwar and Ors. Vs Union of India & Ors.

- The minutes of the meeting of the 28th expert committee dated 18.12.2017
- Important orders of Hon'ble National Green Tribunal in OA no. 151 of 2013 and OA no. 50 of 2015.
- The Bhagirathi Eco sensitive zone amendment notification no. S.O 1656 (E) dated 16th April 2018.
- The minutes of the meeting of the NGT Committee dated 20.11.2017, 9.12.2017 and 09.01.2018 and 02.05.2018
- Written comments and suggestions of the members of the of the NGT Committee received from time to time.

Some of the members of NGT Committee in meetings, held on 20-11-2017, 09-12-2017, 09-01-2018 and 22-05-2018, and also through e-mails as mentioned above, expressed their disagreement with the proposal of SHPs of more than 2 MW in BESZ, as the same is not permitted in the BESZ notification.

Thus honouring the spirit of notificatiion, views expressed by some of the expert members and also honouring the joint affidavit of MoEF&CC and MOWR&GD, GOI, Goverenment of Uttarakhand has not included any hydro project of more than 2MW in the plan, although it means sacrificing the investment potential of around Rs 739.96 crores and the sunk cost of about Rs. 90.16 crores. **For a small and juvenile state like Uttarakhand where other resources are very limited, surrendering this investment opportunity means a lot but Goverenment of Uttarakhand has decided to show a magnanimous gesture by honouring the provisions of BESZ notification and also to reiterate its commitment to conserve and maintain the ecology and sanctity of holy river Bhagirathi.**

Brief Summary of Zonal Master plan

Scientific studies of various National level institutes and special carrying capacity studies as enumerated in **"General Overview"** have been considered and incorporated to make the plan more inclusive and scientific in approach. The revised Zonal Master Plan has been divided into three parts:

- **Part 1** contains 12 chapters which extensively deals with the objective based present and future planning of various sectors in the area, in tune with the spirit of the BESZ notification as amended from time to time
- **Part 2** contains futuristic Physical and Financial plans of various sectors/departments for the next 5/10/15 years' time period.
- **Part 3** comprise up of the annexures including various relevant Government orders, National Green Tribunal orders, Government of India important meetings etc. It also contains a comprehensive **"Compliance Report"** as discussed in detail in the preceding section.

The Zonal Master Plan includes a detailed **"General overview"** of Physiography, Hydrology and Biodiversity in the area along with relevant digital maps. The **"Forest & wildlife"** Management with special emphasis to biodiversity conservation, Man Animal Conflicts with mitigation strategy, Van Panchayats, Right & Concessions of the local people and Forest fire control etc. has been incorporated as **Chapter 1** in the Zonal Master Plan.

Considering the fact that Gangotri Glacier as well as the Bhagirathi watershed which form the basis of the Bhagirathi Eco-sensitive Zone notification and also that the natural springs and water resources are very important part of Bhagirathi watershed. A separate chapter on **"Watershed Management"** has been incorporated as **Chapter -2**. The state of Glaciers report and water resource mapping including high altitude springs has been conducted and a financial plan has been chalked out accordingly.

Agriculture, being the primary source of livelihood in the area needs a policy intervention and proper planning to increase the farm productivity. The area being rich in Agri- Horticultural crops like Rajma, Apple, Finger millets etc. has been given due

importance in terms of future planning in **chapter 3** named "**Agriculture & Allied Activities".** The gradual change in the farming system from inorganic to organic is one of the objective of the plan.

More than 70 percent of the population of Bhagirathi Eco-sensitive Zone area lives in rural area and their proper rural infrastructure and welfare measures are important component of the Zonal Master Plan. Thus, **Chapter 4** on "**Rural Development"** has been included in the ZMP. The plan comprehensively deals with the present status of rural infrastructure and state & central welfare schemes being implemented in the area and the future prospectus of rural development with an objective to improve quality of life of the rural people and to reduce rural migration prevalent in the area.

The Bhagirathi Eco-sensitive Zone area has two urban bodies namely Nagar Palika Parishad Badahat and Nagar Panchayat Gangotri. The plan for "**Urban Development"** as **Chapter 5**, has been incorporated with an objective of proper recycling and disposal of solid & liquid waste, safe drinking water and effective town planning to facilitate quality Tourism and Pilgrimage in the area. The plan has been formulated in such a way so as to ensure proper disposal of solid and liquid waste, hazardous waste and biomedical waste as per existing norms and standards.

The area contains a total of 89 villages most of which depend upon agriculture as a primary source of income. 4631.01 hectare of area in Bhagirathi Eco-Sensitive zone constitutes total agriculture land out of which 443.433 hectare is irrigated area where as rest of the agricultural land is rainfed area. In spite of having a large number of streams/water resources in the area, only a small amount of water has been tapped for irrigation. Most of the agriculture area has been left by the villagers because of lack of a proper irrigation infrastructure which has led to gradual migration from most of the villages over a period of time. **Chapter 6** on **"Irrigation"** has been dedicated to this sector with an objective to develop irrigation infrastructure in the area and other disaster mitigation works related to river training, river bank protection etc.

The area has a lot of potential for clean and green energy. **Chapter 7** on **"Energy"** deals with the component of clean energy in the area. UREDA, UJVNL, UPCL & PTCUL are the agencies involved in the establishment, generation and supply of electricity from solar and hydropower projects.

A separate **Chapter 8** on "**Public Health and Sanitation"** has been incorporated to ensure Solid Liquid Waste Management and clean water supply to rural areas and to comply different Pollution Acts and related regulations and plans has been incorporated and strategy has been devised for proper implementations.

The area has great potential for tourism. **Chapter 9** on '**Tourism'** has been dedicated to this sector. The Plan for religious, cultural, adventurous and village tourism has been proposed based on the recommendation of the carrying capacity study conducted specially for the purpose of Zonal Master Plan. The trek routes in the area serve a lot of potential for adventure tourism.

There are about 16 villages in BESZ area which still lack road connectivity. The area is strategically important as it contains international border with China. Chapter 10 on "**Road Infrastructure and Communication Development"** extensively deals with the road projects related to rural connectivity and national security & Tele communication infrastructure in the area**.** The notification as amended in April 2018 prescribes road construction as per IRC specifications, with proper study of Environment impacts and taking appropriate mitigation measures. have been proposed in the chapter. Necessary guidelines taking due note of environmental impact, slope protection and land use changes have been included in the chapter in tune with the spirit of notification.

The area is prone to number of Natural disaster like Earthquake, flood, Landslides, Flash flood, Avalanche. The District Disaster Management Plan is a comprehensive Plan which shall be a reference document for the purpose of Zonal Master Plan.

IDENTIFICATION OF ACTIVITIES

The committee in its fourth meeting dated 02.05.2018 suggested following modifications/ improvements in the categorisation of different activities under Prohibited, Regulated and permitted categories with regard to the notification of Bhagirathi Eco-sensitive Zone as amended from time to time.

S. No.	Activity as notified in the BESZ by MoEF & CC.	Prohibited	Regulated	Permitted	Comments of the committee.
1.	Mining of minerals and stone quarrying and crushing (all types of mining of minor and major minerals) **Except for the domestic needs of bone fide local residents)**	Y			Mining (manual method) of river bed material for bona fide local use and Govt. projects should be kept under **regulated** category. River training activity should also be allowed under regulated category.
2.	River valley projects : Setting up of new hydro-electric power plants (Dams, tunneling and construction of reservoir) and expansion of existing plants. **(Except micro or mini hydel power projects)**	Y			As per the Notification
3.	Abstraction of river water for any industrial purpose	Y			Agreed as such
4.	Commercial felling of trees & setting up of any wood based industries **(Except for local activities and live hoods which include wood collection, cottage industries etc.)**	Y			Felling of trees to meet rights and concessions of the local people and extraction of dead, dry & fallen trees by Uttarakhand Forest Development Corporation (UKFDC) should be kept under **regulated** category.
	Setting up of new saw mills	Y			Agreed as such.
	Commercial use of fire wood	Y			Due to adverse topography and climate, commercial use of fire wood may be kept under **regulated** categories based on carrying capacity.
5.	Setting up of highly polluting industries and expansion of existing such industries.	Y			Agreed as such.
6.	Discharge of untreated sewage and industrial effluents.	Y			Agreed as such.
7.	Uses of plastic carry bags (in shops, commercial establishments, tourist spots etc.)	Y			Agreed as such.
8.	Establishment of Hazardous waste processing units	Y			Agreed as such.
9.	Extraction of ground water (for agriculture and domestic consumption by bona fide user)			Y	Amended vide notification S.O 1656 (E) dated 16 April 2018
10.	Non-commercial felling of trees (in private and other lands)		Y		Agreed as such.
11.	Sale of ground water for commercial purpose		Y		Agreed as such. Amended vide notification S.O 1656 (E) dated 16 April 2018
12.	Defense installations and any other infrastructure development related to national security		Y		Agreed as such. Amended vide notification S.O 1656 (E) dated 16 April 2018.
13.	Plantation of pine trees in the ESZ		Y		Agreed as such.

14.	Introduction of exotic species		Y		Introduction of exotic species in forest areas should be kept under regulated category. However, introduction of such species in agriculture and horticulture (to improve productivity) should be kept under **permitted** category.
15.	Establishment of Hotels and Resorts		Y		Agreed as such. However, **Home stays** will be treated under **permitted** category and **camping** under **regulated** category.
16.	Erection of electrical cables		Y		Agreed as such. Amended vide notification S.O 1656 (E) dated 16 April 2018
17.	Drastic change of agriculture System		Y		Since this point is not clear, hence it needs to be deleted.
18.	Sign boards and hoardings		Y		Erection of sign boards and hoardings in forest areas should be considered under regulated category. However, in other areas it may be considered under **permitted** category.
19.	Movement of vehicular traffic at night		Y		Agreed as such.
20.	Trekking between Gangotri and Gaumukh		Y		Agreed as such. Also, Eco-tourism/ adventure sport should be kept under **regulated** category.
21.	Protection of hill shopes and river banks		Y		Agreed as such.
22.	Rain water harvesting			Y	Agreed as such
23.	Organic Farming			Y	Agreed as such
24.	Use of green technology			Y	Agreed as such
25.	Walking tourism			Y	Agreed as such
26.	Development of Micro & Mini Hydel projects and solar energy for local use			Y	Agreed as such
27.	Establishment of local bio-resource based industries			Y	Agreed as such
28.	Widening of existing roads/construction of new roads		Y		Allowed only after detailed Environment impact assessment and appropriate mitigation measures. Amended vide notification S.O 1656 (E) dated 16 April 2018

Substantial efforts have been made to make the zonal master plan more realistic and scientific with due regards to environmental aspect in tune with the BESZ notification. The scientific studies and departmental plans coupled with satellite data interpretation has made the plan more inclusive. The procedure of revision, integration of different sectors and vision is clearly reflected in the Plan. The Plan is Dynamic and will evolve further with the gain of knowledge and experience.

The total financial outlay of Bhagirathi Eco sensitive zone is **1942.38282 Cr. (Rupees One Thousand Nine Hundred Forty Two Crores, Thirty Eight Lacs, Twenty Eight Thousand and Two Hundred)**. Moreover, appropriate support (financial and technical) would be needed from the Government of India in implementation of the Plan.

GENERAL OVERVIEW

INTRODUCTION

With spectacular hilly terrain, stunning natural beauty, ancient temples, swift rivers and lush greeneries, district Uttarkashi is one of the favorite tourist destinations. This place is a real paradise for adventure enthusiasts and sports lovers. Bugyals or "high altitude meadows" i.e.Dayara, Kandara, Gidara etc., Tals (lakes) i.e. Saattal, Dodital, Nachiketatal, Kedartal etc. and Gangotri National Park are also quite popular among different tourists. Gangotri, having the main temple of Ganga, the holiest river in the country, is one of the Chardham of Uttarakhand. Gaumukh Glacier is the physical source of Bhagirathi (Ganga) and is of great importance to the pilgrims. In the cold region of the Gangotri National Park ("Neelang Valley"), more than 450 species of vascular plants, 15 species of mammals and 150 species of birds have been recorded.

Considering the fact that, river Bhagirathi is rich in aquatic biodiversity and also continuous and phenomenal increase in human and cattle population; the anthropogenic pressure on ecosystems and environment in the region has tremendously increased, which is causing irreparable damage to the fragile mountain ecosystems including flow and character of the river Bhagirathi; therefore, in Exercise of the powers conferred by Sub-section (1) read with clause (v) and clause (xiv) of Sub-section (2) of section of the Environment (Protection) Act, 1986 (29 of 1986) and Sub-rule (3) of Rule 5 of the Environment (Protection) Rules, 1986, the Central Government has notified entire watershed of about 100 kilometers stretch of the river Bhagirathi from Gaumukh to Uttarkashi, covering an area of 4179.59 square kilometers, as the Eco-sensitive Zone, vide its notification No. S.O. 2930 (E), dated December 18, 2012.

The unique capabilities of satellite-data to provide comprehensive, synoptic and multi-temporal coverage of very large areas at regular interval and with quick

turnaround time has been very valuable in monitoring and managing natural resources. In fact, it is only the GIS technology, which has for the first time provided the basic information needed in the space, time and frequency domain. As such, the ESZ mapping on various parameters has been done and that has been provided by the Uttarakhand Space Application Centre (USAC), Dehra Dun based on satellite data interpretation using the provided ZMP (Zonal Master Plan/Master Zonal Plan) details. The Tools & Techniques used in the mapping is of national standards used for GIS database development. This comprises -

- Coordinate System : GCS/WGS – 84;
- Mapping Scale : 1:5000;
- Interpretation Techniques : Visual Interpretation Technique;
- Satellite Data Used : Resourcesat LISS IV- MX (5.8 M) (Sept.–Dec. 2015).

PRINCIPLE

- The basic principle of the Zonal Master Plan is to enhance productivity in the Bhagirathi eco-sensetive zone in a sustainable and equitable manner through participatory processes.

OBJECTIVES

- To ensure ecological and livelihoods security in the Bhagirathi Eco-sensitive Zone.
- To maintain the environmental flow and ecology of the river Bhagirathi from Gaumukh to Uttarkashi covering the entire watershed.
- To maintain a balance between conservation and development under the broad principles of sustainable development.

AREA OF BHAGIRATHI ECO-SENSITIVE ZONE :

The different broad-categories of areas in the Eco-sensitive Zone (ESZ) are given below in Table-1.

Table-1

S.No.	Description	Area (in sq.km.)
1	Reserve Forest Area (of Uttarkashi Forest Division)	1716.88
2	Protected Area (Gangotri National Park)	2390.02
3	Non-reserve Forest Area	72.66
	Total Area	**4179.56**

The density of forests varies. Figure-1 depicts Reserved Forest area in the ESZ and Figure-2 depicts the various densities of Forest in the region. The different densities of Forests have been defined as follows: -

(a) Very Dense Forest (VDF) - having canopy density of 70% and above;

(b) Moderately Dense Forest (MDF) - having canopy density between 40% to 70%;

(c) Open Forest (OF) – having canopy density between 10% to 40%;

(d) Scrub – having canopy density less than 10%.


RESERVED FOREST AREAS
BHAGIRATHI ESZ
LEGEND
HIMACHAL PRADESH
BHAGIRATHI ECO SENSITIVE ZONE
UTTARKASHI DISTRICT

Fig. 1

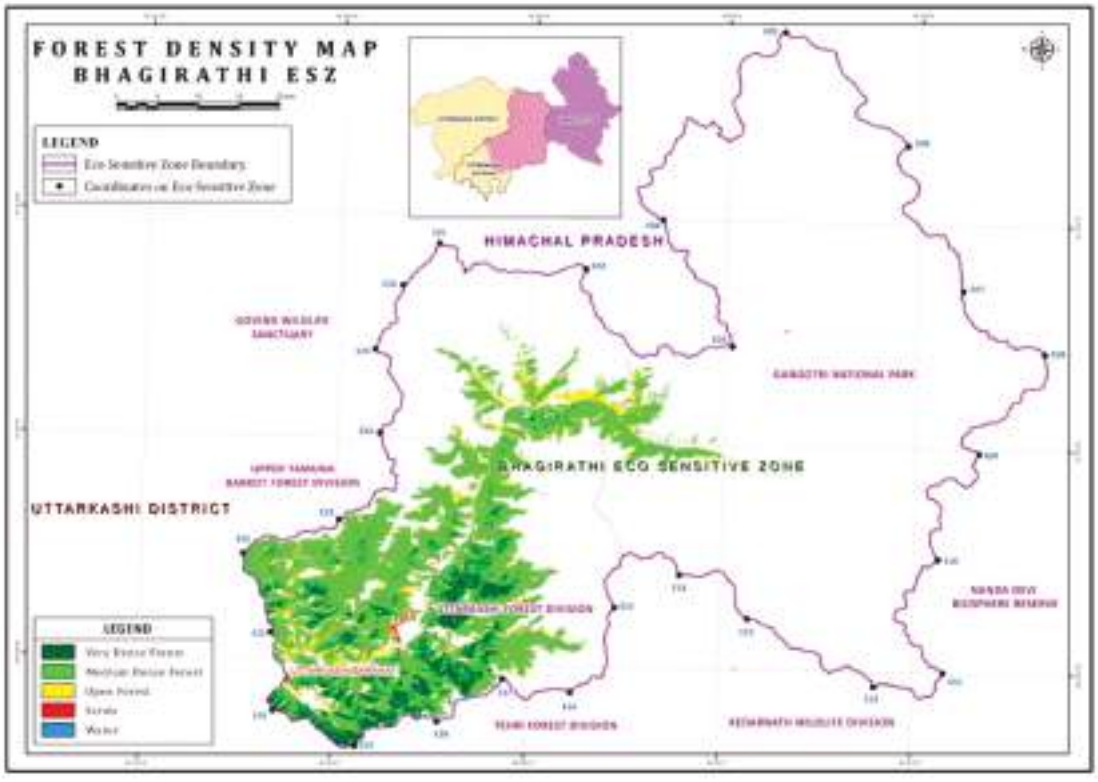

FOREST DENSITY MAP
BHAGIRATHI ESZ
LEGEND
HIMACHAL PRADESH
BHAGIRATHI ECO SENSITIVE ZONE
UTTARKASHI DISTRICT

Fig. 2

LIST OF VILLAGES IN BHAGIRATHI ECO-SENSITIVE ZONE

There are 89 villages falling in the **Eco-sensitive Zone** and the list of the sameis given below in Table-2.

Table-2

S.No.	Village / Town name	Elevation (m)	Area (ha)	S.No.	Village / Town name	Elevation (m)	Area (ha)
1	Agoda	2428	214.09	45	Kyark	2007	149.4
2	Aleth	1785	99.59	46	Ladari	1111	117.9
3	Bagori	2762	83.98	47	Lata	1536	163.08
4	BagyalGaon	1558	91.85	48	Malla	1727	96.97
5	Bandrani	1599	61.79	49	Mando	1220	139.95
6	Barsu	2154	144.6	50	Maneri	1519	95.63
7	Bayana	2003-	133.99	51	Manpur	1578	167.52
8	Bhangeli	2016	160.37	52	Mastari	1705	83.52
9	Bhancoli	2155	213.93	53	Mukhawa	2925	213.31
10	Bhatwari	1649	327.28	54	NaldaUrphBodhhar	1672	290.44
11	BhelaTipri	1639	63.18	55	Natin	2035	72.86
12	Bhukki	2436	96.52	56	Naugaon	2075	123.19
13	Bonga	1327	100.05	57	Nalang	4254	67.24
14	Bongari	1694	54.03	58	Netala	1277	290.7
15	Dandalka	2413	92.06	59	Nirakot	1615	153.97
16	Dansra	2640	68.99	60	Nesmor	2253	263
17	Dhanpur	1833	113.7	61	Ongee	1538	113.55
18	Dharali	2485	99.98	62	Pahi	2331	3.88
19	Dhwari	1799	94.33	63	Pala Maradi	1727	304.37
20	Didsari	1555	173.11	64	Pata	1338	80.93
21	Dovah	1744	305.77	65	Pilang	2040	122.42
22	Gajoli	1720	126.67	66	Purali	2460	155.07
23	Gangotri	3008	71.81	67	Raithal	1720	132.34
24	Gawana	1316	131.94	68	Said Urph Maja Gaon	1970	118.94
25	Gorshali	1962	183.29	69	Sanj	1579	176.77
26	Gyanja	1997	93.6	70	Salang	1794	158.21
27	Hinna	1455	256.56	71	Salu	1864	89.75
28	Hurri	2453 '	140.49	72	Sangralt	1812	51.26
29	Jadung	4373	72.00	73	Sara	1424	63.82
30	Jakhol	1927	101.78	74	Sarag	1328	61.68
31	Jamak	1428	203.4	75	Sari	1909	72.99
32	Jaspur	2649	134.58	76	Saura	1467	150.67
33	Jhala	2459	66.05	77	Seku	1905	217.58

S.No.	Village / Town name	Elevation (m)	Area (ha)	S.No.	Village / Town name	Elevation (m)	Area (ha)
34	Jodaw	2224	228.71	78	Silla	1766	111.6
35	Jokani	1718	54.53	79	Silyan	1509	55.47
36	Joshiyara	1423	217.91	80	Siror	1363	268.62
37	Kamar	1993	85.78	81	Sukki	2642	105.98
38	Kanath	1779	130.42	82	Sungar	1993	62.88
39	Kankrari	1764	60.91	83	Syawa	2145	88.25
40	Kishanpur	1725	154.5	84	Thalan	1481	87.34
41	Kotiyal Gaon	1454	162.52	85	Tehar	1884	150.24
42	Kumalti	1466	77.69	86	Tiloth	1099	60.4
43	Kunjan	2060	143.4	87	Uttarkashi	1241	N/A
44	Kuroli	1804	59.23	88	Uttron	1290	131.7
				89	Harshil*	2620	293.947

*Expert Committee at the level of MoEF&CC, GoI decided in its last meeting dated 31.08.2016, that village 'Harshil' should be included in the ESZ.

Total area of the ESZ comes to 4182.25 sq.km. (Including Harshil village).

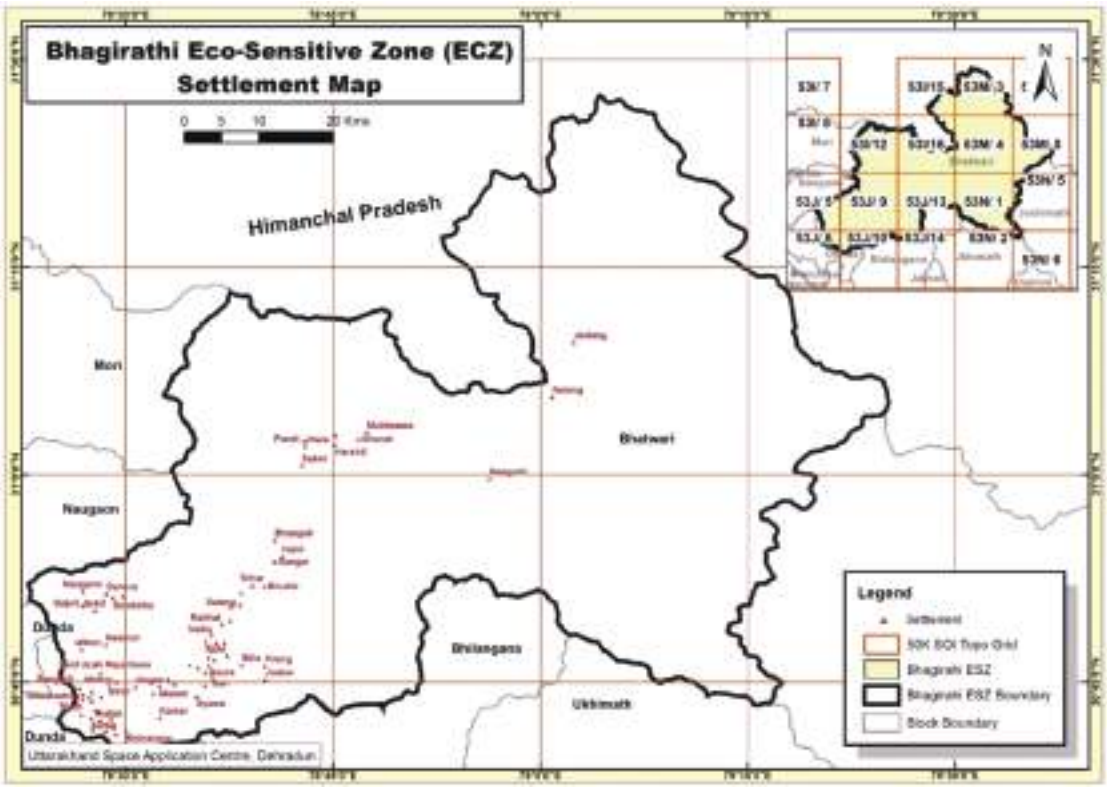


Fig. 3. Depicts the lay out of villages (including Harshil) in the ESZ .

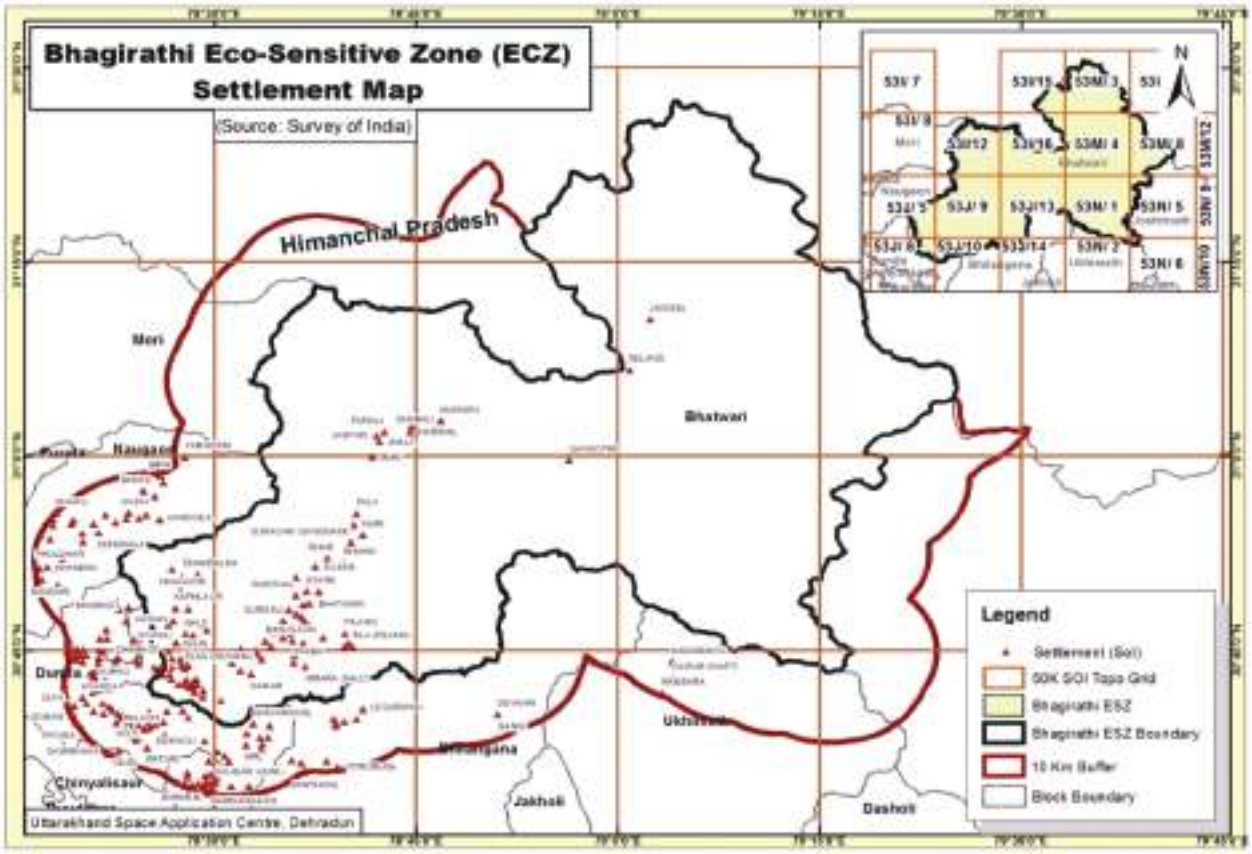


Fig. 4. Depicts the villages within the ESZ and 10 km beyond as per the Survey of India'stoposheet.

PHYSIOGRAPHY

The entire catchment of Bhagirathi from Gaumukh to Uttarkashi has been included in the ESZ. Located in the upper Himalaya, the notified area of the Bhagirathi Eco-sensitive Zone is an interwoven, interdependent fragile Ganga-Himalayan Basin. Geographically the area falls under the Garhwal Lesser Himalaya and Higher Himalaya.The Main Central Thrust (MCT) separates the Lesser Himalayan Formations from the overlying Higher Himalayan Munsiari group of rocks and Vaikrita Thrust separates the Munsiari Formation from the overlying Joshimath Formation.The thrust zones are highly crushed and show unstable slopes along the strike. Several minor irregularly oriented faults are also present. The degree of slope in the region ranges from gentle (16^0 to 25^0) to escarpment/cliff ($>45^0$).

A significant part of the Eco-senstive Zone lies in high to very high hazard landslide zone. After the recurrent disasters of 2012 and 2013, many old landslides have become active and many new landslides have come in to existence. Landslide Hazard Zonation Map of this area classifies most of the area under "High" to "Very High" hazard zones [GIS-based Landslide Hazard Zonation in the Bhagirathi (Ganga) Valley, Himalayas - int. j. remote sensing, 2002, vol. 23, no. 2, 357–369]. Among the various natural hazards, landslides are the most widespread and damaging. They cause loss of life and property, damage to natural resources (e.g. vegetation, land and soil) and hamper developmental projects like roads, bridges and communication lines, etc. Apart from this, lots of inconvenience is caused to the travelers by way of frequent disruption of road-network. It

has been estimated that, on average, the damage caused by landslides in the Himalayan range costs more than US$ 1 billion besides causing more than 200 deaths every year, which overall is considered as 30% of such types of losses occurring world-wide (Naithani 1999).

The Uttarakhand Earthquake Zonation Map (NDMA) indicates that the state is amongst the most seismically active states in the country. There are many parallel thrusts & faults in the state. The Main Central Thrust (MCT) falls right in the middle of the ESZ. "Uttarkashi district was hit by a strong earthquake in 1991 , with its epicenter at Agoda village in the Bhagirathi Eco-Sensitive Zone (BESZ), leading to loss of over 650 human lives, livestock and property."

HYDROLOGY

The water sources of the Himalayan terrain are of great significance. The upper reaches of the Himalaya are the recharge areas in the plains comprising Tarai & Bhabhar regions. Lying at the confluence of the Himalayaand the Indo-Gangetic basin, the Tarai & Bhabhar regions get the fertile alluvial silt from the waters coming from upper reaches and this enriches the fertility of the region.The major water bearing aquifers are quartzites and phyllites of Garwhal group.No pumptests are being carried out to know the aquifer parameters. Being a hilly terrain, the aquifers are discontionous. Realising the importance of water resources in the region, the study of local aquifers, streams and Tals based on GIS technology has been conducted for watershed management purpose and included in Chapter -2 "Watershed management". State of Glaciers report along with the guidelines has also been included. However, Site-specific micro hydrogeological studies are recommended for critical water bodies. The connectivity of ground and surface water needs to be studied in detail. Such studies shall help in further fine-tuning the management strategy in future.

Developmental projects like Hydroppower projects, Road cutting etc may have Irreversible impacts on the perennial aquifer sources in the region. Many road-cutting sites also cut into aquifer source thereby disturbing the overall balance tremendously. The ESZ terrains are part of an integrated and interconnected system. Preserving these terrains insitu is essential. Hydrogeological connectivity of the entire basin is very crucial and cannot be ignored. Hydrology of the ESZ is also directly linked to the well-being of flora and fauna in the region and thus it is an important and integral component of the entire ecology of the area that cannot be ignored. There fore such developmental projects shall assess the impact on local aquifers and special treatment plan for their watersheds be prepared and included in the overall cost of the project.

The Himalayan upper catchment of River Ganga, including the BESZ, is richly endowed with many tributaries and springs. Some of the important tributaries of Bhagirathi in the eco-sensitive zone are Kedar Ganga, Jadh Ganga, Kakora Gad,Jalandharigad Siyan Gad, Kanaujiya Gad, Pilang Gad,Asi Ganga etc.

Bhagirathi sometimes called Jahnvi or Devnadi is the largest tributary river of the **Ganges** (Ganga) in northern India. It is perennial in nature as it receives all the three types of water inputs i.e., snowmelt-runoff, rainfall-runoff and groundwater (Mane et al2005). However, the three components vary in space and time. The extent of human activities that influence the environment, particularly the freshwater has increased dramatically during the past few decades (Kulshrestha and Sharma, 2006; Khanna et al, 2006). The scale of socio-economic activities, urbanizations, industrial operations and agricultural production has a widespread impact on water resources. As a result, very complexinter-relationships between socio-economic factors and natural-hydrological & ecological conditions have developed [Pathak and Prasad (2014), Biotechnology International 7(3): 75-84].

The river Bhagirathi has formed a deep constricted V-shaped valley and indicates a youthful geomorphological stage of the region. Generally, the tributary streams are at a higher elevation (about 40–100 m) than the main river. Bhagirathi flows transverse to the structural axis of the Himalaya. It is fed mainly by small subsequent streams.

Gangotri Glacier is a large collection of glaciers. Glacier melting due to climate-change is a cause of much worry. Gangotri Glacier & the supporting glaciers are melting fast resulting in the formation of huge-lakes. In the last 3-4 years, it has been repeatedly reported that Gaumukh (the "mouth" of the glacier) has receded at an alarming rate. With the increase in the retreat of glaciers, more and more debris will accumulate. These para-glacial sediments are brought down with the rains during monsoons or in the case of a glacial lake outflow, and pose a big threat downstream. The sediments resulted in the 2013 flood-fury that occurred in the Kedarnath region of Uttarakhand.

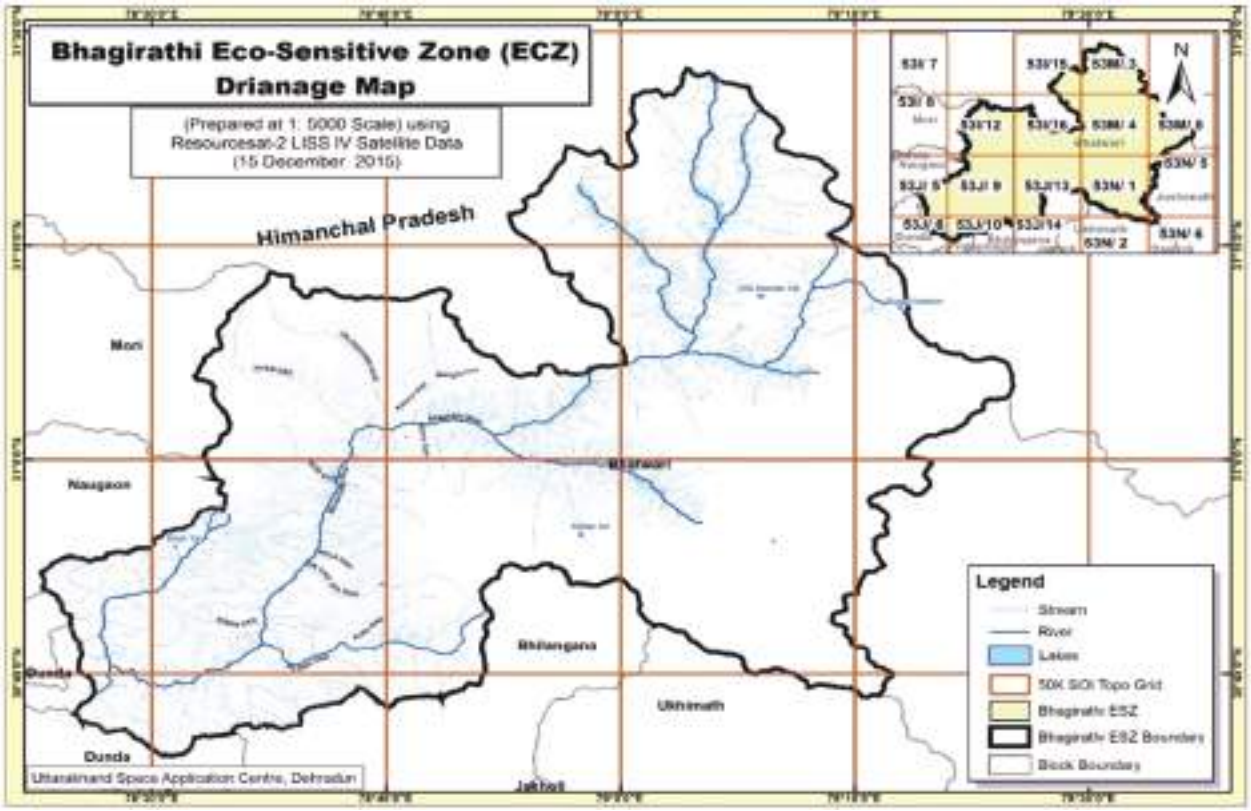


Fig. 5. Depicts the drainage in the ESZ.

Note : Drainage map of Bhagirathi Eco-Sensitive Zonehas been prepraed by using Resourcesat LISS IV satellite data of 15 December 2015 with reference to the Drainage Map of 50K and 10K. Total 2 classes comprising River and Streams have been depicted.

LAND USE AND DEMOGRAPHY

The population in the ESZ is 66,680 with a density of 41 persons/sq.km. this is very low as compared to the national average of 382 persons/sq.km. There are 88 villages notified in the ESZ. One more village in the name of *Harshil* has to be included in the ESZ as per the directives of GoI. Some of the villages have no population because of migration. There is a demographic vacuum in the area near international border.

Fig. 6. Depicts watershed details in ESZ.

The main occupation of people in the region is Agriculture, though the area available for this is about 1.25% of the geographical area of the ESZ. Most of the area lies under "snow/glacier" and "wasteland". Area estimates of Land Use/Land Cover (LU/LC) of Bhagirathi ESZ as per the Satellite data interpretation is as given in **Table-3.**

Table-3

LU/LC Class	Area (Km²)	Area (%)
Settlement	4.79	0.11
Agriculture	52.24	1.25
Forest	566.03	13.54
Grassland	74.27	1.78
Wastelands	1016.74	24.33
Waterbodies	13.18	0.32
Snow/Glacier	2451.75	58.67
Total	**4179.00**	**100**

Note: 1. The above classes have been derived as per the Satellite data interpretation, therefore the data may vary for some classes.

2. Actual Agricultural area as per revenue record is 4827.274 Hectare.

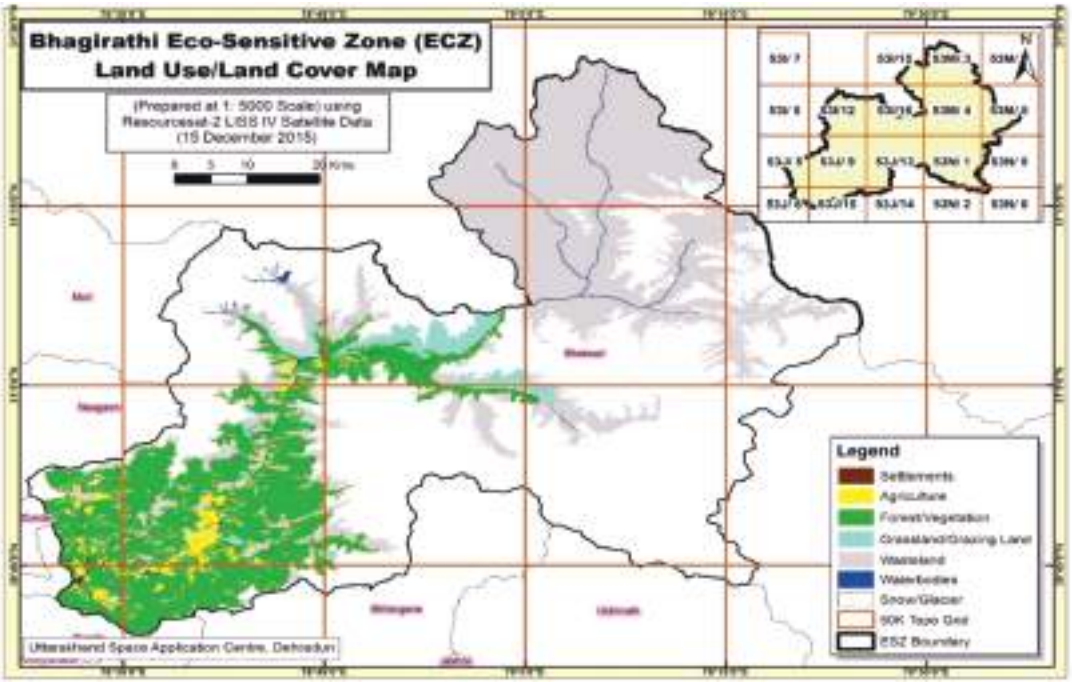


Fig. 7. Depicts the land use pattern in the region.

Note : Land use/land cover map generated for entire Bhagirathi Eco-Sensitive Zone area along with 10 Km buffer zone using Resources at LISS IV satellite data of 15 December 2015 with reference to multi-temporal LULC of 50K (2011-12) and LULC of 10K (2011).

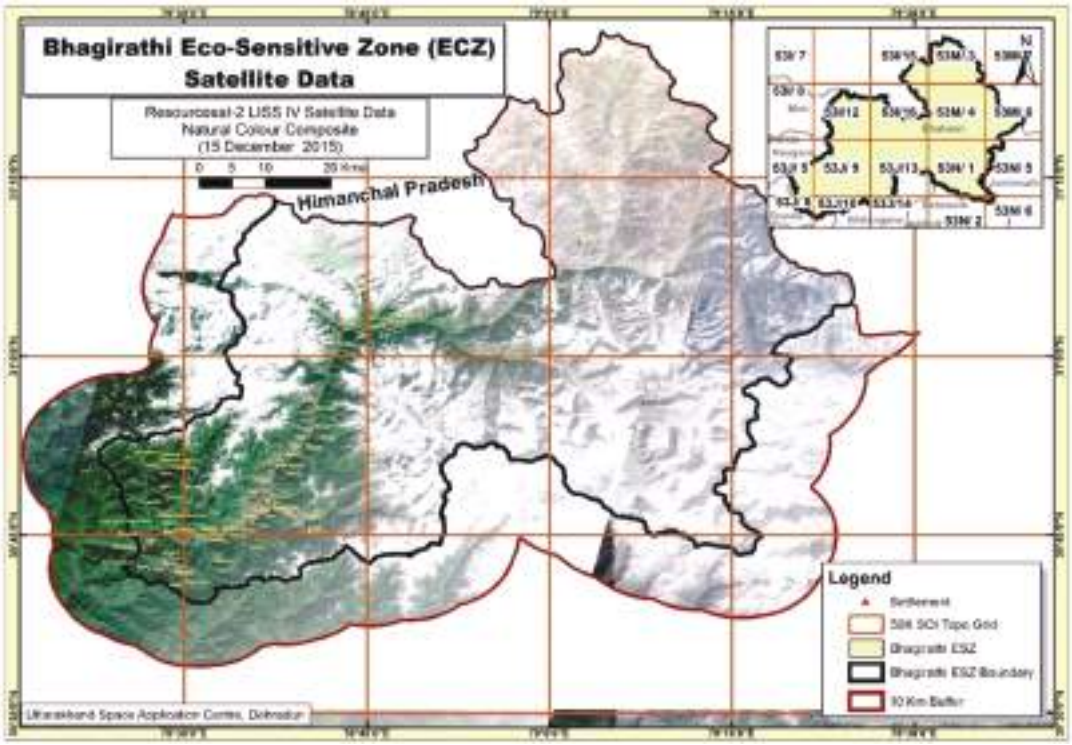


Fig. 8. Depicts the Natural Colour Composite.

Fig. 9. Boundry of ESZ respectively on Survey of India toposheet.

Addresal of the suggestions of the 21st Expert Committee of MoEF &CC dated 31st august 2016.

Table-4 gives the details of the decisions taken at the level of the Expert Committee, GoI and its compliance.

S.N.	Para/Sub-para of the Minutes of the meeting	Comments of Expert Committee	Addressal
1	4.2	The ZMP has mainly complied the existing programmes and regular activities of respective departments. The Master Plan should go beyond the existing activities and future requirments over a time scale (of 5/10/15 years)	A Future plan based on clearly defined objectives in tune with the essence of the notification for 10/15 years time scale has been prepared.
2	4.3(i)	MoEF&CC based upon Cumulative Impact Assessment Study could consider approval of 10 HEPs of a total combined capacity of 82.3 MW (which were approved prior to notification of ESZ). In addition, the views of MoWR, RD and GR would also be obtained. Carrying-capacity Study for the proposed 10 HEPs needs to be initiated immediately by the State Govt.	The Cumulative Impact Assessment Study has been done and the report has been submitted to the MoEF & CC. However the present plan does not include any proposal of Hydro Power Projects of more than 2MW capacity. Carrying capacity study for 10 HEPs has been conducted by IIT Roorkee.
3	4.3(ii)	20^0 for "Steep Hill Slopes" as mentioned in Para-16 of the Bhagirathi ESZ Notification will be replaced as per the definition of "Steep Hill Slopes" in BIS IS Code No. 14496 (Part-2) 1998.	The clause 16 in para 2 of the notification has been amended accordingly by MoEF & CC, GoI amendment notification dated 16.04.2018.
4	4.3 (iii)	Change of land use from "green" to "non-green" and use of land from "tribal" uses to "non-tribal" uses may be permitted in a strictly limited way with the priror approval of the Chief Secretary.	The para 2 (12) has been amended accordingly by MoEF & CC, GoI amendment notification dated 16.04.2018.
5	4.3 (iv)	High Flood Line areas should be properly regulated based on Scientific Impact Assessment Studies and with Flood Plain Zoning Study.	Relevent provisions have been included in chapter 6 under "Irrigation"

S.N.	Para/Sub-para of the Minutes of the meeting	Comments of Expert Committee	Addressal
6	4.3 (vi)	Village Harshil is to be included.	It has been proposed accordingly. Notification will have to be amended accordingly.
7	4.4	Road construction, slope stabilization and treatment measures for slope and toe stability to go concurrently.	Provisions have been included in chapter 10 "Road Infrastructure Development"
8	4.5	Man-Animal conflict to be addressed by way of Wildlife Management Plans and Stratigies including increase in "Prey Base" and maintaining wildlife corridors.	The ESZ has very low population density and consequently quite less cases of Man-animal conflicts. However, due consideration has been given on this aspect in chapter 1 "Forest & wildlife"
9	4.6	Species restoration and rejuvenation to be done. A chapter on aquatic and terrestrial species and their spatial distribution in the region to be incorporated. Bio-diversity Management Plan is required and cultivation of medicinal plants emphasized.	Provisions have been incorporated in chapter 1 "Forest & wildlife"
10	4.7	River Bed Mining (RBM) up to a depth of 2 m could be allowed for meeting local needs.	The Notification of the ESZ may require amendment to include this provision. It is important that RBM may be allowed up to the limit of carrying-capacity of the area for all the limited/ permitted developmental activities in the region by different Govt. agencies as importing material from else where would not only be prohibitive in terms of cost but also its transportation would ensue lot of air pollution.
11	4.8	Sanitation and Solid Waste Management need to be addressed and synergized with NamamiGange project.	A separate chapter on "public Health and Sanitation" has been incorporated.
12	4.9	Continuous Geological Monitoring and GIS mapping would be integrated.	Continuous Geological Monitoring would be ensured once the monitoring station is commissioned. GIS mapping of the area has been done in respect to important parameters. A separate chapter on Watershed management based on GIS technology has been included.GIS mapping for important water resources has been done. Appropriate maps have been included in this plan.
13	4.10	Comprehensive Plan for Disaster Preparedness and Management based on vulnerability is required. Guidelines on materials and housing design, resilient to disasters should be prepared and used.	A separate chapter on Disiaster Management has been incorporated.
14	4.11	Plantation of Pine trees to be discouraged. Local communities to be involved under MNEREGA to collect fallen pine needles to prevent forest fires.	Plantation of Pine trees has been stopped in Uttarakhand. The necessary provision has been incorporated in executive summary. Provision for local communities to collect fallen pine needles has been made.
15	4.12	CD and coloured maps of the ZMP to be provided.	Coloured maps on desired parameters have been included.
16	5	Plan should be futuristic in approach (15 years), proper addressal of Man-Animal conflict and "Skill India Programme" to be integrated. Information dissemination, Awareness, Education and Communication also to be included. Carrying-capacity Study for hydro power projects to be commissioned by the State Govt	Provisions have been made accordingly. Due consideration has been given on Man-animal conflict aspect. Carrying capacity study for 10 HEPs has been conducted by IIT Roorkee.

S.N.	Para/Sub-para of the Minutes of the meeting	Comments of Expert Committee	Addressal
		Evalution and Monitoring activities to be taken up.	A 12 members monitoring committee under the chairmanship of Chief Secretary, Government of Uttarakhand 2018 has been reconstituted vide MoEF & CC GoI Office Memorandum no. 25/3.2010-RE-ESZ dated April 05, for a period of 3 year or till its reconstitution. (Annexure 3)

The new zonal master plan prepared by the nine-member committee constituted by Hon'ble NGT has been prepared after undergoing detailed discussions and deliberations with the stake holders, concerned departments and subject experts. The committee has examined and incorporated almost all the suggestions raised by MoWR, RD & GR and MoEF & CC, Government of India, in its joint affidavit dated 21.12.2016 in OA 151 of 2013 and OA 51 of 2015 in Hon'ble National Green Tribunal, various orders of Hon'ble National Green Tribunal in OA 151 of 2013 and OA 51 of 2015, recommendations of the 21st and 28th expert committee of MoEF & CC GoI etc. GIS technology has been used for ESZ mapping on various parameters, including watershed management, based on satellite data interpretation. The plan has been prepared on the basis of Specific carrying capacity studies conducted for the purpose and scientific studies/ reports obtained from the national level research institutes. A brief summary of the studies/ reports is as follows.

- State of Glaciers in the Bhagirathi Eco-sensitive Zone: Wadia Insitute of Himalayan Geology, Dehradun with inputs from National Instiute of Hydrology, Rorkee.)
- A report named "Soil Erosion in Uttarakhand" published jointly by National Bureau of Soil Survey and Land use Planning & Central Soil and water Conservations Research and Training Institute Dehradun was considered and important recommendations were incorporated in Chapter-2.
- Working plan of Uttarkashi Forest Division (2016-17 to 2025-26) approved by MoEF & CC, GOI
- Management Plan of Gangotri National Park (2012-13 to 2021-22)
- Water shed management plan based on field data collected by forest department and GIS based planning.
- Gram panchayat development plan, BADP plan and MNREGA Plan
- A report on "Carrying capacity studyin respect of Hydro power projectsin Bhagirathi Eco-sensitive zone": Alternate hydro energy centre, IIT, Rorkee
- 'Toursim carrying capacity of existing and potential destinations for planning for infrastructure developments in Uttarakhand'; by JPS Associates (P) Ltd.
- Dr Shivansh kimothi report dated 05.05 2016 on cross slope consideration in Bhagirathi Eco-sensitive zone.
- Bearau of Indian standards (BIS) code no.-14496 (part-2)1998.
- Indian Road Congress- 73 (Geometric design standards for rural highways) sub-clause 4.
- District Disaster Management Action Plan of district Uttarkashi

The Total Financial Outlay of Zonal Master Plan of Bhagirathi Eco Sensitive Zone is 1942.38282 Cr. (Rupees One Thousand Nine Hundred Forty Two Crores, Thirty Eight Lacs, Twenty Eight Thousand and Two Hundred only).

However considerable support (financial and technical) would be needed from the GoI to implement the Plan.Annual Work Plans will be made in detail, based on the ZMP and accordingly implementation in the field would take place. The ZMP is dynamic and it will be further evolved with experience and advancement in knowledge.

It is hoped that the implementation of the Zonal Master Plan will usher in a new era of high ecological-integrity of the pristine river *Bhagirathi* with active and willing participation of local communities and government agencies!

1 CHAPTER

FOREST AND WILDLIFE

1 CHAPTER

FOREST AND WILDLIFE

INTRODUCTION

The state of Uttarakhand is endowed with rich biodiversity and contains some of the most important species of plants and animals found in the Himalayas. Uttarkashi district contains about 86 % of the forest area with two important National parks i.e Gangotri National Park and Govind National Park. The Bhagirathi Eco-sensitive Zone with a total area of 4179.55 sq. km from Gaumukh to Uttarkashi is rich in endemic species of plants and animals. The Gangotri National Park in the Upper Himalayan is abode to some of the most important species of wild animals like Snow Leopard, Brown Bear, Musk Deer, Monal Pheasant etc, making the area most important for protection purpose. In addition to it, the forests of Bhagirathi Eco-sensitive Zone are rich in indigenous plant species like Deodar, Kail, Fir, Spruce, Rhododendrons Taxus baccata, Bhojpatra etc. The area contains a number of important Glaciers including Gangotri, the origin of river Bhagirathi. A large number of streams, which in turn originate from different Glaciers, feed Bhagirathi River all along its length from Gaumukh to Uttarkashi. Thus, the conservation and management of entire watershed of Bhagirathi in the area is very important to maintain the pristine flow of the river and sustainability of this ecosystem. Alpine Pastures/Bugyals in the area are rich in indigenous species of flora and fauna and a site of attraction for tourists also. In addition to it, high altitude springs (Tals) are also unique with rich species composition and potiential sites for tourism also. Their protection and management is very important for the conservation of endemic gene pool.

The villages located in the Bhagirathi Eco-sensitive Zone are very important for the protection and management of forest ecosystem and therefore due consideration in terms of rights and concession as per applicable norms has been provided in the Working Plan. In addition to it, the prevelance of Van Panchayat in the area also strengthens the local level institutional participation in the management of forest and wildlife.

An area of 4106.9 Sq.km (98.27%) Eco-sensitive Zone is reserved forest and/or protected is under the management of forest department i.e Uttarkashi Forest Division (41.80%) and Gangotri National Park (58.19%). The total area under van panchayat is 729.78 hectares. The forest area under Uttarkashi Forest Division from Gangotri to Uttarkashi is managed as per the Prescription of Working Plan whereas the area above Gangotri is managed as per the management plan of Gangotri National Park. The current working plan of Uttarkashi Forest Division (2016-17 to 2025-2026) has been approved by MoEF & CC, Government of India. The current management plan of Gangotri National Park, duly approved by the Chief Wildlife Warden, Uttarakhand is from 2012-13 to 2021-22.

VISION & OBJECTIVES

(1) Protection and conservation of rich bio-diversity of Bhagirathi Eco system including the endemic species of both flora and fauna.

(2) Protection and management of important areas like bugyals, Tals etc.

(3) Maintain and preserve the ambience of wild and pristine Himalayan Forests.

(4) To promote the involvement of local people in forest protection by providing rights and concessions and livelihood opportunities.

CLAUSES RELATED TO FOREST AND WILDLIFE

The following clauses of the notification deals with the different aspects of Forest and Wildlife. The brief summary of various clauses along with the necessary actions incorporated in this chapter have been briefly described as follows:

S.No.	Clause	Content of the clause	Provisions Incorporated
1.	2(4)	The Zonal Master Plan shall provide for restoration of denuded areas, conservation of existing water bodies, management of catchment areas, watershed management, groundwater management, soil and moisture conservation, needs of local community and such other aspects of the ecology and environment that need attention.	The present chapter contains provision for restoration of denuded Areas by means of Plantation and ANR activities. Conservation of Water bodies, watershed management etc has been dealt in detail in Chapter 2 under 'Watershed Management'. Needs of the local communities in terms of Rights and Concessions have been dealt in detail in this chapter. In totality, due importance has been given to the conservation of various aspects of Forest and Wildlife and Biodeversity conservation.
2.	2(6)	The Zonal Master Plan shall demarcate all the existing village settlements, types and kinds of forests, agricultural areas, fertile lands, green areas, horticultural areas, orchards, lakes and other water bodies.	Forest types, lakes, water bodies etc have been covered in detail in this chapter.
3.	2(8)	The Zonal Master Plan shall regulate the development in the eco-sensitive zone to meet the requirement of local people without affecting the rights and privileges of the bona-fide residents and ensure eco friendly development for their livelihood security.	Rights and Concessions of all the villages shall remain as such and have been covered in detail in the chapter.

S.No.	Clause	Content of the clause	Provisions Incorporated
4.	2(10)	The Zonal Master Plan sllall encourage development of walking paths for tourism, pilgrimage and local use.	The development of walking paths and its financial plan has been covered in this chapter and chapter 9 on Tourism.
5.	2(14)	There shall be no consequential reduction in the Green area such as forest area, agricultural area, etc.	The chapter has covered the necessary regulations on ban on green felling in Forest area and else where.
6.	2(20)	Natural Heritage.- The sites of valuable natural heritage in the eco sensitive zone shall be identified, particularly scenic beauty, confluence points of river, waterfalls, pools, springs, gorges, groves, caves, open areas, wooded areas, points, walks, rides, bridle paths etc. and plans for their conservation in their natural setting shall be incorporated in the Zonal Master Plan. All the gene pool reserve areas in the eco-sensitive zone shall be preserved. The State Government shall draw up proper plan for their protection and conservation within one year from the date of publication of this notification. These plans shall form a part of the Zonal, Master Plan. Guidelines and regulations shall be drawn up by the State Government to regulate building and other activities around the heritage structures so that the special character and distinct ambience of the heritage site and area are maintained.	The natural heritages sites like Bhugyals, Lakes, other aquifers, bridle paths, Trek routes, Forest types, etc have been identified and necessary provisions have been prescribed in this chapter along with Chapter 2 Watershed Management"and Chapter 9 "Tourism". Necessary guidelines have been incorporated for the protection of Gene rich areas like Bhugyals, lakes, Streams, etc.
Prohibited activities			
7.	3a(iii)	Mining of minerals and stone quarrying and crushing: All types of mining (minor and major minerals), stone quarrying and crushing except. for the domestic needs of bonafide local residents. The limited mining, stone quarrying and crushing shall be based on site evaluation, provided that such activities are not done on existing steep hill slopes or areas with high degree of erosion, spring lines, ground water recharge areas. The Monitoring Committee shall be the authority to grant such special permission.	Any type of mining (Minor or Major) is prohibited in Reserve Forest Area and protected area of Gangotri National park.
8.	3a(iv)	Commercial felling of trees: Commercial felling of trees and setting up of any wood based industry in the eco-sensitive zone, except local activities and livelihoods, which include wood collection, cottage industry like bamboo basket subject to consent of the gram sabha and all other requisite clearances.	Commercial felling of green trees is prohibited inside the forest area as per the regulations discussed in the chapter. However Regulated removal of dry and dead trees is permitted as discussed under the relevant section in this chapter.
9.	3a(v)	Setting up of new saw mills	Setting up of new Saw mills is prohibited in the area.
10.	3a(vi)	Commercial use of firewood	Commercial use of Firewood is not permitted in the area.

S.No.	Clause	Content of the clause	Provisions Incorporated
Regulated activities			
11.	3b(ii)	Trees : There shall be no felling of trees either on forest, government, revenue or private lands, without the prior permission of the State Government in case of forest land, and the respective District Collector in case of Government, revenue and private land, granted in such a manner as may be laid down by the State Government.	The felling of green trees for developmental works shall be done as per the provisions of Forest Conservation Act 1980. The trees outside reserve forest area shall be removed as per the provisions of Uttar Pradesh protection of Trees in Rural and Hill areas act, 1976.
12.	3b(iv)	The plantation of pine trees in the eco-sensitive zone	The plantation of Chir pine has been prohibited in Uttarakhand by Forest department.
13.	3b(v)	Introduction of exotic species	Regulated as per the plantation policy 2005.
14.	3b(xvii)	Trekking between Gangotri and Gaumukh	Regulated as discussed in chapter 9 under "Tourism".
Promoted activities			
15.	3c(iv)	Walking tourism	Trek routes and necessary guidelines discussed in chapter 9 under Tourism

FOREST TYPES, FLORA AND FAUNA

Forest Types

The forest area in Bhagirathi eco-sensitive zone stretches from the low-lying valleys to the limit of tree growth on the slopes of the lofty ranges of the Himalayas separating Uttarkashi Forest Division and Gangotri National Park from Tibet. They present a large variety of different features and a great diversity of climate and vegetation. These forests have been classified according to Champion & Seth classification as shown below. The list of Flora and Fauna has been Annexed **(Annexure-29).**

Uttarkashi Forest Division

S.N.	Forest Type	According to Champion & Seth	Area (in Hec)
Group 9] Sub Tropical Pine Forest			
2	$9/C_{1b}$	Sub Tropical Himalayan Chir Pine forest	33724-04
3	$9/C_{1/ds-2}$	Sub Tropical Euphorbia scrub	Included in main type
Group&12] Himalayan Moist Temperate Forest			
4	$12/C_{1a}$	Ban oak forests (*Quercus leucotrichophora*	24308-30
5	$12/C_{1b}$	Moru oak forests (*Quercus delitata)*	1284-06
6	$12/C_{1c}$	Moist deodar forests	2045-48
7	$12/C_{1d}$	Western mixed coniferus forests	8185-72
8	$12/C_{1e}$	Moist temperate deciduous forests	4681-00
9	$12/C_{1/ds-2}$	Himalayan temperate secondry scrub	222-58
10	$12/C_{2a}$	Kharsu oak forests	14471-75
11	$12/C_{2b}$	West Himalayan upper oak forests	1619-06
12	12/ds-1	Mountain Bamboo breaks	2736-49
13	12/ds-2	Himalayan temperate park land	Included in main type
14	12/ds-3	Himalayan temperate pasture	Included in alpine pasture area

S.N.	Forest Type	According to Champion & Seth	Area (in Hec)
15	$12/E_1$	Cyprus forests	59-10
16	12/IS-1	Alnus forests	123-63
17	12/2S-1	Low level blue pine forests	3019-02
Group&13] Himalayan Dry Temperate Forest			
18	$13/C_{2b}$	Dry Deodar forests	114-5
Group&14] Sub-Tropical Alpine Forest			
19	14/2S-1	Sub alpine Blue pine forests	206-27
Group&15] Moist Alpine Scrub			
20	$15/C_1$	Rhododendron scrub forests	6967-07
21	$15/C_3$	Alpine pasture	53197-1
22	$15/E_1$	Dwarf Rhododendron scrub forests	-
23	$15/E_2$	Dwarf junior scrub	-
Group&16] Dry Alpine Scrub			
24	$16/C_1$	Dry Alpine scrub	Included in alpine pasture area

Gangotri National Park

Group&12] Himalayan Moist Temperate Forest			
1	$12/C_{1c}$	Moist deodar forests	299-40
2	$12/C_{1d}$	Western mixed coniferus forests	210-10
3	$12/C_{1e}$	Moist temperate deciduous forests	152-05
4	$12/C_{1/s-2}$	Himalayan temperate secondry scrub	85-95
5	12/ds-2	Himalayan temperate park land	Included in main type
6	12/ds-3	Himalayan temperate pasture	Included in alpine pasture area
7	$12/E_1$	Cyprus forests	13-08
8	12/IS-1	Alnus forests	8-02
9	12/IS-2	Reverian blue pine forests	63-25
10	12/2S-1	Low level blue pine forests	72-90
Group&13] Himalayan Dry Temperate Forest			
11	$13/C_{2b}$	Dry Deodar forests	163-60
Group&14] Sub-Tropical Alpine Forest			
12	14/2S-1	Sub alpine Blue pine forests	100-25
Group&15] Moist Alpine Scrub			
13	$15/C_1$	Birch/Rhododendron scrub forests	1]370-50
14	$15/C_3$	Alpine Pasture	26]637-50
15	$15/E_1$	Dwarf Rhododendron scrub forests	&
16	$15/E_2$	Dwarf juniper scrub	33-20
Group&16] Dry Alpine Scrub			
17	$16/C_1$	Dry Alpine scrub	Included in alpine pasture area

WILDLIFE IN BHAGIRATHI ECO-SENSITIVE ZONE

There are many endangered species present in the eco-sensitive zone. The area of eco-sensitive zone adjoins with Govind National Park and Kedarnath Musk Dear Sanctuary that has an important role in conservation and protection of endangered wildlife species. Major mammal, avifauna and butterfly species are as under:

(i) Mammals

Snow Leopard (*Uncia uncia*) : It is found between 3000-5500 m altitudes. It follows general downward migration of herbivores during winter but hardly comes below the tree line. Size 100-130cm.

Leopard (*Panthera pardus*): Manages to co-exist with tigers by hauling the carcasses up the trees in the foothills but in higher hills it dominates amongst the carnivores. It is found till 3500 m altitude. Size 185-215cm.

Asiatic Black Bear (*Ursus thibetanus*): It inhabits the forested hills of the area. It exhibits seasonal altitudinal migration. Size 90-115cm.

Himalayan Brown Bear (*Ursus arctos issabellinus*): It is found in open peaks above the tree line of the area. Size up to 245cm.

Musk Deer (*Moschus chrysogaster*): It is generally found above 2700m. altitude on precipitous rocky slopes in Birch, Rhododendron forests intermixed with Alpine Pastures. It does move downwards during winter. Height at shoulder- 50cm.

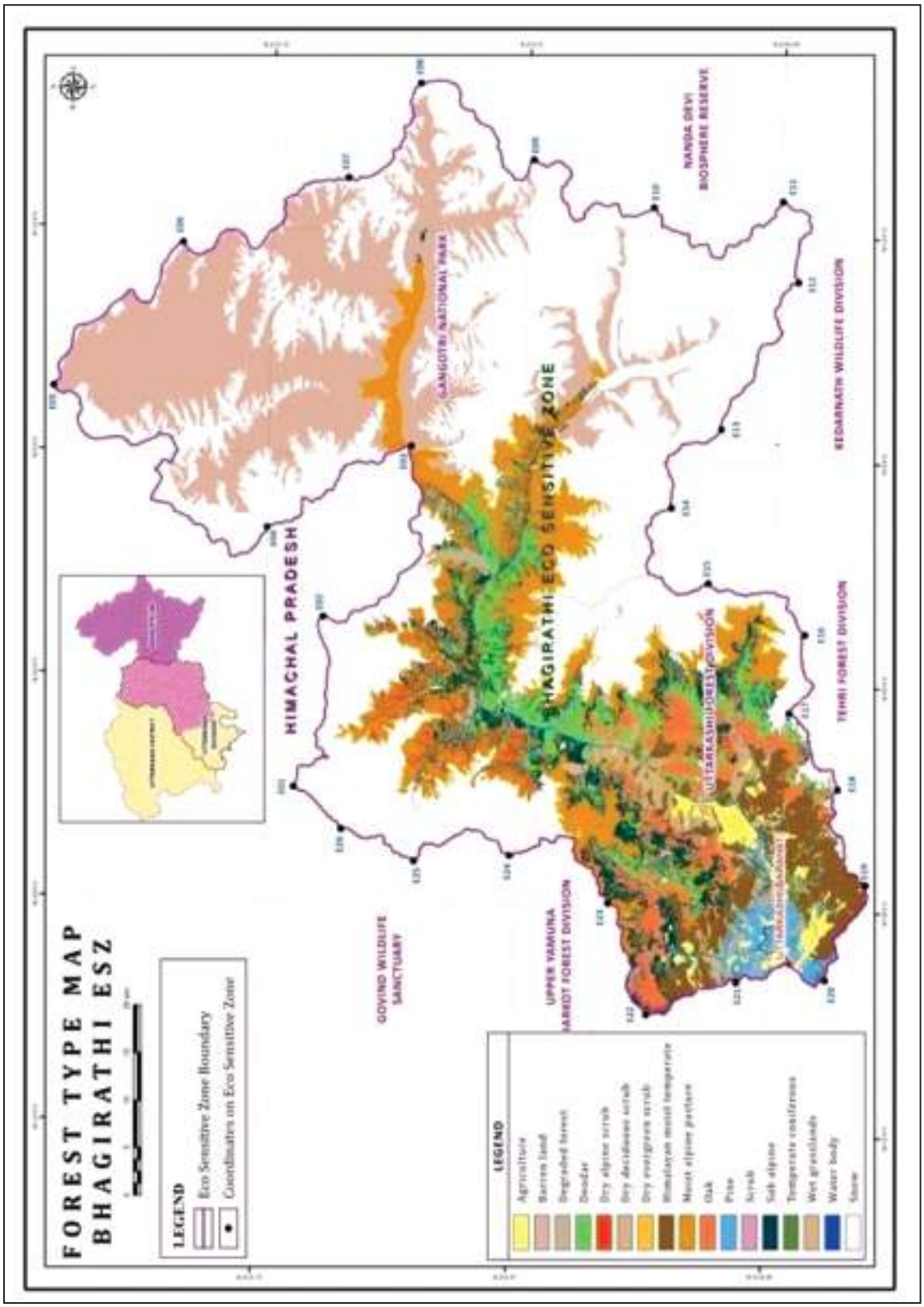
Bharal (*Pseudois nayaur*): The Blue Sheep or Bharal lives in slate-blue shale country and has a light blueish coat to match. Gregarious in nature, it is found between 3500 to 5500 m. Size 80-90cm.

Himalayan Thar (*Hemitragus jemlahicus*) : It is a deep copper-brown coloured mountain goat which is found on precipitous rocky slopes between 2500 to 4400 m. Size 80-100cm.

The Serow (*Capicornis thar*): It has a goat like body with long donkey like ears and found between 1800 to 3000m in steep valleys.

Red Fox (*Vulpes vulpes*): It is found between 1800 to 3000 m in steep valleys. Size 46-70cm.

Yellow-Throated Marten (*Martes flavigula*): Observed at river side and most forests in the sub-tropical and temperate zone in the area.


FOREST TYPE MAP
BHAGIRATHI ESZ
LEGEND
Eco Sensitive Zone Boundary
Coordinates on Eco Sensitive Zone
LEGEND
Agriculture
Barren land
Degraded forest
Deodar
Dry alpine scrub
Dry deciduous scrub
Dry evergreen scrub
Himalayan moist temperate
Moist alpine pasture
Oak
Pine
Scrub
Sub alpine
Temperate coniferous
Wet grasslands
Water body
Snow
HIMACHAL PRADESH
GANGOTRI NATIONAL PARK
NANDA DEVI BIOSPHERE RESERVE
BHAGIRATHI ECO SENSITIVE ZONE
KEDARNATH WILDLIFE DIVISION
TEHRI FOREST DIVISION
UTTARKASHI FOREST DIVISION
GOVIND WILDLIFE SANCTUARY
UPPER YAMUNA HARSIDT FOREST DIVISION

Royale's Pika (*Ochotona roylei*): It is most common pika of the Himalayas. It has a rufous grey body and a chestnut head. It does not burrow but moves underground through existing burrow system in rocky and screw slopes.

(ii) Birds

Monal Pheasant (*Lophophorus impejanus*): It is a beautiful bird with a short tail. It frequents Kharsu, birch and fir forests and comes down to upper deodar forest in winter. The head is metallic green, upper parts are purple and the breast is black with a cinnamon coloured tail. Its call is whistling chuckle that it utters when it is alarmed.

The Himalayan Snowcock (*Tetrogallus himalayensis*): This is a large bird with mixed grey, chestnut and black floorage. It is found above the tree limit and the snow line. It likes rocky areas and also frequents alpine pastures in search of tubers and shoots of grass. It is a shy bird and lives in small groups.

Bearded Vulture (*Gypaetus barbatus*) : It hardly comes below 2200 m. It can be sighted in Gangotri & Gartang blocks of the Protected Area.

Snow Partridge (*Lerwa lerwa*) : It is found between the altitudinal ranges 2500-5000m. It was sighted at Nelapani and Tapovan area.

Snow Pigeon (*Columba leuconota*) : It is found at the altitudinal range 1500-5000m. It was sighted at Nandanvan, Arva Tal, Sonam, Jadung, KedarTal area of P.A.

Yellow-Billed Chough (*Pyrrhocorax graculus digitatus*) : It is a resident and altitudinal migrant found at an altitude 1800-5000m and sighted at Tapovan & near Seta glacier area of P.A.

Red Billed Chough (*Pyrrhocorax centralis*) : It is a resident and altitudinal migrant, found at altitude 1600-3500 m, and sighted at Naga, Sonam area of P.A.

(iii) Butterflies

As per the study, report of Wildlife Institude of India done in 2009 an effort of 10.5 km in 9 hrs encountered a total of 760 individual butterflies from 18 species, 15 genera and five families across eight sampling sites during the survey. Species richness and abundance from each of the following butterfly families were recorded as Nymphalidae eight species, Pieridae three species, Lycaenidae three species, Papilionidae three species and Hesperiidae with only one species.

Nymphalidae was found to be most abundant family with 491 individuals followed by Papilionidae (165), Lycaenids (55), Pieridae (48) and Hesperiids with only one individual. Species richness was found to be decreasing with an increase in altitude.

List of some Butterflies found in Gangotri National Park.

Papilio machaon Linnaeus

Parnassius hardwickii Gray

Parnassius epaphus Oberthür

Peiris brassica Linnaeus

Issorea lathonia

Vanessa indica

Celastrina huegelli

Lycaena phlaeas lunnaeus

Ypthima sacra

Colias electo fieldii Menetries

Distribution of Flora and Fauna in Bhagirathi Eco-Sensitive Zone

(Source: Assessment of Cumulative Impacts of Hydroelectric Projects on Aquatic and Terrestrial Biodiversity in Alaknanda and Bhagirathi Basins, Uttarakhand- WII, 2012).

(1) Sub-basin Bhagirathi I (Areas above Bhagirathi- Jadh ganga confluence)

This sub-basin is drained by Bhagirathi River with its main tributary, Jadhganga, Jalandhari Gad, Kakara Gadand Siyan Gad. The head waters of Bhagirathi river takes origin form Gangotri glaciers and the important shrine Gangotri is located along the

bank of river. The entire catchment of this sub-basin forms the Gangotri National Park. It falls in the Greater and Trans Himalayan regions, which encompasses the temperate forests, scattered trees and scrubs, sub alpine oak forests, alpine scrub meadows, moraines and glaciers.

Fish diversity

Considered as a '*no fish*' zone, as no fish species were reported from this region,this oligotrophic basin has perennial, cooler, cleaner water with low primary producers and aquatic meiofauna.

Mammals and Birds

Over 200 birds species are reported, including a critically endangered Indian white-backed vulture; 3 Schedule-I species of IWPA (Indian White-Backed Vulture, Cinereous Vulture and Himalayan monal). This basin also has 29 species of mammal which include 5 RET species (Himalayan Brown Bear, Asiatic Black Bear, Snow Leopard, Common Leopard and Himalayan Musk Deer) and 8 IWPA Schedule-I species (Himalayan Brown Bear, Asiatic Black Bear, Snow Leopard, Common Leopard, Himalayan Musk Deer, Himalayan Tahr, Blue Sheep and Serow). This sub-basin represents a unique cold, arid ecosystem in Nilang valley which is one of the best habitats for Snow Leopard and its prey Blue Sheep (Paramanand et al. 2000; Uniyal & Ramesh 2004; Rasmussen & Anderton, 2005; Chandola et al. 2008; Bhardwaj & Uniyal 2009 and Bhardwaj et al. 2010, Maheshwari & Sharma 2010).

Floristic diversity

Bearing mixed conifer and Himalayan moist forests of temperate environment, the area is floristically diverse. 130 species of flowering plants were recorded during the study. Of these, 74 were herbs, 28 shrubs, 16 trees and 12 climbers, 56 species of medicinal value. The common species of the sub-basin are *Picea smithiana, Cedrus deodara, Pinus wallichiana, Euonymus fimbriatus, Populus ciliata, Prunus cornuta,* and *Acer caesium.* Important species of medicinal value are *Aconitum hetrophyllum, Allium stacheyi, Arnebia benthamii, Lilium polyphyllum, Ephedra gerardiana, Nardostachys jatamansi,* and *Picrorhiza kurrooa.* The RET species recorded from this sub-basin are *Acer caesium, Aconitum hetrophyllum, Alliumstacheyi, Arnebia benthami, Epipogium aphyllum, Lilium polyphyllum, Nardostachys jatamansi* and *Picrorhiza kurrooa.*

(2) Sub-basins -Bhagirathi II (From Bharongati to Asi ganga Confluence)

The stretch of Bhagirathi from its confluence with Jadhganga to the location of its confluence with Asi Ganga has been categorised as Bhagirathi II sub-basin. This sub-basin falls in the middle and high Himalayan ranges and encompasses wildlife habitats such as Himalayan moist temperate forests, coniferous and moist mixed forests and scrub habitat, alpine scrub and meadows. Much of the sub-basin has been degraded due to development and anthropogenic pressures.

Fish diversity

Ecologically the sub-basin is mesotrophic to oligotrophic in nature, in which 19 species of fishes were recorded. It included 11 species of habitat specialists and 4 threatened species. State Fisheries Department has been maintaining a fish farm here. The threatened species of fishes recorded from this basin are golden mahseer (*Tor putitora*), snow trout (*Schizothorax richardsonii*), and stone suckers (*Garra gotyla gotyla* and *Gara lamta*). The river basin serves as migrated route for golden mahseer and snow trout, whose abundance has now become very low. This sub-basin is also infested with invasive brown trout, which appears

to be expanding its range in this sub-basin due to barriers downstream. On account of the presence of existing dam across Bhagirathi river near Uttarkashi, the upward movements of mahseer and snow trout species have also been reduced or stopped.

Mammals and Birds

About 320 bird species have been reported in this sub-basin, out of which 4 are RET species (white-backed vulture, Egyptian vulture, cheer pheasant and western tragopan) and 5 are IWPA schedule-I (White-backed vulture, Egyptian vulture, Cinereous vulture, Cheer pheasant and Western tragopan). This sub-basin encompasses 24 species of mammals, out of which 2 are RET species (i.e. Asiatic black bear and Common leopard) and 4 are mentioned in IWPA schedule-I list (i.e. Asiatic black bear, Common leopard, Himalayan Tahr and Serow). (Paramanand et al. 2000; Uniyal & Ramesh 2004; Rasmussen & Anderton, 2005; Chandola et al.2008; Bhardwaj & Uniyal 2009 and Bhardwaj et al. 2010, Maheshwari & Sharma 2010).

Floristic diversity

The sub-basin's catchments have dry temperate conifer, moist deodar and mixed forests. 184 species were recorded during the study, of which 94 species were herbs, 41 Shrubs, 33 trees and 16 climbers. Among these, 78 species have medicinal values. Prominent species were *Abies pindrow, Alnus nepalensis, Aesculus indica, Populus ciliata, Cedrus deodara, Celtis australis, Pinus wallichiana, P. roxburghii, Picea smithiana, Prunus cornuta, Pyrus malus. Hippophae salicifolia, Aspargus filicinus, Berberis asiatica, Centella asiatica, Prinsepia utilis, Juglans regia, Swertia chirayita, Viola biflora, Zanthoxylum armatum, Datisca cannabina,* and *Lilium polyphyllum*are the important high value medicinal plants. **RET species** in this sub-basin are *Acer caesium, Aconitum hetrophyllum, Allium stacheyi, Arnebia benthamii* and *Caragana sukiensis.*

(3) Sub-basin Asiganga (Asiganga valley)

The river Asiganga is one of the major tributaries of Bhagirathi. It originates from Dodital Lake at an altitude of 2240m and joins Bhagirathi near Uttarkashi. The sub-basin falls in the middle and high Himalayan ranges. The Asi Ganga Valley is marked by undulating and rugged terrain and steep slopes with highly mountainous, precipitous ridges interspaced by deep gorges. The valley is seemingly narrow and either slope is covered with very dense forests falling in the category of Himalayan moist temperate forest, secondary scrub, alpine scrub and meadows.

Fish diversity

Three species of fishes were recorded from this river basin, including a threatened species of snow trout (*Schizothorax richardsonii*) and an invasive brown trout (*Salmo trutta fario*). These two species migrate from downstream to upstream for breeding. This basin seems to be the major breeding ground of brown trout and distributed upto Dodital Lake and from here this species expands its range to upstream of the Bhagirathi River. Ecological condition of this basin is oligotrophic to mesotrophic with clean and cooler water

Mammals and Birds

This sub-basin have about 250 birds species, including 2 RET species (Indian white-backed and Egyptian vulture); 4 Schedule-I species of IWPA (Indian white-backed vulture, Egyptian vulture, Cinereous vulture, Himalayan monal). This sub-basin also provides habitat for 32 mammal species which includes 3 RET species (Asiatic black bear, Common leopard and Himalayan musk deer) and 4 IWPA Schedule-I species (Asiatic black bear, Common leopard, Himalayan musk deer and Serow). Upper

reaches of sub-basin (>2000m) are recognized as high biodiversity area and it is a transition zone between Govind NP and Gangotri NP and therefore facilitates the movement of large mammals. (Paramanand et al. 2000; Uniyal & Ramesh 2004; Rasmussen & Anderton, 2005; Chandola et al. 2008; Bhardwaj & Uniyal 2009 and Bhardwaj et al. 2010, Maheshwari & Sharma 2010).

Floristic diversity

The sub-basin encompasses subtropical pine mixed, temperate oak and conifer and sub alpine forests, alpine scrub and meadows. Lower stretches of riverine forests in this area are rich in orchids. The tract beyond Aghora village is dominated by various species of oak, rhododendron, maple and *Carpinus viminea*, and at higher altitudes temperate oak-conifer mixed forests. Other prominent species on way to Dodital are *Pinus roxburghii, Pyrus pashia, Quercus leocotrichophora, Rhododendron arboreum, Toona ciliata, Juglans regia, Hippophae salicifolia, Prinsepia utilis, Prunus cerasoides, Prunus cornuta, Debregeasia salicifolia, Cedrus deodara* and *Taxus wallichiana.* A total of 188 species of vascular plants were recorded from the study sites, of which, 94 are herbs, 46 are shrubs, 38 are trees and 10 are climbers. These also include 54 species of medicinal value. Some important medicinal plants recorded from the area include *Anagallis arvensis*, *Saponaria vaccaria*, *Vernonia anthelmintica*, *Prinsipia utilis*, *Aspargus filicinus, Barleria cristata, Berberis aristata, Berberis asiatica, Berginia ciliata, Centella asiatica, Dactylorhiza hatagirea, Picrorhiza kurrooa, Swertia chirayata, Thalictrum foliolosum*, and *Aconitum hetrophyllum.* RET species recorded from this basin are *Acer caesium, Aconitum hetrophyllum, Allium stacheyi, Nardostachys jatamansi* and *Picrorhiza kurrooa.*

FOREST AND WILDLIFE MANAGEMENT

Forest and wildlife management is key to ensure ecological balance as well as habitat degradation in ESZ. The scientific management of reserved forest and protected area in the ESZ is of utmost importance. The forest area of the Bhagirathi Eco-sensitive zone is managed as per the prescriptions of working plan of Uttarkashi Forest Division and Management Plan of Gangotri National Park.

The working plan of the Uttarkashi Forest Division is a comprehensive document written by a working plan officer in which a set of prescriptions are laid down for scientific management of forest for ten years based on the scientific studies done at the field level. It is then delebrated at various platforms and finally approved by the MoEF & CC, Govt. of India. The present working plan of Uttarkashi Forest Division (2016-17 to 2025-26) has been recently approved by MoEF &CC and the forest management shall be carried out as per its prescriptions. The Management Plan of Gangotri National Park is a comprehensive document prepared as per Wildlife Protection Act 1972, and approved by the Chief Wildlife Warden. The management practices inside the park are carried out as per its prescriptions.

A. UTTARKASHI FOREST DIVISION

• WORKING PLAN PRESCRIPTIONS

The last working plan (2006-07 to 2015-16) expired in September 2016 whereas the new ten-year working plan for the period 2016-17 to 2025-26 has recently been approved by MoEF & CC, Govt. of India. The Zonal Master Plan shall confirm to the prescriptions of approved working plan for forest and wildlife management..

List of Working Circles

S.No.	Name of the Working Circles
1	Chir
2	Baanj (Oak)
3	Deodar-Kail Conservation
4	Fir-Spruce
5	Conservation and Improvement
6	Forest Protection –Encroachment, Illicit Felling, Poaching, Forest Fire etc. Overlapping WC.
7	Plantation Overlapping WC
8	Bamboo & Ringal Overlapping WC
9	Soil & Moisture Conservation Overlapping WC
10	Fodder Development Overlapping WC
11	Wildlife Management Overlapping WC
12	Joint Forest Management WC
13	NTFP Overlapping WC
14	Ecotourism Overlapping WC

• PLANTATION

The plantation of indigenous species of trees, shrubs, herbs and grasses is normally done in denuded areas as identified in the Working Plan, Namami Gange and other schemes. These areas are mostly natural blanks, under stocked areas, badly burnt areas and areas in which natural regeneration has been poor or failed to come up due to one reason or the other.

Present Scenario

The plantation work in the division is carried out as per the prescriptions of Working Plan, CAMPA, Namami Gangey and other schemes of the state and central Government from time to time. The area prescribed for annual plantation in Plantation Working Circle in Working Plan of Uttarkashi Forest Division is taken for plantation. In addition to it, the compensatory afforestration targets of the division under CAMPA are taken for plantation. Denuded/degraded area of the Eco Sensitive Zone is taken for plantation under CAMPA. The *Charagah Vikas Yojana* of Govt. of Uttarakhand provides incentives to the *Van Panchayats* to plant fodder species on *Van Panchayat* land. The objective of the scheme is to promote the plantation of fodder species near villages thereby reducing the biotic pressure on the reserved forests..

Plantations for the last 5 years

Sl. No.	Yojana	2013-14 (In hac)	2014-15 (In hac)	2015-16 (In hac)	2016-17 (In hac)	2017-18 (In hac)
1	CAMPA	165	248	369	104	55
2	Working plan	285	360	235	56	75.10
3	Namami Gangey	0	0	0	0	175
4	Van Panchyat	0	5	53	10	0
	Total	**450**	**613**	**657**	**170**	**305.10**

The species planted under above schemes have been Annexed as **Annexure-30.**

PLANTATION GUIDELINES

1. The plantation activities shall be as per the provisions of Divisional Working Plan and Zonal Master Plan shall conform to the Working Plan.
2. Areas which are suitable i.e. natural blanks, under stocked areas, badly burnt areas and areas where natural regeneration has failed to come up, shall be taken for plantation of suitable species.
3. The plantation of pine trees shall be regulated/ discouraged.
4. The plantation of exotic species shall be regulated/ discouraged.
5. The plantation of broad leaved and miscellaneous tree, shrub and herb species (especially fodder, fuelwood, aromatic, medicinal, and fiber species) would be promoted with emphasis on to meet the needs of local people. In case of compensatory afforestation, as far as possible, similar species as that of the forest getting lost in development projects need to be selected for plantations.
6. No felling shall be done for plantation purpose and good quality nursery seedling would be used for plantation.
7. Plantation shall be helpful in improving density and condition of existing vegetation.
8. Areas have been identified in working plan for Assisted Natural Regeneration. However, additional areas will be tried on priority over plantations. This will ensure the right natural species mix and would come closest to the natural forests. Plantations would only supplement ANR work and only if desired success in ANR is not achieved, plantations would be resorted to. This guideline will over ride other guidelines in this section.

Future Strategy

Plantations for the next ten years shall be carried out as per the following schemes:

- Prescriptions of Working Plan: Denuded areas as identified in the present Working Plan (2016-17 to 2025-26)
- Namami Gangey Yojana: Plantation areas as identified in detailed project report approved by Govt. of India
- CAMPA Scheme: Yearly targets of the division.
- Others: Annual targets for plantation under van panchayats etc

Assisted natural regeneration in a total area of 630 hactares for ten years in baanj working circle has been prescribed in Working plan. **(Annexure-31)**. In addition to it, additional 200 ha area per year will be brought under ANR totaling 2630 ha for 10 years time period. The budgetary requirement for the entire 10 years plan period has been included in Financial plan.

Ten years Plantation plan for Uttarkashi Forest Division (projected)

S. No	Name of Scheme	Plantation Targets (hec.)			Total Plants (in lacs)	Total Expenditure (in cr.)
		5 yr	10 yr	Total		
1	Namami Gange	2660	-	2660	26.60	34.58
2	Working Plan	840	735	1575	17.33	20.47
3	Campa	300	300	600	12.00	7.80
4	Others	100	100	200	2.20	2.60
	Total	**3900**	**1135**	**5035**	**58.13**	**65.46 cr.**

The physical and financial outlay provided above is not final and shall be subject to changes in future as per the requirement. The plant species as provided earlier shall be considered for plantation.

Brehat Vriksharopan

Brehat Vrikasharopan is a plantation scheme under "Environment Protection and Afforestation" under **Twenty Point Programme** of the Government of India. The scheme aims at involving different departments and people to participate actively in plantation activity with an objective to increase the green cover by afforestation. The plantation targets are allotted to each state and then to districts each year. At the district level, the District Magistrate distributes targets and monitors the plantation activity and progress of different departments. Various departments like Forest, Agriculture, Rural Development, Education, Horticulture etc are allotted plantation targets each year. The progress is monitored and documented by the District Magistrate and a monthly report is sent to the government. Presently, 650 plants/ hectare are planted on community land, degraded land, land on the sides of the road and canals, government institutions etc.

SOIL AND MOISTURE CONSERVATION

The conservation of water resources and soil and moisture conservation measures have been discussed in detail in Chapter-2 under 'Watershed Management'.

• TREE FELLING

➢ The Hon'ble Supreme Court, in a writ petition (CIVIL) NO. 202 of 1995 (T.N. Godavarman Vs. Union of India) has passed an order on date 12 December 1996, related to the state of Himachal Pradesh and the hill region of the state of UP (Now called Uttarakhand) and West Bengal which is as follows:

1. There will be no felling of trees permitted in any forest, public or private. This ban will not affect felling in any private plantation comprising of trees planted in any area which is not a 'forest'; and which has not been converted from an earlier 'forest'. This ban will not apply to permit granted to the right holder for their *bonafide* personal use.
2. In a forest, the state govt. may either departmentally or through the state forest corporation remove the fallen trees and remove the diseased or dry standing timber from the areas other than those notified under Section 18 or Section 35 of the Wildlife (Protection) Act, 1972 or other acts banning such felling or removal of trees.
3. For this purpose, the state government is to constitute an Expert Committee comprising of a representative from MoEF, a representative of the state government, two private experts of eminence and the MD of the state forest corporation (as Member Secretary), who will fix the qualitative and quantitative norms for the felling of fallen trees and diseased and standing timber. The state shall ensure that the trees so felled and removed are in accordance with these norms.
4. Felling of trees in any forest or any clearance of forest land in execution of projects shall be in strict conformity with the Forest Conservation Act 1980 and any other laws applying thereto. Moreover, any trees so felled, and the disposal of such trees shall be done exclusively by the state forest corporation and no private agency is to be involved in any respect thereof. In compliance of Para-3 of above-mentioned order, an Expert Committee was formed, which has given recommendation regarding the ban on tree felling above 1000 metres from the mean sea level except fallen, dried and diseased trees. **(Annexure-32).**

- Presently dry and deceased trees are removed from the forest as per the prescriptions of the working plan and as per the approval of the special committee constituted in each division.
- The trees posing damage to life and property are removed as per the provisions of the 'Uttar Pradesh Protection of Trees in Rural and Hill Areas Act, 1976 as amended from time to time'. The same provision shall remain in force as per the above act.

• FOREST FIRE MANAGEMENT

Objective

1. To control the incidences of forest fires by effective fire management strategies so as to conserve/ protect flora & fauna of the region.
2. To identify the vulnerable fire sensitive areas particularly in Chir forest and follow preventive measures before the fire season.
3. To ensure active participation of the Villagers/Van panchayat/Gramsabha and spread awareness among the local people about the bad effects of forest fires.

Present Scenario

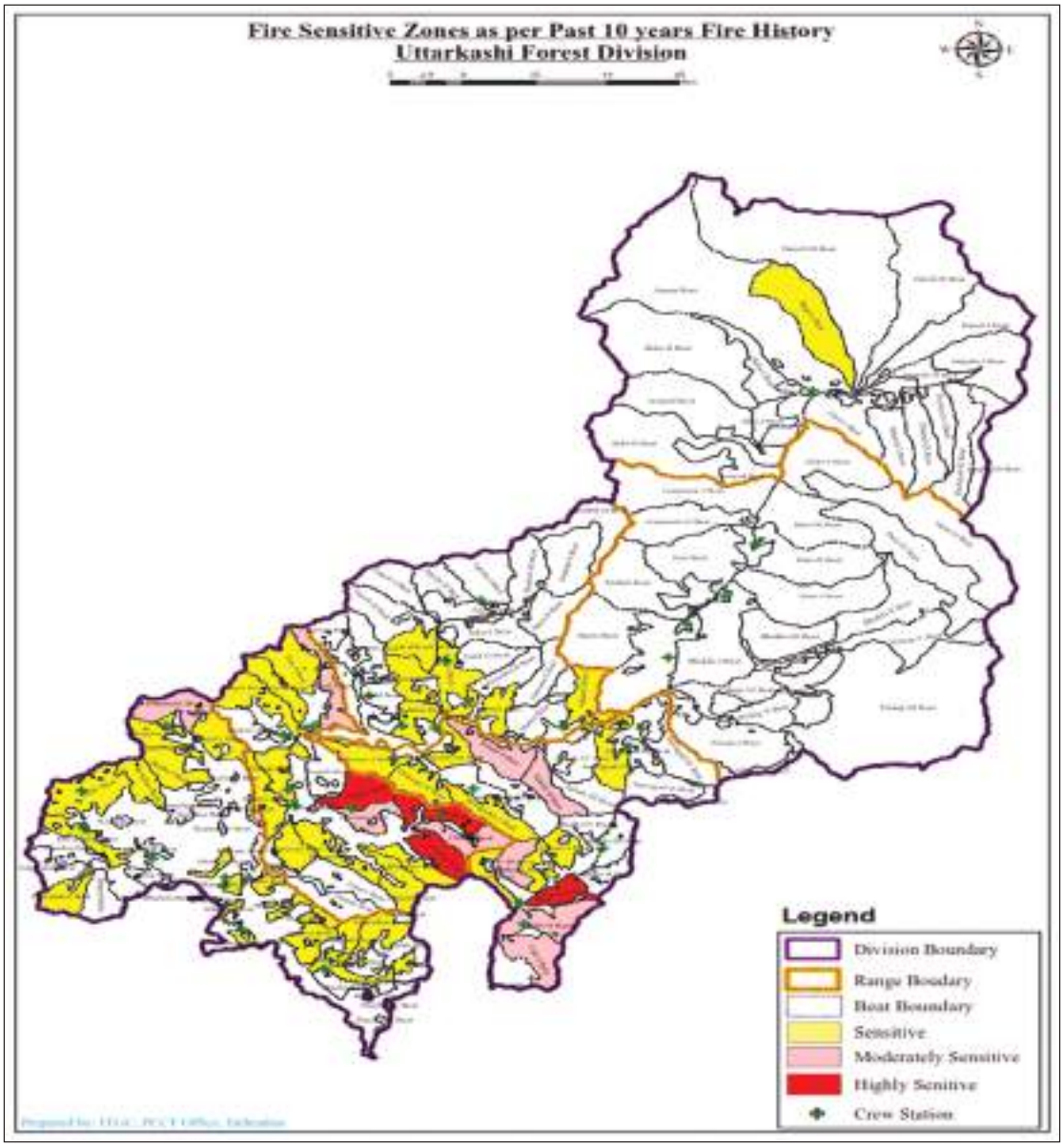
(A) Basic Infrastructure and Resources

- Master Control Room
  - Situated at Kotbangla, Uttarkashi
  - It contains advanced facilities like computers with Internet, Walkie Talkie, Telephone, Thermometer, Hygrometer, Rain Gauge and division level Rapid Action Team during the fire season.
  - Contact number of all the Gram Pradhan/ Van Sarpanch and district level officer are listed and maintained in the Master Control Room.
  - It is connected to all the Crew Stations of the Division, Disaster Control Room, Police Control Room and Fire Service etc.
- Base Stations
  - 3 in number, situated at Bhatwari, Maneri, Kuteti.
  - These base stations act as the mid point for information dissemination between the Master Control Room and the Crew Stations.
- Crew Stations
  - There are 17 Crew Stations in the Bhagirathi Eco- sensitive Zone. The details of the same has been annexed as **(Annexure-33)**
- Wireless/Communication system
  - Repeater: Established at Mahidanda
  - Field staff of the forest department is equipped with 36 Walky- Talky handsets.

- Vehicles
  - ➢ There is shortage of vehicles in the division and therefore extra vehicles are engaged during the fire season.
- Equipments
  - ➢ Various equipments used for fire control has been annexed as **(Annexure-34)**

(B) Fire Sensitive areas in Bhagirathi Eco-sensitive Zone

Based on the last 15 years data, fire sensitive maps have been generated by using GIS technology and area has been measured accordingly. Total total fire sensitive area under Bhagirathi Eco Sensitive Zone is 7,627 hectares. The details of the same has been Annexed as **(Annexure-35).**



(C) Management Practices

- **Working Plan of Uttarkashi Forest Division**

  "Forest Protection (Encroachment, Fire, Illicit felling, Poaching) Working Circle" of Working Plan extensively deals with fire management. The above-mentioned Working Circle prescribes fire management strategies and guidelines for the same.

- **District Fire Management Plan**:

  Every year a District Fire Management Plan is prepared and approved by District Fire Management Committee headed by a District Magistrate (Divisional Forest Officer as a Member Secretary).District Fire Management Plan is a document, incorporated with the necessary preventive and remedial measures for fire management in district.

Future Strategies

The future strategies for the fire protection in Bhagirathi ESZ shall be as per the prescription of the Working Plan of Uttarkashi Forest Division and Management Plan of Gangotri National Park. Annual Fire Mangement Plan shall be prepared and the following measures shall be incorporated and followed effectively.

1. Controlled Burning

- Controlled Burning in fire sensitive areas. (1488 Ha.)
- Controlled Burning (20 metres on both sides of the road)

S.No.	Range	Road (in Km)
1	Badahaat	130
2	Mukhem	85
3	Taknor	33
4	Gangotri	25
	Total -	**273**

- Controlled Burning along the bridle paths (20 metres along both sides of the road)

S.No.	Range	Bridle Path in Km
1	Badahaat	262
2	Mukhem	76
3	Taknor	86
4	Gangotri	86
	Total -	**510**

- Controlled Burning in old plantations & old Resin coupes:-
  - ➢ Last 10 years plantation and resin coupes shall be cleaned and burned accordingly.

2. Cleaning & Maintaining of Fire Lines.

S.No.	Range	Firelines (in Km)
1.	Badahaat	28.00
2.	Mukhem	27.50
	Total -	**55.50**

3. Fire Watchers : Every year from 15 February to 15 June fire watchers (local villagers) are engaged by Forest Department for fire control during the fire season. Following number of fire watchers shall be engaged in each crew Station / Master Control Room.
   a) Master Control Room : 12 Fire watchers
   b) 17 Crew Station : 102 Fire watchers (6 in each Crew Station)
4. Meeting shall be conducted in pre fire season at different level i.e. village, block, district level and rallies shall be conducted in schools.
5. Strengthening our forest fire information and control mechanism by improving coordination/ wireless communication between Master Control Room and crew Stations and persuading the local people/agencies to support the forest department.

Village level Fire Management Committees

Lower areas of the Bhagirathi eco-sensitive zone particularly the chir forests are prone to forest fires from feberuary to June. On one hand, fire affects small herbs and shrubs growing in the area thus affecting biodiversity whereas on the other hand the local people are also sufferers in terms of damage to life and property. Therefore, there is a need for participatory management of forest fires in which the villagers shall be kept in the centre of overall management. As per the G.O. Number 454/1(2)/Van Gram Vikas /2004-9(22)/2001, Forest & Environment section-2 Dehradun Dated 27/03/2004 , The committees are formed at three levels i.e. District/Block/ Village level to ensure active participation of public representatives and other departments in execution and monitoring of Forest Fire. The State Govt. Order regarding the formation of Fire Management Committee has been Annexed as **(Annexure-36).** The village level committee is headed by Gram pradhan with patwari, forest guard etc as its members. The committee convenes regular fire meetings in the respective villages. The financial outlay for these committees have been proposed in the financial plan. There is the provision of block and district level committees headed by Block Pramukh and District magistrate respectively.

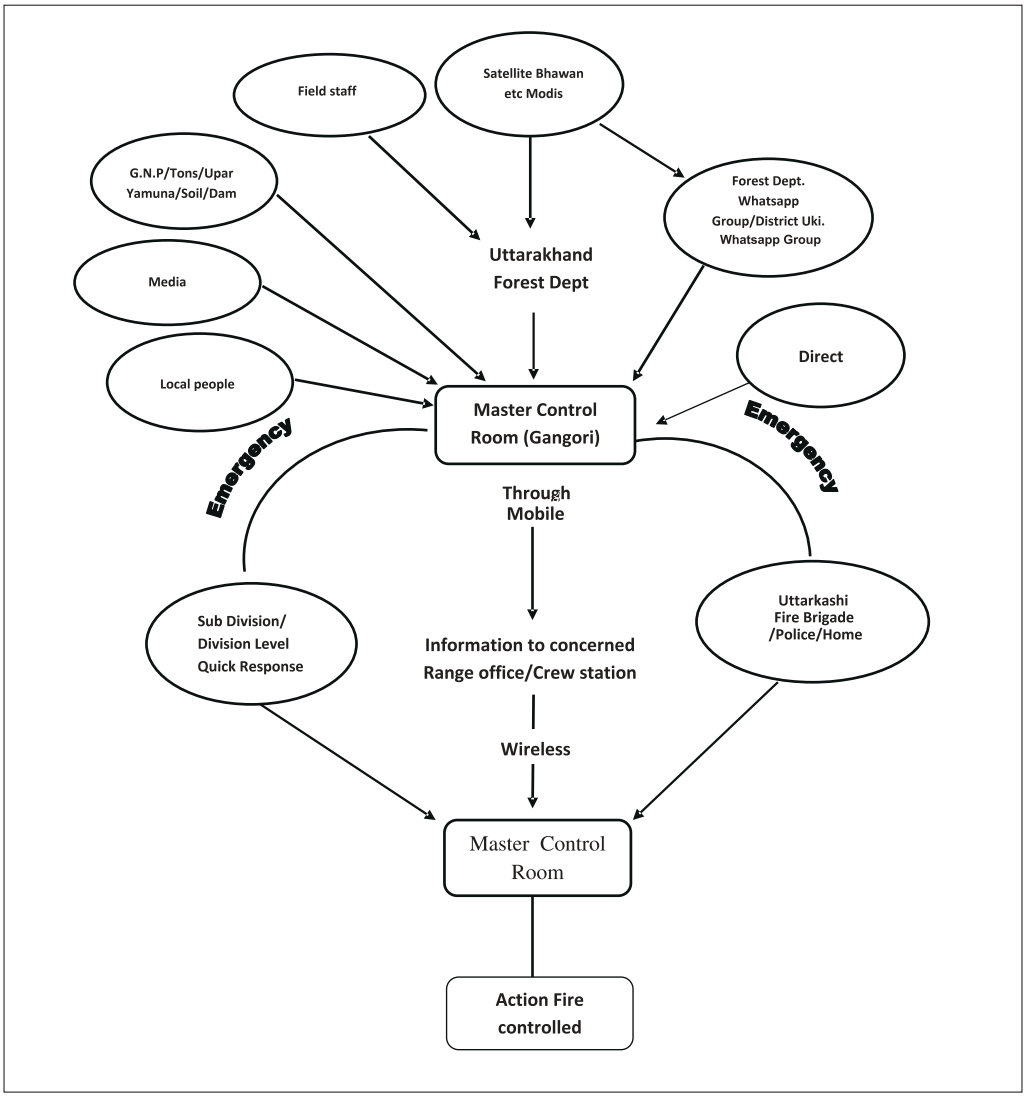
Guidelines for Village level Committees:

- The financial outlay for strengthening of village level committees shall be included in District Fire Plans. The necessary funds shall be channelized through CAMPA, MNREGA, District Plan etc.
- It shall be the responsibility of the committee to act as first responder for fire control in case of any incidence in the vicinity of concerned village.
- The committee will convene periodic meetings at village level to sensitize the villagers for effective fire control.
- The participation of van sarpanch and members of van panchayats will be mandatory in the meetings of the committee.
- The Gram pradhan who is the chairman of the committee shall discuss the allotment of haq-hakooks with the committee before recommending the names of the beneficiaries to the Forest department. The villagers participating proactively in forest fire control shall necessairily be given priority for the allotment of Haq-haqooks (Rights & Concessions).

In addition to the traditional Haq hakooks (rights & concession) being granted to the local villagers, there is a need to fix the responsibility of local villagers for effective fire control measures. The district Fire Management plan shall include the strategy to involve local people in fire control measures. The physical and financial plan regarding villagers participation shall be clearly described in the district fire management plan. The following components and guidelines shall be included in District Fire management plan every year.

- Village level fire management committee for all the fire sensitive villages to be created with majority of members to be women.
- The committee shall be given responsibility to control fire in the territorial area (including reserved forest) of the village.

- A bank account should be opened on the name of the committee in any nationalised bank and financial provision/ honorarium of minimum 50,000 shall be provided to each committee every year. The fund shall be demanded in CAMPA, MNREGA, IFM, State sector etc.
- As far as possible, one person from each village shall be engaged as fire watcher during fire season.
- The BMC's formed under the ambit of State Biodiversity Board should be given the responsibility of prevention of Forest Fires in their respective areas.



Forest Fire Information and Control Mechanism

Physical and Financial Proposal for 10 years

The physical and financial plan has been discussed in Volume -2.

WILDLIFE MANAGEMENT

The area of the BESZ is rich in wildlife. Most of the species are endangered and thus need a high level of protection. The wildlife management-working circle of the Working Plan deals with the issues of wildlife protection, habitat management, man animal conflict, poaching, patroling by staff etc. The physical targets and financial outlay for various works has been discussed under the physical and financial proposal provided at the end of this chapter. The most important component of wildlife management is human-wildlife conflict as discussed below.

MAN-ANIMAL CONFLICT

Human beings and wild animals both are integral components of the forest ecosystem. Their presence affects each other even in normal conditions. However, they live in harmony unless their interests come into conflict and their activities start harming each other.

Man-animal conflicts are manifested by such incidents as a human being killed or injured by wild animal on the one hand and any wild animal is injured or killed by a man on the other hand. Villagers living in and around such jungle areas where wild animals also have their habitat are most affected in such conflicts. The cattle reared by man are killed or injured by wild animals in and around these jungle areas and his crops are damaged by many herbivores like wild boar and monkeys.

The conflicts between humans and wild animals are not new. Because of competition for natural resources, need and greed of the people; there is heavy biotic pressure on these forests also and people have started penetrating deeper and deeper in the habitat of wild animals which is giving rise to conflicts between them. Sometimes conflicts are only because of accidents and without any kind of intention by either man or wild animal.

Present Scenario

Uttarkashi is a hilly district and its human habitation is surrounded by forest area, which is natural habitat for wildlife. Due to increasing human population and resource scarcity for wild animals, there are number of man animal conflict events. However, the ESZ has a very low population density, hence there are lower incidents of man-animal conflicts. Here animals mean wild animals like leopard, wild boar, bear and monkey, which are potentially capable of harming human-beings or their livestock, crops and other property.

Kinds of Man-Animal conflicts

The incidents of man-animal conflicts can be categorized into the following major types:

(i) Human beings get killed or injured by wild animals in human-wild animal conflicts.

(ii) Livestock/cattle reared by man get killed or injured in human-wild animal conflicts.

(iii) Crop cultivated by man gets damaged in human-wild animal conflicts.

(iv) Wild animals are killed or injured in human-wild animal conflicts.

The wild animals involved in these conflicts in this area are mostly leopard, wild boar, bear, and monkeys.

Causes of Man-Animal conflicts

(i) Shrinking of habitat give rise to shrinking of space, food etc in the forest which is required for the wild animals which results in animals straying out of habitat in search of food, water or shelter. This habitat shrinkage may be result of many reasons, e.g., construction of roads etc.

(ii) Increased disturbance due to collection of fuelwood, fodder, NTFPs, water etc. from the forests has also increased the incidences of man-animal conflicts.

(iii) Most incidences of man-animal conflicts are noticed during summer when water becomes scarce. The livestock and wild animals have to share the limited water sources on the fringes or inside the forest. Human interference with the natural drainage system in forest areas and diversion of water towards habitation has further complicated the issue.

(iv) In some forest areas, the number of wild animals especially prolific breeders like wild pig and monkeys has increased beyond the carrying capacity of the habitat concerned. Hence, wild animals straying out of forests cause man-animal conflicts.

(v) Sometimes the wild animals and humans come in sudden contact and out of fear of each other, they harm each other accidentally.

Man animal conflict statistics of last 5 years in Uttarkashi Forest Division

YEAR	Wild Animal	No. of Cattle loss	No. of Human being affected	
			Died	Injured
2012-13	Wild Boar	-	-	2
	Bear	-	1	5
	Snake	-	-	-
	Leopard	140	-	1
	Total	**140**	**1**	**8**
2013-14	Wild Boar	-	-	2
	Bear	-	-	9
	Snake	-	-	-
	Leopard	156	-	3
	Total	**156**	-	**14**
2014-15	Wild Boar	-	-	4
	Bear	-	-	10
	Snake	-	1	1
	Leopard	196	1	9
	Total	**196**	**2**	**24**

YEAR	Wild Animal	No. of Cattle loss	No. of Human being affected	
			Died	Injured
2015-16	Wild Boar	-	-	5
	Bear	-	-	4
	Snake	-	1	1
	Leopard	338		1
	Total	**338**	**1**	**11**
2016-17	Wild Boar	-	-	2
	Bear	-	1	9
	Snake	-	1	-
	Leopard	195	-	1
	Total	**195**	**2**	**12**
2017-18 (Till November, 2017)	Wild Boar	-	-	1
	Bear	-	-	2
	Snake	-	-	2
	Leopard	141	-	1
	Total	**141**	**0**	**6**
	Grand Total	**1166**	**6**	**75**

Future Strategies

The wildlife management strategies in the area shall be under the broad guidelines of wildlife management working circle of the Working Plan. The main points to be considered for wildlife management are as follows:

- Creation and Maintenance of water holes for wildlife (as and when required)
- Eradication of weed/exotic species
- Preventing forest fire incidences
- Regular patrolling by staff
- Planting fruit and fodder species in fringe areas and van panchayat land
- Mitigation of human wildlife conflict

Guidelines for Man-Animal Conflict mitigation and Wildlife management

- The compensation in Man-animal Conflict cases shall be granted as per the Compensation policy of Govt. of Uttarakhand A copy of the GO of the same has been Annexed as **(Annexure-37).**
- The Developmental Projects in the area shall include the budgetary provision for Wildlife Management. Since the area is home to important wildlife species and the projects may affect their habitat and distribution, therefore site specific Wildlife management plan including provisions for waterholes, small corridors, plantation of local fruit and fodder sps, wild boar proof fencing around agricultural land etc prepared by Divisional Forest Officer shall be included in the proposal. The cost shall be included in the overall cost of the project.

- The training and awareness to be imparted by the Toursim Department to the locals shall include information about the local fauna and flora also. The unemployed youth will be trained as guides having knowledge about birds, plants and animals.
- Eco- development Committees involving local un-employed youth shall be constituted as per the UP GO. No. UO-84/14-PA-BHU-99-63/9 dated 21-05-1999 **(Annexure-38).**

Measures for mitigation of Man-Animal Conflicts :

The following measures shall be adopted to mitigate man-animal conflicts:

1. Prey-base to be increased

The area under **Bhagirathi Eco-senstive Zone** consists of some of the important carnivore species like- snow leopard, leopard, Himalyan black bear etc. The existence of these species depends on a healthy prey-base like monkeys, wild boars, deer etc. in the region. A decreasing prey-base may force the carnivores to move out of the forest and occupy the near by villages there by increasing man animal conflict. Following measures shall be taken for increasing the prey base in the region :

(a). Promotion of edible species : The plantation of miscellaneous fodder and wild fruit species are already being done as per the prescription of Working Plan of Uttarkashi Forest Division and Management Plan of GNP. The State Government's flagship schemes of *Charagah Vikas Yojna, Varsha Jal Sangrakshan Yojna* etc. are a welcome step-promoting plantation of fodder species and habitat management leading to increase in the prey-base. A plan is under active consideration to rear ex-situ, appropriate animal species for leopards.

(b). Habitat Management : Soil erosion, invasion of weeds, decreasing water availability etc. are the factors that force wild animals to move out of their habitat. Manangement of habitat has extensively been dealt in Wildlife Working Circle of Working Plan of Uttarkashi Forest Division and Management Plan of GNP. As already discussed earlier, soil erosion and water availability in the forest can be increased by soil and moisture conservation measures (SMC) like vegetative check dams, loose boulder check dams, cement plugs, nala bunding, water tanks, should be taken in the forest so that water regime of the forest is increased in a natural way which will increase the productivity of the forests as well as water availability in the habitat. As a result, sufficient food and water for wildlife will be available and the number of animals straying out of forest will be controlled. In addition to it the removal of *invasive species* is being done as per the prescriptions of Working Plan and Management Plan.

2. Maintenance of Corridors

Bhagirathi Eco-sensitive Zone covers some part of Uttarkashi Forest Division and some part of Gangotri National Park. Gangotri National Park a part of ESZ and is the only national park to conserve the fragile cold desert ecosystem, its flora & fauna. It is a vital corridor between Govind Pashu Vihar Wildlife Sanctuary & Kedarnath Wildlife Sanctuary to facilitate easy movement of large ranging animals such as Small leopard, brown bear,black bear, argali, Himalayan blue sheep and Tibetan wolf. Following measures shall be taken for the maintenance of corridors.

- Strict control on poaching by establishing forest *chowkis* on sensitive locations and long range patrolling by the forest department
- Habitat improvement in identified corridors through water and soil conservation, weed eradication and restoration activities.
- The corridor region not to be opened for any kind of tourism activity

3. Providing LPG to the villagers

Use of LPG shall be promoted among those villagers who frequently go to the forest areas specially wildlife habitats to fetch fuel wood for their cooking needs so that they stop venturing into forest areas and stop inviting man-animal conflicts.

4. Creating awareness among locals

People shall be made more and more aware through meetings and pamphlets etc. that they should avoid going deep into the forest areas. If they have to go in any case they should go in groups and they should keep talking to each other to distract the wild animals. School children in vulnerable villages should be educated about the importance of wildlife and human co-existence. Open defecation in nearby forest should be discouraged. Clearance of shrubs and proper lighting around villages should be encouraged for better visibility of an approaching danger. Creating awareness among people about the animal-behaviour and Wildlife (Protection) Act 1972 will be useful, so that they have better understanding about wild animals and their legal status.

5. Solar fencing /Stone wall around agriculture fields

Agriculture fields situated near wildlife habitat/forest areas shall be protected by stone fencing or solar fencing. The detailed physical outlay has been included in the 10 year plan provided at the end of this chapter.

6. Paying *Ex-gratia*/Compensation to the people

Ex-gratia/compensation is promptly paid to the victims of wildlife attack for which the Uttarakhand Man-Animal Conflict Relief Fund, 2012 has been created.

7. Relocation/Rehabilitation of problematic and disadvantaged wild animals

If wild animals like leopard, monkey or bear have become disadvantaged or problematic, such animals are caught either by tranquilization or by trapping cages, safely. Then it is relocated in suitable habitat or kept in a zoo/ rescue centre for all its remaining life. Permission has been granted to catch problematic wild boars and monkeys.

The physical and financial outlay for wildlife management has been discussed at the end of this chapter..

ECOTOURISM

Ecotourism is an important activity that is directely connected to the livelihood opportunities of the local people. This has been discussed at length in chapter 9 under 'Tourism'.

BIODIVERSITY CONSERVATION

Bhagirathi Eco-sensitive Zone covers some part of Uttarkashi Forest Division and some part of Gangotri National Park. Gangotri National Park a part of ESZ is the only national park to conserve fragile cold desert ecosystem, its flora & fauna. It is a vital corridor between the Govind Pashu Vihar Wildlife Sanctuary & Kedarnath Wildlife Sanctuary to facilitate easy movement of musk deer, Himalayan blue sheep and snow leopards. GNP protects 982 vascular plants belonging to 109 families and 389 genera of angiosperms, gymnosperms & pteridophytes with nearly hundred endangered & endemic taxa, including 4 point endemics, 11 state endemics, 58 western Himalayan endemics & 26 rare taxa. Rhododendron nivale is known in Western Himalayas only from GNP. GNP harbours nearly 5% of Indian flora (vascular plants), 10% of Himalayan flora (vascular plants), and 20% of the state flora of Uttarakhand (vascular plants). A copy of the flora of ESZ (GNP) part by P.K. Pusalkar and D.K. Singh, Botanical Survey of India is Annexed as **(Annexure-39).**

MEDICINAL PLANTS

ESZ area is rich in medicinal herbs. A copy of Chief Wildlife Warden Uttaranchal, Dehradun regarding the classification of species for commercial Harvesting from forests, letter no. 1704/22-1 (CWLW) dated 12th December, 2004 is Annexed as **(Annexure-40A)** and copy of forest and Rural Development Commissioner, Uttarakhand regarding sustainable extraction of Aromatic Medicinal Plants letter no. 761/Van Gram Vikas/2004, Dehradun dated 15th December, 2004 is Annexed as **(Annexure-40B)**

Threats to floristic Diversity

1. **General anthropogenic pressure**- Unique and rich biodiversity in the Upper Bhagirathi valley is facing considerable anthropogenic pressure because of the presence of the prime religious centres Gangotri & Gomukh. Easily approachable base camps with challenging peaks & unparalleled scenic beauty of Gangotri are also responsible for the greater influx of pilgrims, mountaineers & tourists. Over exploitation of wild plants used in religious ceremonies also fall in this category. Over extraction of Van Tulsi (*Origanum vulgare*), Ganga Tulsi (*Artemisia gmelinii)* & Brahma Kamal *(Saussurea obvellata).*
2. **Natural Threats-**Unpredictable natural events like landslides, avalanches, glacier receding/melting, glacier crevice formation, change in river /rivulet course, stonefall, erosions, changing climate etc.
3. **Commercial uses /exploitation from forests-**Exploitation of medicinal/economic plants from forests for commercial purposes has brought many species into vulnerable & endangered category e.g. *Aconitum heterophyllum, Dactylorhiza hatagiera, Dioscorea deltoidea, Nardostachys jatamansi, Podophyllum hexandrum* etc.
4. **Other Threats-** Intense and unrestricted grazing of local villagers /nomadic shephards has lead to serious depletion to population of medicinal plant species. Moreover, grazing by domestic sheep and goats reduce the availability of food for wild herbivores including endangered Musk deer, Himalayan Bharal.

Present Management

For the conservation of biodiversity, an overlapping working circle named Biodiversity Conservation and Improvement W.C. has been prescribed in the Working Plan. Also management plan is almost entirely devoted for the conservation of flora and fauna and their habitat.

Following measures are taken in this W.C. for the conservation of biodiversity.

1. As much as possible, no rights and concessions are given from this W.C.
2. *Lisa* collection is prohibited.
3. If there is pressure of right holders, then lopping is allowed under certain lopping rules-
   (a) No lopping is allowed in trees of diameter 20 cm or less.
   (b) No cutting of branches of diameter less than 5 cm.
   (c) No lopping in *Deodar, Kail, Pine, Surai, Fir, Spruce, Bhotia badam, Kanjal, Khadik, Chamkhadik, Moru, Kharsu, Utis, Akhrot, Kafal, Tejpat* etc.
   (d) No lopping and grazing is allowed in regeneration areas

Species restoration and rejuvenation

The area under Eco-senstive Zone contains some of the very important threatened and endemic species. The restoration and rejuvenation of such species is very important for the conservation of bio-diversity in the region. Species restoration measures

like soil & soil conservation works, plantation, eradication of invasive species, ANR etc. are carried out as per the prescription of Working Plan and Management Plan.

Future Strategy

Biodiversity wise sensitive areas are enlisted in working plan and their conservation measures are given. Same policy shall be continued in future also with respect to Biological Diversity Act 2002. Extraction of non-timber forest produce from Bhagirathi ESZ is allowed for local people in a sustainable manner to fulfill their bonafide domestic need. In case of commercial extraction, there is a provision of regulation e.g. licence etc. NTFPs constitute a very important part of biodiversity of ESZ and exerts a great impact on livelihood and social upliftment of local people, so our future strategies shall be focused on conservation of NTFPs on a sustainable manner.

BIOLOGICAL DIVERSITY ACT, 2002

Objectives

1. Conservation of biological diversity
2. Sustainable use of its components
3. Fair and equitable sharing of the benefits arising out of utilization of biological resources and associated knowledge

The Act envisages following tripartite institutional structure for implementation :

1. **National Biodiversity Authority** (NBA), Chennai established by the Central Government.
2. **State Biodiversity Boards (SBB)** at the state level established by respective State Governments.
3. **Biodiversity Management Committees (BMC)** at local bodies' level.

All the three institutions are statutory autonomous bodies with specific mandates. The function of NBA is mainly to regulate the use of biological resources for research, commercial use, bio survey, bio utilization, transfer of results of research on biological resources to non-Indians and Intellectual Property Right (Patent).

The functions of the State Biodiversity Board are as under :

(a) Advise the State Government, subject to any guidelines issued by the Central Government, on matters relating to the conservation of biodiversity, sustainable use of its components and equitable sharing of the benefits arising out of the utilization of biological resources;

(b) Regulate by granting of approvals or otherwise requests for commercial utilization or bio-survey and bio-utilization of any biological resource by Indians;

(c) Perform such other functions as may be necessary to carry out the provisions of this Act or as may be prescribed by the State Government.

Biodiversity Management Committee and its formation

Under Section 41 of National Biodiversity Act, every local body shall constitute a Biodiversity Management Committee within its area for the purpose of promoting conservation, sustainable use and documentation of biological diversity including preservation of habitats, conservation of land races, folk varieties and cultivars, domesticated stocks and breeds of animals and microorganisms and chronicling of knowledge relating to biological diversity. Presently Uttarakhand Biodiversity Board is in the process of formation of 75 BMCs at the level of Gram Sabha. Thus, the main function of BMC is to prepare People's

Biodiversity Register (PBR) which contains detailed information on local biological resources, their medicinal and other uses and the traditional knowledge associated with them.

Chairperson of the local body convenes a meeting of the general body in which six members of the BMC are unanimously elected. Out of these six members, there should be at least two women and one from SC/ST community. In the same meeting these six members elect the Chairperson. In case of a tie, the Chairperson has to cast the decisive vote. The local Territorial Divisional Forests Officer has been nominated as the Nodal Officer of the BMCs in his/her jurisdiction by the Uttarakhand Government. As per this Government order the DFO has to nominate a nearby forest guard/forester/deputy ranger as the secretary of the BMC.

In addition to preparation of the People's Biodiversity Register (PBR), the BMCs are given a mandate to ensure the following :

- Conservation and sustainable utilization of biological resources
- Eco-restoration of the local biodiversity
- Proper feedback to the SBB in the matter of IPR, Traditional Knowledge and local Biodiversity issues, wherever feasible and essential feedback to be provided to the NBA.
- Management of Heritage Sites including heritage trees, animals/microorganisms etc., and sacred groves and sacred water bodies.
- Regulation of access to the biological resources and/ or associated traditional knowledge, for commercial and research purposes.
- Sharing of usufructs arising out of commercial use of bio-resources
- Conservation of traditional varieties/breeds of economically important plants/animals.
- Biodiversity education and awareness building.
- Documentation, enable procedure to develop bio-cultural protocols.
- Sustainable use and benefit sharing.
- Protection of traditional knowledge recorded in PBR

Details of BMCs to be found at the level of Gram Panchayat/Nagar Panchayat/Nagar Palika as per notification no. 2429 dated 18.12.2012 of Bhagirathi Eco-Sensitive Zone. **(Annexure-41)**

Thus 75 BMCs (73 at Gram Panchayat level, 1 (Gangotri) at Nagar Panchayat level and 1 (Uttarkashi) at Nagar Palika level) will be formed/operationalized. As per the guidelines for operationalization of BMCs issued by the National Biodiversity Authority in 2013 each BMC will be provided an amount of Rs. 60,000/-. Thus, an expenditure of Rs. 4500000 is proposed for formation/ operationalization of BMCs. In addition, the preparation of PBR and management expenses has been provided at the end in physical and financial outlay.

Peoples Biodiversity Register (PBR)

The main function of the BMC is preparation of People's Biodiversity Register (PBR) for documentation of biodiversity and associated traditional knowledge in the areas under its jurisdiction. The process of preparing PBR is as under :

First phase	:	Formation of BMC
Second phase	:	Sensitizing local people on study, survey and prospective management
Third phase	:	Training/capacity development of members on identification of biological resources and compilation of data and traditional knowledge.
Fourth phase	:	Compilation of data; review of available literature on natural resources of the district, Participatory Rural Appraisal at village level, interview with families, knowledgeable persons, head of family, heads of *Panchayati Raj* Institutions, Non-Governmental Organizations etc. conducting direct field observations..
Fifth phase	:	Analysis and validation of data by consultation with BMC and TSG.
Sixth phase	:	Preparation of PBR in the format prescribed by the National Biodiversity Authority.
Seventh phase	:	Computerization of information and biological resources.
Eighth phase	:	The PBR to be endorsed by BMC and finally countersigned by the Member Secretary,Uttarakhand State Biodiversity Board.

The State Biodiversity Board is currently in the process of formulation of BMCs.

Biodiversity Heritage Sites

Section 37 of Biological Diversity Act, 2002 provides for notification by the State Government of areas of biodiversity importance as Biodiversity Heritage Sites (BHS). Traditionally local people have been conserving some biodiversity areas based on their cultural values. To strengthen and promote the biodiversity conservation in traditionally managed areas and to stem the rapid loss of biodiversity in intensively managed areas BHS are identified. Uttarakhand Biodiversity Board proposes to notify two areas of biodiversity importance in the Bhagirathi Eco-Sensitive Zone as Biodiversity Heritage Sites. An amount of 10 lacs per site is proposed to be utilized for this purpose. The process involved in the declaration of BHS has been annexed **(Annexure-42).**

Physical and Financial Outlay

The physical and financial plan regarding Formation of BMCs, Formation of PBR and the future management expenses of the BMCs is provided in Volume -2.

NATURAL HERITAGE

Bhagirathi Eco-Sensitive Zone is blessed with incredible natural and man-made heritage sites like Bhugyals, Tals, Glaciers, Gangotri dham etc.The protection of these heritage sites is very important and has been given due consideration in the Zonal Master Plan.

Bugyals

Bugyals are alpine pasture lands, or meadows, in higher elevation range between 3,300 metres (10,800ft) and 4,000 metres (13,000ft) of the Himalayas in the Indian state of Uttarakhand, where they are called “nature’s own gardens”. The topography of the terrain is either flat or sloped. The surface of these bugyals is covered with natural green grass and seasonal flowers. During

the winter season, the alpine meadows remain snow covered. During summer months, the bugyals present a riot of beautiful flowers and grass. As bugyals constitute very fragile ecosystems, particular attention needs to be given for their conservation. Medicinal plant species include *Aconitum heterohpyllum, Nardostachys jatamansi, Betula utilils, Podophyllum hexandrum, Swertia chirayta, Dactylprhiza hetagirea, Saussurea lappa, Potentilla fulgens*, etc. and grass species include *Phelum alpinum, Phelum paniculatum, Avena ludovicinea, Deschampsia ceaspitosa, Helictotrichon pretense, Koeleria argentea, Koeleria cristata, Trisetum aeneum, Bromus himalaicus, Festuca lucida, Festuca ovina, Poa himalayana, Poa pratensis, Sporobolus diander and Stipa himalaica* etc.

List of Bugyals falling within the Eco-Sensitive Zone

Uttarakashi Forest Division

S.No.	Name of Bugyals	Remarks
1	Dayara Bugyal	Situated at an elevation of about 3048 metres, covering an area of about 406 ha. This vast meadow is the best in natural beauty. This bugyal along with its twin Gidara Bugyal is perhaps one of the most beautiful alpine meadows in india. During winter it provides excellent ski slope over an area of 28sq. km. the panoramic view of the Himalayas from here is breathtaking.
2	Bakra Top Bugyal	Situated at an elevation of 3050 metres covering an area of about 200 hectares.
3	Belak Bugyal	Situated at an elevation of 2400 metres covering an area of about 293 hectares.
4	Kush Kalyan Bugyal	Situated at an elevation of 2400 metres covering an area of about 107.6 hectares.
5	Sahastratal Bugyal	Situated at an elevation of 3048 metres covering an area of about 225 hectares.
6	Khedatal Bugyal	Situated at an elevation of 2400 metres covering an area of about 150 hectares.
7	Bhujangal Bugyal	Situated at an elevation of 3048 metres covering an area of about 692.3 hectares.
8	Gidara Bugyal	Situated at an elevation of 2400 metres covering an area of about 200 hectares.
Gangotri National Park		
9	Tapovan Bugyal	Situated at an elevation of 4300 metres covering an area of about 130 hectares.
10	Nandan Bugyal	Situated at an elevation of 4400 metres covering an area of about 250 hectares.
11	Sundarvan Bugyal	Situated at an elevation of 5000 metres covering an area of about 77 hectares.
12	Raktvan Bugyal	Situated at an elevation of 4470 metres covering an area of about 185 hectares.
13	Bhujgadi Bugyal	Situated at an elevation of 3726 metres covering an area of about 4.7 hectares.
14	Jadung Table top Bugyal	Situated at an elevation of 4300 metres covering an area of about 1000 hectares.
15	Janaktal Bugyal	Situated at an elevation of 4100 metres covering an area of about 35 hectares.
16	Kyarkoti Bugyal	Situated at an elevation of 4130 metres covering an area of about 2000 hectares.
17	Rangmanch Bughyal	Situated at an elevation of 4200 metres covering an area of about 820 hectares.
18	Badaguddi Bugyal	Situated at an elevation of 5300 metres covering an area of about 750 hectares.
19	T-Sang chokla Bugyal	Situated at an elevation of 4585 metres covering an area of about 1260 hectares.
20	Thangla –I Bugyal	Situated at an elevation of 4850 metres covering an area of about 3500 hectares.

S.No.	Name of Bugyals	Remarks
21	Himadrithach Chaudhar Bugyal	Situated at an elevation of 4270 metres covering an area of about 681.61 hectares.
22	Himadrithach Chorgad Bugyal	Situated at an elevation of 4300 metres covering an area of about 564.50 hectares.
23	Himadrithach Syuriya Bugyal	Situated at an elevation of 4110 metres covering an area of about 328.2 hectares.
24	Himadrithach Maina Bugyal	Situated at an elevation of 2400 metres covering an area of about 474.1 hectares.
25	Himadrithach Maina Rudragaira Bugyal	Situated at an elevation of 3960 metres covering an area of about 1185.70 hectares.
26	Himadrithach Budragaira Kedarganga Bugyal	Situated at an elevation of 3960 metres covering an area of about 509.50 hectares.
27	Himadrithach Kedartal Bugyal	Situated at an elevation of 3960 metres covering an area of about 374.80 hectares.

Guide lines for conservation of Bugyals

1. Steps should be taken to regulate and to reduce the intensity of grazing. Effort should also be made to introduce rotational or periodic grazing.
2. Number of livestock shall be regulated.
3. Number of visitors shall be regulated.
4. Construction of hotels, resorts, from one-kilometre periphery of the bugyals shall be prohibited.
5. Camping site in the bugyal except for research study and official work shall be prohibited.
6. Camping site should be situated near the periphery of the bugyal in the form of tents, bamboo huts.
7. Soil erosion control measure shall be carried out as per the provisions prescribed in soil moisture conservation.
8. Naturally regenerated, unwanted weeds shall be regulated/eradicated in bugyal

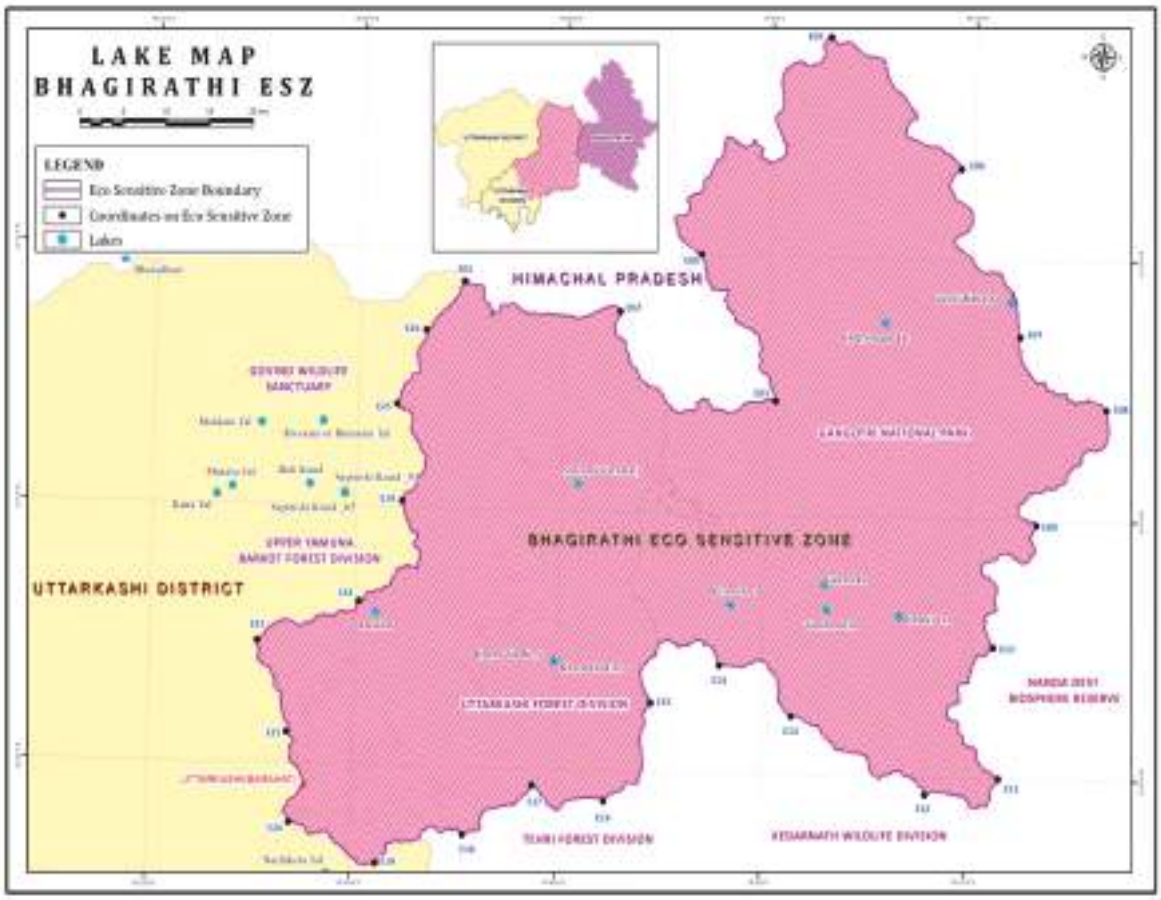
TAL (Lake)

There are 14 high altitude lakes/tals in BESZ, which are unique ecosystems rich in species diversity. The status of lakes determine the health of an ecosystem. These tals are a site of attraction for tourist and potential Eco tourism sites also. They are discussed in detail in chapter 2 'Watershed management'.

Guidelines for Tal (Lake) conservation

1. Discharge of waste water, dumping of solid waste, other non point source of pollution, and flow of heavy silt loads in the lake catchment would be prohibited.
2. Increasing the lake depth through de-siltation does have an impact on its flora and fauna and may lead to destruction of habitat for migratory birds. De-siltation component of the lake as per the standard methodology and its planning and execution has to be carried out scientifically under expert guidance.
3. No construction for any developmental work shall be carried out within 500 metre distance from the bank of the lake. However, this restriction is not applicable to infrastructure related to forest protection.
4. Engineering works in respect of bund shall be minimized with naturalization of bund as a preferred option.

5. The lake shores to be naturalized as far as possible by planting macrophytes on the lake slope rather than providing hard stone pitching.
6. Research work to be promoted regarding the study of lakes and its ecology.



PEOPLE'S INVOLVEMENT

Van Panchayats

Van Panchayats in Uttarakhand were born out of conflicts and compromises that followed the settlements and reservations of forests in the hills in the last century. The first government-approved *Van Panchayat* was thus formed in 1921. There are 12,089 *Van Panchayats* in Uttarakhand managing 7350.85 sq.km. of forests. Most of these have been carved out of civil (protected) forests under the jurisdiction of the Revenue Department. It may be mentioned here that Community forests managed in accordance with the *Van Panchayat Rules* is a hybrid of state ownership and community responsibility. In its efforts to manage and control community forests, forest committees are guided by the Revenue Department rules and by the technical advice of the Forest Department. In contrast to civil forests, community forests or Panchayati forests as they are popularly known are not 'open' forests. Access and use of forests is guided by the rules elaborately designed and implemented by the communities. In fact, four identifiable working rules exist relating to use, monitor, sanctions and arbitration. Though only notionally or nominally owned by the communities, community forests are in a very real sense a common property with an identifiable user group,

have finite subtractive benefits and are susceptible to degradation when used beyond a sustainable limit. However what is more important is that the local users consider them as their collective property and in the real sense they are not actually divisible. These forests though are not immune from misuse and the condition of the forests varies from poor to very good..

Van Panchayat Rules, 2005:

The *Van Panchayat Rules, 2005* prescribes how *vanchayats* (Councils) can be formed and impose duties. The objective is to protect the forest areas and ensure that the forest products are being distributed among the right holders in an equitable manner. These *Van Panchayat Rules* lay down the broad parameters of management practices to be followed by the *Van Panchayats*.

The main function of *Van panchayats* are as follows:

(a) To develop and protect forests by preventing indiscriminate felling of trees and to fell only those trees which are marked for by the forest deptt. and are useful from the point of view of silviculture.

(b) To ensure that there is no encroachment on the Van Panchayat land and that no rules are being violated that are being enacted under the Kumaon and Sodic Land Act of 1948 and that no land should be encroached without prior permission for agricultural practices.

(c) To construct and fix boundary pillars and to maintain them.

(d) To carry out the directives of the Sub-Divisional Magistrate in developing and protecting forests.

(e) To distribute its produce amongst the right holders in an equitable manner.

(f) 20% of the area of the forest must be closed for grazing every year.

The Punitive Powers

(a) They can levy fines upto Rs. 500 with the prior approval of the Deputy Commissioner.

(b) They can seize intruding cattle and impound them under the Cattle Trespass Act of 1871.

(c) They can forfeit the weapons of the offender.

The administrative and financial powers

(a) They can sell grass, fallen twigs and stone slates to local people.

(b) The income realised from resin, timber and fees is distributed as follows:

  (i) Management Committee is given 30% for creating and maintaining community-based infrastructure;

  (ii) Management Committee is given 40% for local development schemes;

  (iii) And the remaining 30% is given for maintenance of local schemes which are useful for local people.

Preparation of Micro-plan for *Van Panchayat*

Survey

(1) Location of Van Panchayat

(2) Availability of natural resources

(3) Population of village

(4) Number of livestock

(5) Education level of villagers

(6) Land resources

(7) Climate and weather

(8) Potential of development

(9) Problems & solutions

After surveying the socio-economic condition & problems of the *Van Panchayat* the management committee prepared by forest department shall prioritize the work to be done in the micro plan as per consensus with the local people. Micro plan works always tends to provide livelihood opportunities & social upliftment of people as follows: (Other than conventional work of *Van Panchayat)*

(1) Entry point activity- construction of road, bridle path and bridges etc.

(2) Agriculture & irrigation- Rain water harvesting structure, distribution of minikit of high quality seeds, co-ordination with the irrigation department

(3) Fuel & Fodder- Plantation of fodder species and grasses on bunds of fields, to create awareness among people about the alternative sources of energy

(4) Animal husbandry- Pasture development

(5) To make aware people about bio diversity conservation & environment

(6) Capacity building of villagers by training & study tour

Present Scenario

At present 57 *Van Panchayat*s with a total area of 729.78 hectare are present in Bhagirathi Eco Sensitive Zone ESZ. A micro-plan is prepared for every Van Panchayat with the active participation of people under the guidance of forest department.

List of *Van Panchayat* villages falling within the Eco-Sensitive Zone

S.No.	Name of Village	Formation of Van panchayat (Yes/ No)	Formation of Biodiversity Management Committee (Yes/ No)	Selected under I.W.M.P Scheme (Yes/ No)	Area (in Hectares)
1	Agoda	Yes	-	-	3.822
2	Aleth	Yes	-	-	3.790
3	Bagori	Yes	Yes	-	184.3
4	Bagyal Gaon	Yes	-	-	1.350
5	Bandrani	Yes	Yes	Yes	11.288
6	Barsu	Yes	Yes	Yes	3.256
7	Bayana	Yes	-	-	6.090
8	Bhangeli	Yes	Yes	-	6.781
9	Bhankoli	Yes	Yes	-	22.589
10	Bhatwari	Yes	-	Yes	2.364
11	Bhela Tipri	Yes	-	-	5.643
12	Bhukki	Yes	-	-	2.933

S.No.	Name of Village	Formation of Van panchayat (Yes/ No)	Formation of Biodiversity Management Committee (Yes/ No)	Selected under I.W.M.P Scheme (Yes/ No)	Area (in Hectares)
13	Bonga	Yes	-	-	5.699
14	Dwari	Yes	Yes	-	16.459
15	Didsari	Yes	-	-	1.445
16	Gajoli	Yes	Yes	-	19.464
17	Gawana	Yes	-	Yes	25.611
18	Gorshali	Yes	Yes	Yes	25.940
19	Gyanja	Yes	-	-	1.007
20	Hinna	Yes	-	Yes	5.004
21	Hurri	Yes	Yes	-	7.202
22	Harsil	-	-	-	124.2
23	Jakhol	Yes	-	Yes	9.730
24	Jaspur	Yes	Yes	-	4.058
25	Jhaala	Yes	Yes	-	3.936
26	Kyark	-	-	Yes	
27	Laata	Yes	-	-	14.206
28	Malla	Yes	-	Yes	15.112
29	Mandou	Yes	-	-	8.519
30	Maneri	Yes	-	Yes	22.860
31	Mukhawa	Yes	-	-	2.046
32	Nald Bodhhar	Yes	-	-	15.248
33	Natin	Yes	-	Yes	4.285
34	Nalang	Yes	-	-	
35	Netala	Yes	Yes	Yes	10.290
36	Nirakot	Yes	-	-	0.840
37	Nesmor	Yes	Yes	-	9.730
38	Ongee	Yes	-	Yes	3.766
39	Pahi	Yes	-	Yes	18.448
40	Pala Maradi	Yes	-	Yes	4.221
41	Paata	Yes	-	-	5.106
42	Pilang	Yes	Yes	-	7.098
43	Purali	Yes	Yes	-	3.54
44	Raithal	Yes	Yes	Yes	3.22
45	Sald	Yes	-	-	0.663
46	Salang	Yes	Yes	-	12.696
47	Saalu	Yes	-	-	8.569
48	Sangrali	Yes	-	-	
49	Saari	Yes	-	-	8.348
50	Saura	Yes	Yes	Yes	3.541

S.No.	Name of Village	Formation of Van panchayat (Yes/ No)	Formation of Biodiversity Management Committee (Yes/ No)	Selected under I.W.M.P Scheme (Yes/ No)	Area (in Hectares)
51	Seku	Yes	Yes	-	8.140
52	Silla	Yes	-	-	12.949
53	Sukki	Yes	-	-	2.714
54	Sungar	Yes	-	-	4.789
55	Syaba	Yes	-	-	5.901
56	Thalan	Yes	Yes	-	0.887
57	Tihar	Yes	-	-	8.087
		Total			**729.78**

Future Strategy

Van Panchayat is an effective mechanism for active involvement of the local people in the conservation of forest, developmental work, planning for the increase in productivity, distribution of usufructs & to encourage local people in decision making for the management of van panchayat. It is based on care and share policy. Present policy shall be followed in the future under the guidelines of the Working Plan of Uttarkashi Forest Division& Management Plan of Gangotri National Park.

RIGHTS AND CONCESSIONS

The forest rights and concessions are governed mainly by the erstwhile Tehri State Darbar Circular no. 21of 1930 with certain amendments made by the Govt. from time to time. The rules are incorporated in the Tehri Garhwal Rajya Forest Manual published by Chief Secretary, Tehri Garhwal State's Order No. M.O.B. No. 5/8-C/XIX-F-23, Dated 27 July 1940. Rules and Conditions Governing the Exercise of Rights, Concession and Grazing etc Annexed as **(Annexure-43A)** and CCF Garhwal regarding Rights Order No. Kha-976, 17-2 dated Dehradun April 6, 1998 Annexed as **(Annexure-43B).**

The Hon'ble Supreme Court by an order dated 21th January 1998 permitted only 32000 cubic metres annual free grant for building timber to the entire state of Uttarakhand . In compliance to the order passed by Hon'ble Supreme Court the Chief Conservator of Forest Garhwal Region vide its letter no. B-976/17-2 dated 06thApril 1998 allocated 2488 cubic metres per year free grant to Uttarkashi Forest Division. So accordingly, free-grant timber is being provided to the villages falling under Uttarkashi Forest Division.

Present Scenario

The procedure for free annual grant :

A. Every year the *Gram Sabhapati* will apply to the Range Officer concerned in the prescribed form for the free grant of timber for his villages, latest by 31st March. The application received after the said date will not be considered.

B. The Range Officer submits the indents to the Divisional Forest Officer and obtains his approval by 15th May.

C. The trees are marked from June to September every year.

D. The Range Officer submits the list of marking to the Divisional Forest Officer for sanction as soon as the marking in a particular area is completed but latest by 31st August.

E. The Divisional Forest Officer or his assistant inspects the marking, as far as possible, between 1st December and 31st October and accords his sanction.

F. The Range Officer sends the list of trees marked to the Gram Pradhan concerned by 1st November.

G. The villagers remove the marked trees by 31st of March the following year as per the orders issued under G.O.No. 365/XIV-515/1949 dated 8 February 1952.

H. According to Hon'ble Apex court Order such claim shall be made only from dead, diseased, uprooted trees. In case any new decision/order is passed by the Hon'ble Supreme Court in future then such a right shall be deviated accordingly.

I. Accordingly to the decision taken in the 51st meeting of the Forest Fact Finding Committee on 29th January 1964 the Gram Pradhan shall maintain a register showing therein the details of the timber received in the free grant and its distribution to the individual villagers. Panchayat secretary shall submit the account of the timber of annual free grant to the Range Officer concerned. If proper account is not maintained by the Gram Pradhan the free grant for the next year shall not be given.

Fuel, fodder grasses and litter

1. Fodder grass and litter can be removed from the areas not closed for regeneration of plantation. The Divisional Forest Officer can allow cutting of grass in the areas closed for regeneration of plantation under the supervision of the forest officials provided that no damage is caused to such areas by the villagers.
2. The villagers can remove the fallen leaves if no damage is caused to the forests.
3. Removal of dry fallen wood for fuel is permitted.
4. Lopping of *Kokat* (trees that are not of much importance) and *banj* (Oak) trees for green leaves in the areas open for the purpose can be done according to the prescriptions of the Working Plan.
5. Dry pine needles can be collected for commercial purposes with the permission of the DFO. Local people get livelihood opportunities in this activity.

Livestock Grazing

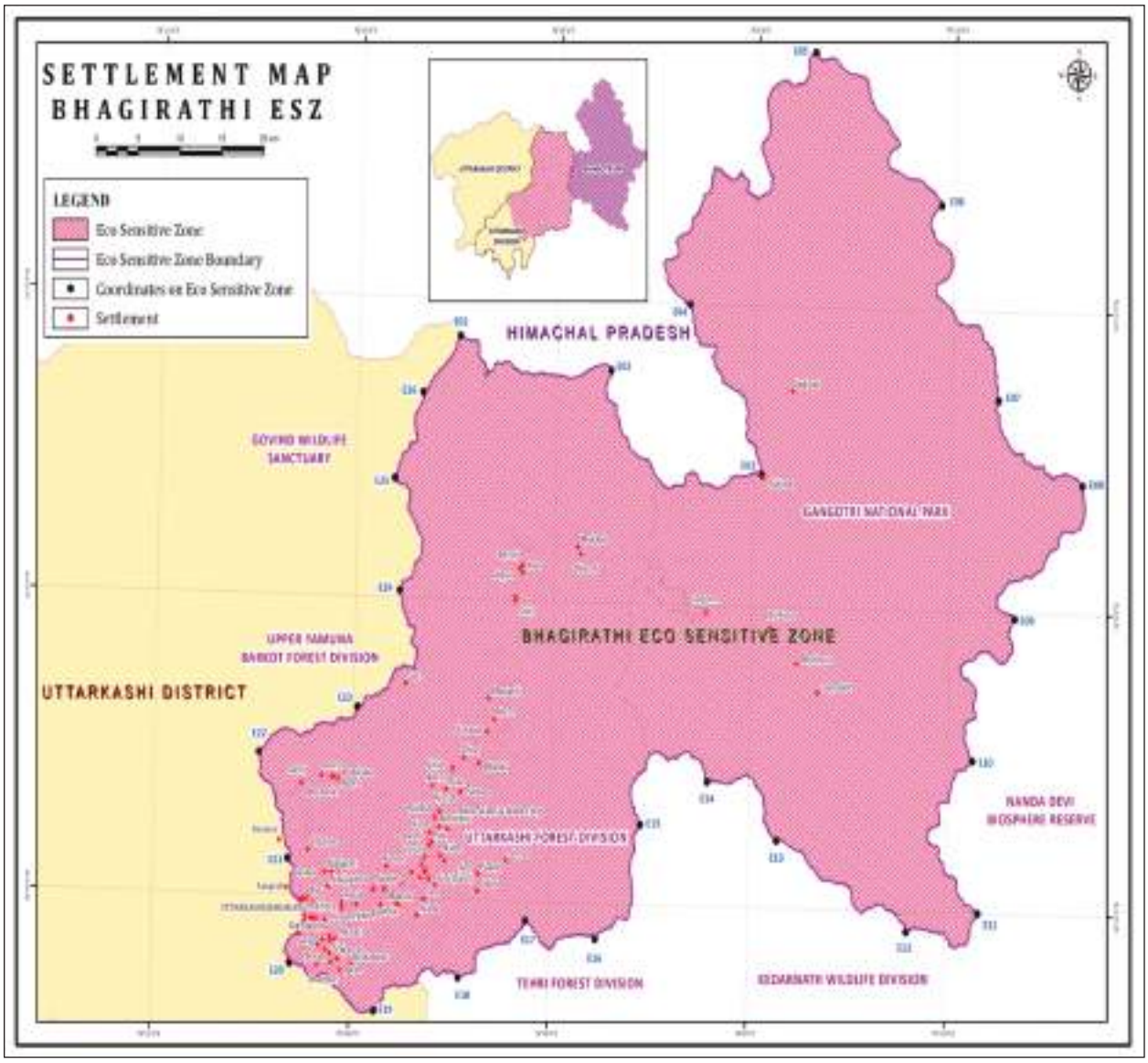
Livestock including cows, buffaloes, goat and sheep and pack animals (horse and mule) maintained by the villagers for their bonafide requirement are allowed free grazing within a radius of 8 kilometres of the village concerned.

Recorded Annual Free Grant given to the villages falling under the Eco-Sensitive Zone are as under:

S. No.	Name of Village/Town	Name of Range	No. of Households	Right (quantity in cu. mt.) per year
1	2	3	4	6
1	Agoda	Badahat	46	9.20
2	Aleth	Mukhem	26	5.20
3	Bagori	Gangotri	2	0.396
4	Bagyal Gaon	Badahat	28	5.6
5	Bandrani	Taknor	38	7.524
6	Barsu	-"-	35	6.930

S. No.	Name of Village/Town	Name of Range	No. of Households	Right (quantity in cu. mt.) per year
1	2	3	4	6
7	Bayana	Mukhem	56	11.20
8	Bhangeli	Taknor	42	8.316
9	Bhancoli	Badahat	52	10.4
10	Bhatwari	Taknor	22	10.296
11	Bhela Tipri	Mukhem	25	5.00
12	Bhukki	Taknor	16	3.168
13	Bonga	Mukhem	110	22.2
14	Bongari	Mukhem	43	8.600
15	Dandalka	Badahat	6	1.2
16	Dansda	Badahat	16	3.20
17	Dhanpur	Mukhem	32	6.40
18	Dharali	Gangotri	20	3.960
19	Dwari	Taknor	55	10.890
20	Didsari	Mukhem	36	7.2
21	Dovah	Mukhem	36	7.2
22	Gajoli	Badahat	52	10.4
23	Gangotri	Gangotri	4	0.792
24	Gawana	Badahat	58	11.6
25	Gorshali	Taknor	130	25.740
26	Gyanja	Badahat	33	6.6
27	Hinna	Badahat	31	6.20
28	Hurri	Taknor	30	5.940
29	Harsil	Gangotri	30	5.940
30	Jakhol	Badahat	46	9.20
31	Jamak	Mukhem	34	6.8
32	Jaspur	Gangotri	16	3.168
33	Jhala	-"-	69	13.662
34	Jodaw	Taknor	10	1.980
35	Jokani	-"-	13	2.574
36	Joshiyara	Mukhem	28	5.6
37	Kamar	Mukhem	28	5.6
38	Kaneth	Badahat	1	0.2
39	Kankrari	Mukhem	42	8.4
40	Kishanpur	-"-	115	23.0
41	Kotiyal Gaun	-"-	25	5.0
42	Kumalti	Badahat	30	6.00
43	Kansain	Mukhem	39	7.8
44	Kuroli	Mukhem	79	15.8
45	Kyark	Taknor	51	10.098
46	Ladari	Mukhem	44	8.80
47	Lata	-"-	57	11.4

S. No.	Name of Village/Town	Name of Range	No. of Households	Right (quantity in cu. mt.) per year
1	2	3	4	6
48	Malla	Taknor	107	21.186
49	Mando	Mukhem	44	8.80
50	Maneri	Badahat	50	10.00
51	Manpur	Mukhem	71	14.2
52	Mastari	-"-	12	2.40
53	Mukhawa	Gangotri	30	5.940
54	Nald Bodhhar	Badahat	60	12.00
55	Natin	Taknor	20	3.960
56	Naugaon	Badahat	52	10.40
57	Netala	Badahat	61	12.2
58	Nirakot	Badahat	-	-
59	Nesmor	Badahat	53	10.6
60	Ongee	-"-	28	5.6
61	Pahi	Taknor	48	9.504
62	Pala Maradi	-"-	22	4.356
63	Pata	Badahat	52	10.4
64	Pilang	Taknor	60	11.880
65	Purali	Gangotri	27	5.346
66	Raithal	Taknor	137	27.126
67	Sald Urph Maja Gaon	Badahat	72	14.4
68	Sanj	-"-	77	15.4
69	Salang	Taknor	67	13.266
70	Salu	Mukhem	40	8.00
71	Sangrali	Badahat	33	6.6
72	Sada	Mukhem	20	4.00
73	Sadaga	-"-	8	1.60
74	Sari	-"-	58	11.6
75	Saura	-"-	70	14.0
76	Seku	Badahat	56	11.2
77	Silla	Taknor	60	11.88
78	Silyan	Mukhem	11	2.2
79	Siror	-"-	67	13.4
80	Sukki	Gangotri	67	13.266
81	Sungar	Taknor	10	1.980
82	Syaba	Mukhem	46	9.20
83	Thalan	-"-	75	15.0
84	Tehar	Taknor	72	14.256
85	Tiloth	Mukhem	40	8.00
86	Uttarkashi	Badahat	-	-
87	Uttron	Badahat	77	15.4



Future Strategy

The annual grant of rights and concessions shall be provided in the future as per the Tehri State Darbaar Circular no. 21 of 1930.A total of 2488 cu.mt.per year annual free grant will be given to villagers as per the directions of the Hon'ble Supreme Court judgement.The procedure provided in the Working Plan, shall be followed in future also.

B. GANGOTRI NATIONAL PARK

A policy of minimal intervention in natural biological process has been followed in the Management Plan of the Gangotri National Park, considering the fragility of the high Himalayan Eco Systems. The floral and faunal assemblages of PA. have arisen through years of change and adaptations to a natural set of conditions.

ZONATION

Core Zone

The total area of 2, 39,002.40 hectares of Gangotri National Park, as intentionally notified, vide Gazette Notification No. 3962/14-3-89/88 dated 16 September 1989 of U.P. Govt. Lucknow, serves as the Core Zone. The major strategy for the entire national park (Core Zone) will be protection. A small Tourism Zone shall be identified within this area for limited and regulated tourism.

Entry into the park by persons other than the PA/ITBP/Indian Army staff will be permitted only with a written permission from the Chief Wildlife Warden (CWLW) or his authorized officer. The ITBP or the Indian Army personnel other than the permanently stationed staff will also, however, need to obtain permission from the CWLW as per the provisions of the Wildlife (Protection) Act, 1972.The area will be used for wildlife education and research as per the provisions of this plan.

Eco-restoration work will be carried out, and communication network will be developed. The staff quarters inside the PA are not adequate. It is thus difficult for the staff to monitor the activities inside the park. Staff quarters and touring huts need to be constructed at suitable locations such as Bhojbasa, Naga, Sonam, Neela Pani, Bhaironghati and Gangotri.

Buffer Zone

Presently the area of Gangotri Range of Uttarkashi Forest Division is the proposed Buffer Zone for Gangotri National Park. The area of this zone is 669.85 km2 and shall be managed as per the Working Plan of the Uttarkashi Forest Division.

Eco-development

It is conservation oriented rural development designed with the participation of the local people for the purpose of reconciling the genuine needs of the people and compatible PA management objectives.The Eco-Development Zone extends up to 5 km from the boundary of the national park as per G.O. UO-84/14 Pa.Bhu.-99-63/ dated 21 May 1999, issued by the U.P. Government to this effect, and includes all the villages located in this zone of influence.

Tourism

The proposal for development of the Tourism Zone will include the following areas for development of tourism.

A. Gangori–Gaumukh–Tapovan zone B. Bhaironghati–Nelong zone C. Gangotri-Kedartal

Gaumukh, located inside the park, and Gangotri, on the fringe, are centres of great attraction for pilgrims, tourists and nature lovers hailing from across the country and abroad. Apart from this snowy peak, *bugyals* such as Kedar Ganga are also places of great attraction. Nelong Valley, a very beautiful landscape having cold desert topography, also attracts tourists. Tourism was initiated on an experimental basis from Bhaironghati to Nelong in 2015–2016. Detailed prescriptions relating to tourism has been discussed in Chapter 9 under 'Tourism'.

FUTURE MANAGEMENT

Protection

Owing to the rugged terrain and unfavourable climatic conditions in the PA and the lack of staff and camping facilities in the interior areas, the PA is vulnerable to poaching. Further, there are numerous exit points without any checkposts.

This helps offenders escape safely. Hence, creation of additional posts and construction of camping huts (snow huts) are needed. A new barrier needs to be established at Kedartal and strengthened on priority. Modern methods of surveillance need to be brought in to deal with the protection issues in the very difficult and inhospitable terrain of Gangotri National Park.

Habitat management

Locals and nomadic shepherds have subjected parts of the area, namely Jadganga Valley, to high grazing pressures. This has led to degradation of the habitat in certain parts of the PA. Landslides occur sporadically, and the vegetation has been reduced at most places. The area is sensitive to fire owing to the dry nature of the forests. However, since there are no habitations, the chance of fires breaking out is minimal.

Weed management

The alpine pastures of the PA constitute a prime habitat for the endemic herbivorous population of the PA. The vegetation found consists of *Aconitum* spp., *Primula* spp., *Potentilla* spp., *Fragaria* spp., etc. These alpine pastures are also summer resorts for local grazers. Because of the heavy grazing pressure in some areas, the weed Rumex has started colonizing them. To put a check on the aggression of this weed, diversion of the grazing pressure and manual uprooting of the weed in the flowering season are suggested.

Soil conservation works

The entire national park area is under a great thrust of tectonic movement. A combination of steep slopes and heavy downpours causes heavy landslides. Certain areas affected by grazing are witnessing soil erosion. In order to put a check on the erosion, construction of suitable engineering structures coupled with planting of suitable species is proposed. The soil and moisture conservation measures in the area has been discussed in detail in Chapter 2 “Watershed management”.

Human—wildlife conflicts and mitigation

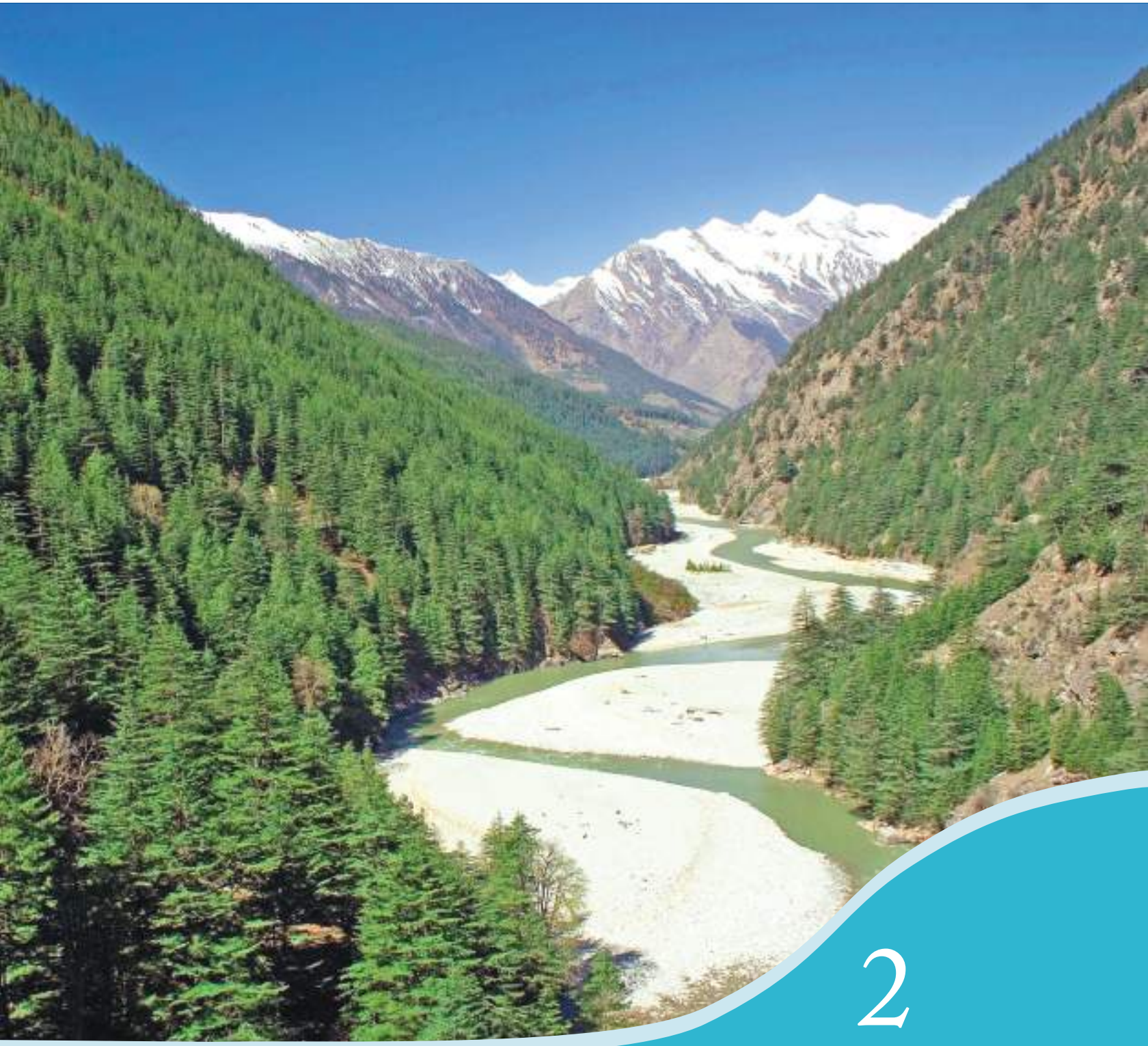
The basic cause of human–wildlife conflict is the overuse of wildlife habitat by humans and cattle. The dependence of people on the natural habitats of Gangotri National Park is negligible, and consequently man–animal conflicts are unheard of.

Anti-poaching measures

The rugged terrain and unfavourable climatic conditions in the PA coupled with the lack of adequate staff and camping facilities in the interior areas make the PA vulnerable to poaching. In addition, there are numerous exit points without any check posts. This helps offenders escape safely. Hence, additional posts need to be created, and construction of camping huts (snow huts) is needed. A new barrier needs to be established on the Gangotri—Kedartal bridle path and strengthened like the Kankhu barrier.

Physical and Financial Outlay

The physical and financial plan for Gangotri National Park is provided in the end of this chapter.



2 CHAPTER

WATERSHED MANAGEMENT

2 CHAPTER

WATERSHED MANAGEMENT

INTRODUCTION

Watershed is defined as a geo-hydrological unit draining into a common point by a system of drains. A watershed is thus an area of land and water bounded by a drainage divide within which the surface run off collects and flows out of the watershed through a single outlet into a larger river.

The total catchment of river Bhagirathi from Gaumukh to Uttarkashi constitutes a huge watershed of 4179.59 Sq.km. The river is fed by many large and small tributaries, most of which emanate directly from glaciers. On the lower catchment of these streams, human settlement along with agricultural land is situated, thus these streams provide lifeline to these villages. The entire watershed of Bhagirathi Eco-Sensitive Zone contains 89 villages, mostly either on the bank of river Bhagirathi or its tributaries. The area being a part of the upper Himalayas is ecologically fragile hence very much prone to landslides and soil erosion. Thus identification of the vulnerable areas vis-à-vis soil erosion/ landslides etc and its management on a watershed approach is the core objective of Zonal Master Plan.

The area of Bhagirathi Eco-Sensitive Zone contain a large number of water resources in the form of big & small water streams (seasonal and perennial) as tributaries of Bhagirathi river and high altitude lakes (tals). The mapping of small water streams particularly those, which pass through the human settlement and form the watershed on the upper valley of the villages has been done and the treatment based on broad watershed management principles has been proposed. Present status report of the glaciers along with the necessary guidelines for their future conservation has also been included in the chapter.

The high altitude lakes, tals, have been identified as per available studies and guidelines for their conservation have been devised. Also the catchment treatment

of the watershed of vulnerable lakes (where human interference is reported) has been proposed to enhance recharging and water holding capacity and to prevent any siltation.

Agricultural land on the lower areas of the vulnerable streams has been identified and treatment of upper catchment of these streams has been prescribed with an objective to provide/recharge water for better farmer productivity.

OBJECTIVE

1. To protect, conserve and ensure the consistent flow of river Bhagirathi by applying broad principles of watershed management so as to conserve the rich biodiversity of the area including flora and fauna.
2. To formulate Watershed Management plans for each micro-watersheds through peoples' participation in all the villages of the ESZ area so as to enhance the livelihood options of the rural households.
3. To identify different aquifers in the area and prescribe treatment plan of the threatened one with micro watershed as the basic unit.
4. To enhance the forest cover in the area by preventing soil erosion & degradation and planting local indigenous species for better ecological balance and biodiversity conservation.
5. To control damaging run off and to promote soil & water conservation.
6. To increase infiltration of rainwater and enhance ground water recharge to increase the moisture contents in agriculture lands for better farm productivity.
7. To ensure active peoples'participation in achieving all watershed management objectives

PROVISIONS /CLAUSES IN THE NOTIFICATION RELATED TO WATERSHED MANAGEMENT

S.No.	Clause	Content
1.	2(4)	The Zonal Master Plan shall provide for restoration of denuded areas,conservation of existing water bodies, management of catchment areas, watershed management, groundwater management, soil and moisture conservation, needs of local community and such other aspects of the ecology and environment that need attention.
2.	2(5)	The Zonal Master Plan shall be prepared based on watershed approach. Itshall also ensure that there is no attempt to tamper with the natural boundariesof the river and tributaries through the construction of any kind of structures on the banks of the river and tributaries.
3.	2(17)	Natural Springs.- The catchment areas of all springs shall be identified and plans for their conservation and rejuvenation of those that have run dry, in their natural setting shall be incorporated in the Zonal Master Plan and strict guidelines shall be drawn up by the State Government to ban development activities at or near these areas;
4.	3c(i)	Rainwater harvesting.

PRESENT SCENARIO

Presently different departments are involved in watershed conservation activities in Bhagirathi Eco-Sensitive Zone. The upper area of the watershed is under the management of Forest the Department. Agriculture & Horticulture Department manage the lower areas including agricultural land near the villages by implementing various schemes of Central and State Government. In addition to it irrigation canal system, river bank protection worksis done by the Irrigation Department. The area of Bhagirathi Ecosensitive Zone thus requires the convergence of various schemes related to watershed works, development of microenterprises and livelihood generation. Like wise the watershed management has many issues and challenges which need to be addressed during implementation of works.

ISSUES & CHALLENGES

- Degradation caused by unsustainable exploitation of natural resources
- Decreasing amount and quality of water resources
- Damages caused by natural disasters like heavy floods, landslides, Forest fires, etc.
- Reduction in replenishment of groundwater due to degradation in ground cover as a result of heavy storms, Floods, forest fires, landslides etc increasing the amount of sediment in surface water and rampant soil erosion.
- Increase of soil and water contamination from inappropriate use of chemicals and fertilizers.
- Rural poverty in the uplands, causing migration to crowded urban centres
- Poor infrastructure and therefore limited access to markets, health care and education
- Poor irrigation system

Future management in zonal master plan in different chapters have covered the above issues. The above issues have been addressed extensively in Chapter-4, Chapter-5, Chapter-8, Chapter-9 & Chapter-11. Chawill include the addressal of the above mentioned issues. The implementation of the watershed management plan shall be based on the integration of the watershed works with the microenterprise development and livelihood generation schemes being implemented by various departments. A participatory approach involving the local communities shall be the basic principle of implementation of watershed management.

(A) FOREST DEPARTMENT

1. **Integrated Watershed Management Program (SWP VI) :** A Special Watershed Programme VI (SWP VI) is currently being implemented by Uttarkashi Forest Division, as the project implementing agency, in 25 revenue villages of Bhatwari block of Uttarkashi district aiming at treatment of 9 micro watershed of river Bhagirathi. The programme was initiated in 2013-14 with an objective to overcome the precedent damages and losses caused to infrastructure in the area in 2013 disaster.

   The main objective of the Project is to conserve, restore and rehabilitate the disaster affected inhabitants of the area and to increase the productivity and income of the rural inhabitants in the affected areas through Participatory Watershed Management.

   A separate Directorate- Watershed Management Directorate (WMD) has been established as a nodal agency for coordination, monitoring and implementation of integrated watershed development program in the Uttarakhand State.

Agencies involved in project implementation

1. State level Nodal agency (SLNA) : Watershed Management Directorate at Dehradun
2. District Watershed Programme Unit: Headed by District Magistrate, Uttarkashi
3. Project Implementing Agency: Uttarkashi Forest Division
4. Watershed Development Team (for helping Watershed Committee in livelihood & Micro- enterprise activities).
5. Watershed Committee: The program is being implementing at the village level by Watershed Management Committee headed by Gram Pradhan as per the Watershed Guidelines 2008 of Govt. of India and amended in 2011.

Present status of project implementation

The project was initially for a period of four years (2013-14 to 2017-18). But due to delay in funds availability, the project may extended till 2019-20. Around 12% funds of the total sanctioned budget have been received so far. The project is being implemented through Watershed Management Committees as per the Common Guidelines for Watershed Development, 2008, Govt. of India. This is a project which is based on community participation at the village level.

Project area for affected micro watershed

The 9 (nine) micro watersheds of Bhatwari Block, district Uttarkashi in the Bhagirathi eco-sensitive zone were severely affected by 2012, 2013 disaster. About 25 villages of these micro watersheds were taken up for the eco-restoration programme.

Summary of the Project Area

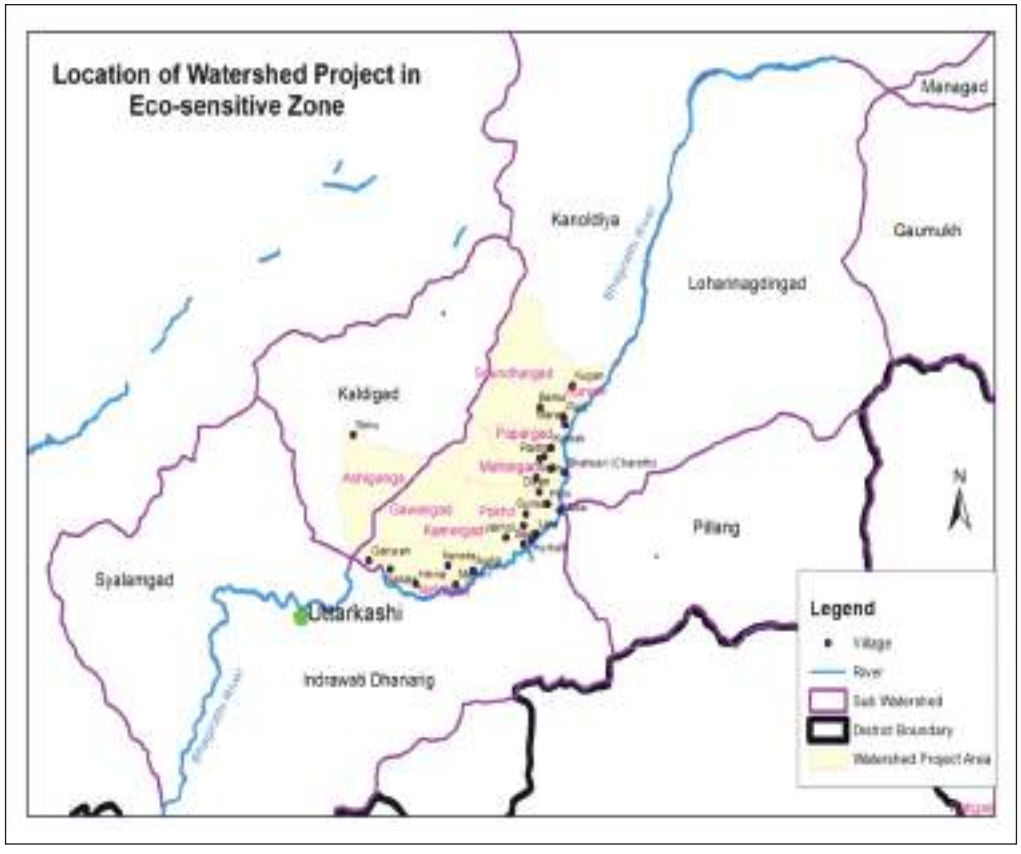
District	Development Blocks	No. of MWS	MWS Area (in Hectare)	No of Village	RV Area (in Hectare)	Treatable area (in Hectare)	House holds	Population
Uttarkashi	Bhatwari	9	18346	25	4551	14972	2824	13622

Micro watershed wise details of the Project area

Project Name	MWS	MWS Area (In Hectare)	No of Villages	Revenue Village area (in Hectare)	Proposed Area for Treatment (in Hectare)	No. of House holds	Population
Uttarkashi-SWP-I/2013-14	Ashiganga	2695	1	173.4	2275	177	939
	Gawangad	2944	1	190.78	2557	174	879
	Kamergad	1256	1	104.4	1194	52	226
	Kunjan	1125	1	198.24	642	94	377
	Mahargad	1675	4	390.3	1386	512	2335
	Netalgad	1438	5	685.68	1388	767	3614
	Papargad	1365	1	373.94	1067	170	904
	Pokhri	2268	9	1904.07	1968	756	3662
	Soundhargad	3580	2	529.94	2495	122	686
Total	**9**	**18346**	**25**	**4550.75**	**14972**	**2824**	**13622**

S.No.	Micro watershed	Village	Treatable Area (Hectare)	Amount (Rs)
1	Asiganga	Seku	1660.119	24901785.00
		Nald	737.812	11067180.00
2	Gawana gaad	Gawana	1353.965	20309475.00
3	Naitala gaad	Heena	1081.341	16220115.00
		Naitaala	1070.275	16054125.00
		Maneri	816.625	12249375.00
		Kaneth	564.140	8462100.00
4	Kaamar gaad	Ongi	282.215	4233225.00

S.No.	Micro watershed	Village	Treatable Area (Hectare)	Amount (Rs)
5	Pokhri gaad	Sainj	343.556	5153340.00
		Jakhol	424.102	6361530.00
		Laata	82.075	1231125.00
		Kumalti	33.419	501285.00
		Malla	183.225	2748375.00
		Ghorsaali	1256.627	18849405.00
		Jonkaani	82.717	1240755.00
		Dwaari	268.490	4027350.00
6	Mahar gaad	Paahi	84.401	1266015.00
		Bhatwari	108.576	1628640.00
		Bandraani	106.158	1592370.00
		Nateen	123.019	1845285.00
7	Paapad gaad	Kyaark	69.188	1037820.00
		Raithal	1156.106	17341590.00
8	Swari gaad	Baarsu	1837.793	27566895.00
		Paala Maradi	495.837	7437555.00
9	Kujjan gaad	Kujjan	750.219	11253285.00
		Total	**14972.000**	**224580000.00**



Map showing areas of special watershed project

PROJECT ACTIVITIES

The major activities which are proposed to be taken up are as follows:-

(a) Watershed Works : Activities like-rural connectivity, drainage line treatment, agriculture terrace repair, restoration of horticulture and fuel wood and fodder plantations, restoration of water supply through repair of damaged structures and construction of new water harvesting structures.

As per DPR Watershed development work has been conducted in four domains which are as follows:

S.No.	Domain	Work prescribed in revenue village area	Works units proposed in DPR
1	Water conservation & enrichment	Construction of irrigation canal	5834 metre
		Water harvesting tanks	350 m3/ 14 number
		Irrigation pipelines	209 metre
		Irrigation tank	720 m3/ 6 number
		Construction of chaal, khaal	24 number
2	Soil conservation work	Roadside protection wall	775 m3/51 number
		Crate wire check dam	2241 m3/ 224 number
		River bank protection work	6655 m3/ 65 number
		Dry stone checkdam	10584 m3/ 1058 number
3	Work in Individual land	Maintenance of retaining/sidewall	1170 m3
4	Community works	Bamboo plantation, & other plantation	10 hectare for Bamboo plantation, 83.5 hectare for other plantation.

(b) Production mechanism & Micro Enterprise : Agriculture is the main stay of the rural economy so IWMP project focus on providing intensive agriculture/ horticulture inputs to enhance the awareness and knowledge of farmers about the agriculture techniques and significance of bio- fertilizer with an objective to increase the productivity substantially.

Production mechanism & micro enterprise works includes farming of wheat, rice,millets, pulses, micro enterprise rejuvenation, farming of spices, vegetable growing, vermi- composting & poly-house and agriculture equipment's.

(c) Livelihood Initiatives : IWMP program was initiated not only with the objective of watershed management but also aims at betterment of poor families by providing Livelihood opportunities. In SWP-VI, livelihood opportunities being generated for the local people of 25 villages by means of Self Help Groups.

A total of 22 Self Help Groups have been identified and are working for livelihood generation. Livelihood generation works mainly includes goat rearing, sheep rearing, poultry, milk production, iron goods making, cloth stitching, tent house, small business, local production marketing group.

Financial Summary

Total budget sanctioned for the project	Rs 2245.80 lac.
Budget released by SLNA as of November 2017	Rs 267.81165 lac
Expenditure till November 2017	Rs. 236.32036 lac

The implementation of this project could not be started at time, so the project duration may get extended up to 2019-20, subject to budgetary provision in future.

Funding agency

The Restoration Watershed Project was proposed under Special Watershed Projects supported by the Centrally Sponsored Schemes namely Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) - Watershed Development. The estimated cost of the Project is Rs. 22.45 crore and was approved by the State Level Nodal Agency (SLNA) of Uttarakhand State on dated 25-02-2014 and the same was sanctioned by the Department of Land Resources, Ministry of Rural Development, and Govt. of India.

Project period

The project period is of four years.

Project monitoring

This special watershed project would be implemented by the Gram Panchayats and Watershed Management Directorate as per the guiding principles of Common Guidelines for Watershed Projects 2008 of Govt. of India. At the district level Uttarkashi Forest Division is nominated as the Project Implementation Agency (PIA) to implement and monitor the project. A third party monitoring & evaluation will also be done as per the guidelines of the Government of India.

2. **Japan International Co-operation Agency (JICA) :** The activities for the restoration of disaster affected infrastructure like roads and landslides etc are funded by JICA.

Proposed Soil & Moisture Conservation Work under JICA

Sl.No.	Block	Range	Name of work	Unit	Amount (in lac)
1	Bhatwari	Gangotri	Dharali-3 jochiriya nala	L.S	10.00
2			Dharali-3 Chholmi nala	L.S	5.00
3			Gangotri- Patangni-5 nala	L.S	6.00
4			Gangotri-3 Pakoda-gad nala	L.S	5.00
5			Dharali-4 Khhir-gad nala	L.S	10.00
6			Songad Plantation area /nala	L.S	10.00
7		Taknor	Bakriya top & Narubana area	L.S	5.00
8			Vill Dwari ke gognua/Fadkudiya tok area	L.S	5.00
9	Batwari	Taknor	Dayara-Bugyal ke goi & Naheta area	L.S	6.00
10			Silla to palsyari nala	L.S	8.00
11			Vill Palla ke Swaari-gad	L.S	10.00
12		Barahat	Tinyada khala	L.S	7.50
13			Nali nama nala part-2	L.S	7.50
14			Ringali nala	L.S	7.50
15			DandaThaatar nala	L.S	7.50
16			Bougyapani nala	L.S	8.25

Sl.No.	Block	Range	Name of work	Unit	Amount (in lac)
17			Garampani dhar nala	L.S	7.50
18			Arkhandi nala I &II	L.S	7.50
19			Jokla khala	L.S	7.50
20			Patho nala	L.S	9.00
21			Daudaw nala	L.S	7.50
22			Munora kahala I & II	L.S	8.25
23			Bagodi nala I	L.S	7.50
24			Hodiyada nala	L.S	7.50
25			Maandni khad	L.S	7.50
26			Bagodi nala II	L.S	7.50
27			Hewra nala	L.S	9.00
28			Bhilu nala	L.S	9.00
29			Sunarkhala-rawara nala	L.S	7.50
30			Maandoni khala	L.S	7.50
31			Golinda khala	L.S	9.00
32			Pilona nala II	L.S	9.00
33			Pilona nala III	L.S	7.50
34			Nairtha nala	L.S	9.00
35			Parnala	L.S	8.25
36			Chimchiyadi nala	L.S	9.00
37			Bondhar nala	L.S	9.00
38			Kundi nala	L.S	7.50
39	Bhatwari	Barahat	Nagni Chhota nala	L.S	9.00
40			Laldhang nala	L.S	6.00
41			Ghattu nala	L.S	7.50
42			Mando nala	L.S	9.75
43			Vasuki nala	L.S	7.50
44			Lau kanaka khaada nala	L.S	7.50
45			Namla khala	L.S	7.50
46			Pirmudiya khala	L.S	7.50
47			Dagudi-dhar nala	L.S	8.25
48			Mati dhar nala	L.S	7.50
49			Molu khud nala	L.S	6.00
50			Bouludi khala	L.S	9.00
51			Nismor 2a damage area	L.S	1.05
52			Jhangara tok	L.S	4.80

Sl.No.	Block	Range	Name of work	Unit	Amount (in lac)
53			Pilona damage area	L.S	3.00
54			Khainda nala	L.S	1.75
55			Daudbhinda dhar area	L.S	8.00
56			Digela powerhouse damage area	L.S	4.00
57			Kunda nala	L.S	8.00
58			Dodital-5c area	L.S	3.50
59			Dodital-4c area	L.S	1.50
60			Bhamoru damage area	L.S	3.00
61		Mukhem	Pipalkhala-badagaddi-13 damage area	L.S	5.00
62			Chargad nala	L.S	5.00
63			Kamar gad damage area	L.S	10.00
64			Bhaungad nala	L.S	5.00
65			Dilasour nala	L.S	5.00
66			Andhera nala soura gad-7	L.S	10.00
67			Devriya nala badagaddi-13b	L.S	10.00
			Total		**478.35**

3. **Agriculture Department :** The non-reserve forest area of the entire watershed is 7266 hectares out of which 4827.274 hectares of area is agricultural land. The total area suitable for cultivation is 4531.01 hectare. Presently Agriculture department is implementing various schemes of the State & Central Government for increasing farm productivity in the area. The schemes like National Mission on Sustainable Agriculture, National Mission on Agriculture Extension and Technology, National Mission on Oilseed and Oil Palm, Pradhan Mantri Krishi Senchayee Yojna are being implemented by Agriculture Department. Detailed information about the activities of Agriculture Department is provided in chapter 3 under "Agriculture & Allied Sector".

4. **Irrigation Department :** Irrigation department is currently looking after the establishment and maintenance of minor canals in the area along with flood protection work. In addition it undergoes renovation and restoration of existing ghats on the bank of river Bhagirathi. River training works such as river channelization, flood protection walls etc. are constructed by the Irrigation department on banks of river so as to guide and confine the flow into the main course to regulate the riverbed configuration and thus protecting the area/properties along the bank. The total culturable command area covered under existing irrigation system is 830 hectares. Detailed information about the activities of Irrigation department related to watershed is described in Chapter 6 under "Irrigation".

FUTURE MANAGEMENT

The Bhagirathi watershed contains 64 micro watersheds including several streams and 13 tals which ultimately joins the Bhagirathi river at different places from Gaumukh to Uttarkashi. The area of the Gangotri National Park is far away from the human interference and the area of Uttarkashi Forest Division in its higher reaches is also free of anthropogenic activities. About 80 streams in Uttarkashi Forest Division and 33 streams in Gangotri National Park have been found prone to soil erosion

and landslides. Most of the above cited streams therefore need soil & moisture conservation treatment to reduce the rampant soil erosion in micro watershed and siltation. In addition to it, these streams have direct or indirect impact on the agricultural activities/ productivity of the nearby villages. The 13 high altitude lakes in the area are unique water resources which need effective watershed management strategy for the consistent water availability and sustainability.

The watershed based futuristic planning of BESZ has taken into consideration. the scientific data and methodology available with different national institutes and forest department coupled with GIS based advance technology so as to make future strategy more realistic and inclusive.

WATER AVAILABILITY AND PRESENT USAGE

Flow regime of a river can be analysed in a variety of ways depending on the type of data available and the type of output information required.There are only two discharge measurement sites in the ESZ of available one at Uttarkashi operated by Central Water Commission (CWC) and another at Maneri Bhali operated by Irrigation Department of Uttarakhand. Based on the average water footprint of India, the water footprint of the region is estimated to be 80MCM per year. Surface water availability at Maneri Bhali-I is 4.103 BCM per year (50% dependability) and 3.667 BCM per year (75% dependability). The surface water availability at Uttarkashi is 4.172 BCM per year(50% dependability) and 3.571 BCM per year (75% dependability). It is seen that water availability at both 50% and 75% dependence level would be sufficient as compared to the demand for the region. However, the people often face problems, as the houses/dwelling are located at higher elevations while the river flows in deep valleys. A large section of section of population uses spring water and these springs may often get dry.

(Source: National Institute of Hydrology)

WATERSHED MANAGEMENT GUIDELINES

- The Micro watersheds as identified in the Bhagirathi Eco-sensitive zone shall be managed in a participatory manner with the active involvement of local communities.
- Although this chapter primarily focuses on Water shed works, an integrated approach as per the broad watershed guidelines 2008 of Goverenment of india shall be the guiding principle for watershed management in future.
- Productivity enhancement and livelihoods shall be given priority along with conservation measures. Resource development and usage will be planned to promote farming and allied activities to promote local livelihoods while ensuring resource conservation and regeneration. Various schemes of the Agriculture, Horticulture and Rural development Department may be converged along with the watershed treatment works so as to fulfill the basic goal of watershed management guidelines.
- Efforts shall be made not to disturb the established slopes during treatment works. Emphasis shall be given to vegetative treatment and ANR works.

GUIDELINES FOR AQUIFER/ STREAMS/ SUBSTREAMS CONSERVATION AND MANAGEMENT

- Developmental projects involving cutting of forest terrain like roads etc may have irreversible impact on the perennial *aquifer* sources in the region. Therefore such developmental projects shall take into account the adverse impact on local aquifers/streams and special treatment plans for their watersheds be prepared and must be included in the overall cost of the project.

- No blasting shall be permitted near the streams in construction works
- No domestic or any type of sewage shall be allowed to drain in the natural water resource. In reserve forest area Forest department shall check its implementation whereas in area outside forest Peyjal nigam, Swajal and Nagar palika will check its implementation.
- No extraction of water for commercial purpose shall be allowed from natural aquifers in forest areas.
- Dumping of solid waste in the catchment of the streams shall be regulated as per the existing rules and acts.
- Site specific micro- level hydro geological studies are recommended for the area. The connectivity of ground and surface water needs to be studied in detail. Such studies shall help in further fine tuning the watershed management strategy in future.
- The data regarding different micro watersheds including various soil erosion classes for the present plan has been taken from Central Soil and Water Conservation Research & Training Institute, Dehradun and further processed using satellite enabled GIS technology. However the site specific estimates may vary in future and financial outlay may increase or decrease accordingly.
- Active landslides shall be identified and site specific plans to be made for proper treatment in future.
- Treatment priority shall be given to micro watersheds having more agricultural land. The protection walls shall be given priority for protecting agricultural areas from floods
- The grazing on both sides of such streams shall be regulated.
- Removal of exotic weeds shall be done regularly.

GUIDELINES FOR LAKE CONSERVATION

1. Dumping of solid waste, other non-point source of pollution, and flow of heavy silt loads in the lake catchment would be prohibited.
2. Increasing the lake depth through de-siltation does have an impact on its flora and fauna and may lead to destruction of habitat for migratory birds. De-siltation component of the lake as per the standard methodology and its planning and execution to be carried out scientifically under expert guidance.
3. Engineering works in respect of bund should be minimized with naturalization of bund as a preferred option.
4. The lake shores are to be naturalized as far as possible by planting macrophytes on the lake slope rather than providing hard stone pitching.
5. The construction works like roads etc. shall be prohibited in area up to 500 metres from the bank of the lakes. However works for protection of forest (forestry works) shall be allowed.

METHODOLOGY

The data, maps and the related reports regarding *"soil loss through water erosion"* were provided by Central Soil and Water Conservation Research and Training Institute Dehradun. The data was then interpreted and the maps were used to generate soil

loss area each for 64 micro watersheds. The data was cross checked with the field data maintained by the forest department and also with the digital data and maps maintained by Information technology and Geomatics Centre (ITGC), of Uttarakhand forest Department in Dehradun.

National Bureau of Soil Survey and Land use Planning & Central Soil and Water Conservation Research and Training Institute Dehradun has jointly published a report named **"Soil Erosion in Uttarakhand"** regarding soil loss in Uttarakhand. The report deals with the estimation of soil loss data and has accordingly classified the entire area into following six classes based on the intensity of soil loss through erosion.

S. No	Class	Rate of soil loss (Tons/Hectare/Year)
1	Very slight	< 5.0
2	Slight	5-10
3	Moderate	10-15
4	Moderately severe	15-20
5	Severe	20-40
6	Very severe	>40

Soil Loss Tolerance denotes the maximum level of soil erosion that will permit crop productivity to be sustained economically and indefinitely. Soil loss in excess of 11.2 tons/hectare/year is the tolerance limit of soil in Himalayas. The above report, thus recommends soil conservation planning for *moderate, moderately severe, severe and very severe classes.* The area above moderately severe category has been taken for treatment by soil and water conservation measures in this chapter. Most of the streams of the micro watersheds have direct or indirect impact on the agricultural productivity of nearby agricultural area. Site specific micro watershed wise watershed plans with public participation as per watershed management guidelines 2008 of Government of India shall be prepared in future under general principles and prescriptions as discussed in this chapter. Keeping in view the future dynamics of the area, it is not rational to prepare site specific watershed plan at this point of time.

(A) DATA COLLECTION & GIS MAPPING

Data for the watershed management has been taken from the following sources.

1. The report regarding soil loss by water erosion named as "Soil Erosion in Uttarkhand" (NBSS Publication 156) published jointly by National Bureau of Soil Survey and Land use Planning & Central Soil and Water Conservation Research and Training Institute Dehradun. The report on soil loss is based on survey and the sample grid data **(Annexure-44)** taken from district Uttarakashi.
2. The GIS maps and the relevant soil erosion class wise data as provided by Central Soil and Water Conservation Research and Training Institute Dehradun.
3. The field data of the vulnerable streams along with its coordinates were collected by forest department which include the details like name of stream/nala, GPS reading, benefitted village, status of water flow etc.
4. Survey & Topographic Sheet of the area is available with the forest department.
5. Working Plan of Uttarkashi Forest Division, Uttarkashi

6. Management Plan of Gangotri National Park.

7. Digital data and maps available with the IT cell, Dehradun, Uttarakhand Forest Department.

8. Data pertaining to village wise agriculture land holding settlement etc was taken from the Agriculture Department.

WATER RESOURCES/STREAMS FALLING WITHIN BHAGIRATHI ECO-SENSITIVE ZONE AREA

1. Uttarkashi Forest Division (Source: working plan of Uttarkashi Forest Divison and field data collected for this purpose)

Range	Local Name of stream	Availability of water	Condition of Catchment	Condition of soil erosion	Villages benefitting
Gangotri	Kedarganga	Complete year	Normal	Affected	-
	Rudragaira	-"-	-"-	-"-	-
	Ptangni gad	-"-	-"-	-"-	-
	Gumgum nala	-"-	-"-	-"-	Mukhwa
	Kadoda gad	-"-	Need for treatment	-"-	Harsil
	Jalandri gad	-"-	-"-	-"-	Bagori
	Siya gad	-"-	-"-	-"-	Bagori, Jaspur
	Til gad	-"-	-"-	-"-	Dharali, Harsil
	Swari gad/ Kheer gad	-"-	-"-	-"-	Dharali
	Hatiya gad	-"-	-"-	-"-	Dharali
	Son gad	-"-	-"-	-"-	Sukki
Taknor	Dugda gad /Papad gad	-"-	-"-	-"-	Raithal, Kyark
	Mahar gad	-"-	-"-	-"-	Nateen, Bandrani
	Mahar gad	-"-	-"-	-"-	Bhatwari, Bandrani
	Swari gad	-"-	-"-	-"-	Barsu, Pala
	Ghattu gad	-"-	-"-	-"-	Bhangeli
	Gunja gad	-"-	-"-	-"-	Gunga
	Molyani gad	-"-	-"-	-"-	Sunagar
	Helgu gad	-"-	-"-	-"-	Tihar
	Chin gad	-"-	-"-	-"-	Hurri
	Lemtha gad	-"-	-"-	-"-	Hurri
	Garam kund	-"-	-"-	-"-	Hurri, Gangnani
	Din gad	-"-	-"-	-"-	Bhukki
	Charkhya gad	-"-	-"-	-"-	Bhukki, Salang
	Pula gad	-"-	-"-	-"-	Jalang
	Jalang gad	-"-	-"-	-"-	Jalang
	Gawantok gad	-"-	-"-	-"-	Silla
	Panyasari gad	-"-	-"-	-"-	Panyasari
	Palam gad	-"-	-"-	-"-	Jadaw
	Pilang gad	-"-	-"-	-"-	Pilang

Range	Local Name of stream	Availability of water	Condition of Catchment	Condition of soil erosion	Villages benefitting
Badahat	Bebra khad	-"-	-"-	-"-	Agoda, Bankoli
	Banjjadi khad	Rainy season	-"-	-"-	Naugaun
	Chadda nala	-"-			Seku
	Paniyarlog shrot	-"-	-"-	-"-	Dasda, Agoda
	Rikhera shrot	-"-			Naugaun
	Parikabena gad	Complete year	-"-	-"-	Gajoli
	Kohri gad	-"-			Nald, Uttarkashi
	Paniyara nala		-"-	-"-	Nald
	Rawada tok	-"-			Rawada, Gangori
	Pairigaun nala		-"-	-"-	Uttron, Gangori
	Pathhon nala	-"-			Sangrali, Pata
	Nawa nala		-"-	-"-	Sangrali
	Jakhni nala	-"-			Aungi
	Thanda pani nala		-"-	-"-	Maneri
	Haipta nala	-"-			Heena
	Nagni nala		-"-	-"-	Jakhol
	Nelu nala	-"-			Sanj
	Paniyari nala		-"-	-"-	Kumalti
	Ganwada gad	-"-			Ganeshpur
	Khilyari nala	-"-	-"-	-"-	Naitala
Mukhem	Ryala	-"-	-"-	-"-	Aleth
	Koti	-"-	-"-	-"-	Ladhari
	Nirakot	-"-	-"-	-"-	Mando
	Haryali	-"-	-"-	-"-	Manpur
	Mastari	-"-	-"-	-"-	Mastari
	Kyan Gou Toli Gad	-"-	-"-	-"-	Bonga
	Bongadi	-"-	-"-	-"-	Bongadi
	Dhanpur	-"-	-"-	-"-	Dhanpur
	Dhobaha	-"-	-"-	-"-	Dhobaha
	Jamak	-"-	-"-	-"-	Jamak
	Manera	-"-	-"-	-"-	Joshiyara
	Kamar	-"-	-"-	-"-	Kamar
	Kankrari	-"-	-"-	-"-	Kankrari
	Indrawati	-"-	-"-	-"-	Kishanpur
	Koti	-"-	-"-	-"-	Kotiyal goun
	Kuroli	-"-	-"-	-"-	Kuroli

Range	Local Name of stream	Availability of water	Condition of Catchment	Condition of soil erosion	Villages benefitting
	1. Nirakot, 2. Baroda	-"-	-"-	-"-	Nirakot
	Sadha	-"-	-"-	-"-	Sada
	Devrana	-"-	-"-	-"-	Sadang
	Nilada	-"-	-"-	-"-	Sari
	Sora Gad	-"-	-"-	-"-	Sura
	Chada	-"-	-"-	-"-	Siror
	Bhatkali	-"-	-"-	-"-	Sayuna
	Silai	-"-	-"-	-"-	Syaba
	Thalan	-"-	-"-	-"-	Thalan
	Nirakot	-"-	-"-	-"-	Tiloth
	Koti	-"-	-"-	-"-	Salu
	Bayana	-"-	-"-	-"-	Bayana
	Silyana	-"-	-"-	-"-	Silyana

2. Gangotri National Park (Source: Management plan of Gangotri National Park)

Range	Local Name of stream	Availability of water	Condition of Catchment	Condition of soil erosion	Villages benefitting
Patangani- 3	Kedarganga	Complete year	Normal	Affected	Gangotri Nagar Panchayat
Patangani- 1	Rudragaira	-"-	-"-	-"-	-"-
Patangani- 2	Patangani gad	-"-	-"-	-"-	-"-
Gangotri	Devrishi nala	-"-	-"-	-"-	-"-
	Kankhu nala	Rainy season	-"-	-"-	-"-
	Kakoda nala	Complete year	-"-	-"-	-"-
Bhagirathi	Hamkiya nala	-"-	-"-	-"-	-"-
	Devgad	-"-	-"-	-"-	-"-
	Bhanglubasa	Rainy season	-"-	-"-	-"-
	Cheerbasa gad	-"-	-"-	-"-	-"-
	Bhujgadi	-"-	-"-	-"-	-"-
	Bhojbasa nala	Complete year	-"-	-"-	-"-
	Bhojbasa nala- 2	-"-	-"-	-"-	-"-
	Bhojbasa nala- 3	-"-	-"-	-"-	-"-
	Gaumukh nala	-"-	-"-	-"-	-"-
Jadganga	Karchha nala	-"-	-"-	-"-	-"-
	Kalagadi nala	-"-	-"-	-"-	-"-
Karcha	Pagal nala	-"-	-"-	-"-	-"-
	Girchu gad	-"-	-"-	-"-	-"-

Range	Local Name of stream	Availability of water	Condition of Catchment	Condi- tion of soil erosion	Villages benefitting
Neelapani	Karmoli nala	-"-	-"-	-"-	-"-
	Dhenigad	-"-	-"-	-"-	-"-
	Rigowa gad	-"-	-"-	-"-	-"-
	Yala/Gully gad	-"-	-"-	-"-	-"-
	Neelapani gad	-"-	-"-	-"-	-"-
	Mana gad	-"-	-"-	-"-	-"-
	Sonam nala	-"-	-"-	-"-	-"-
	Old sonam nala- 1	-"-	-"-	-"-	-"-
	Old sonam nala- 2	-"-	-"-	-"-	-"-
	Angar nala	Rainy season	-"-	-"-	-"-
	Tripani purvi nala	Comlete year	-"-	-"-	-"-
Gartang- 1	Chorgad	-"-	-"-	-"-	-
	Gartang Gailary gad	-"-	-"-	-"-	-
Jadung beat	Jadung nala	-"-	-"-	-"-	-
	Jadung gad	-"-	-"-	-"-	-
	Sukra gad	-"-	-"-	-"-	-
	Rangmach gad	-"-	-"-	-"-	-

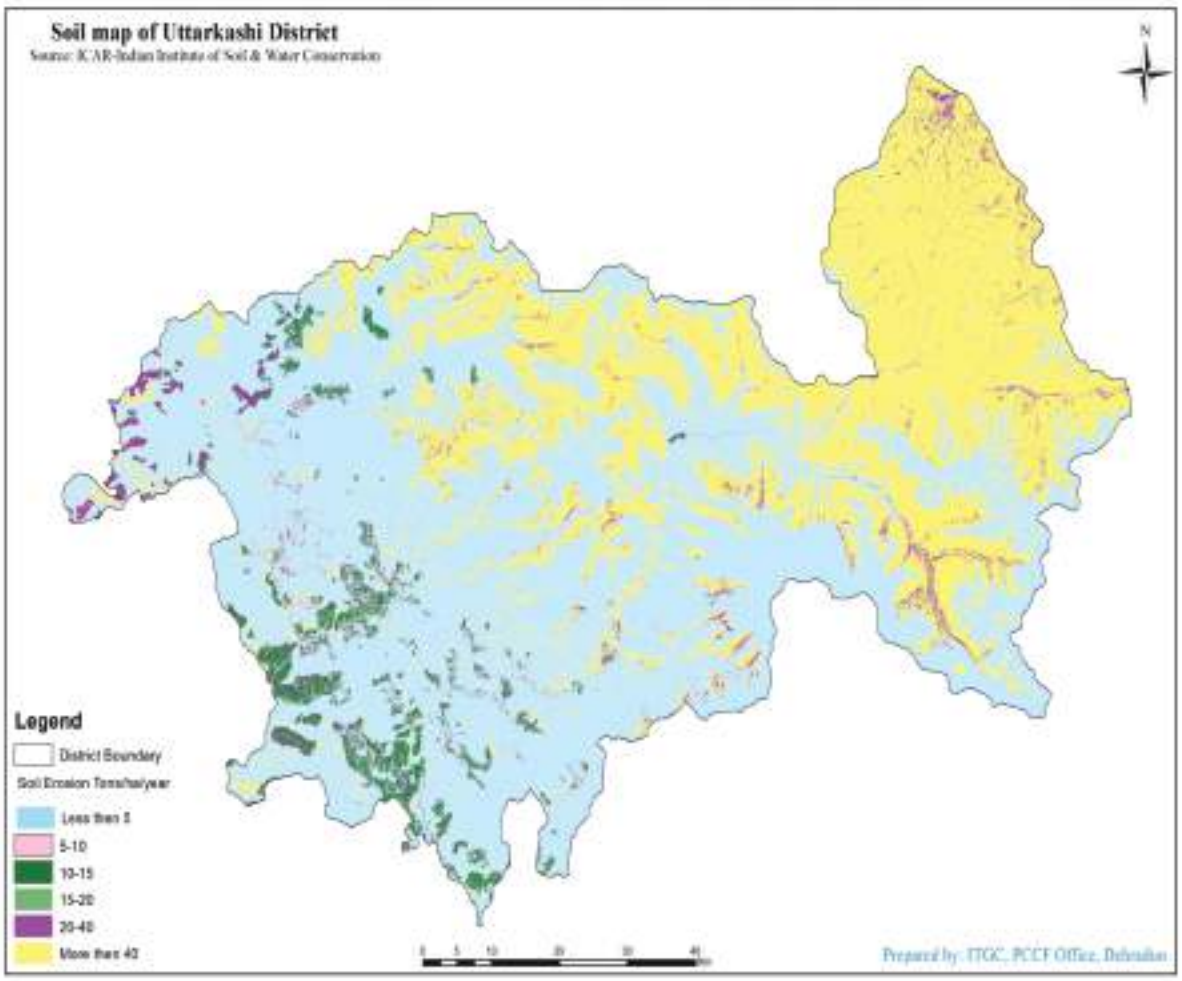
List of Lakes/ Tals falling within the Bhagirathi Eco-Sensitive Zone

S.No.	Name of Tal	Remarks
1	Dodital	Dodital is an emerald lake nestled amidst high mountains at an altitude of 3,310mts above sea level. With its serene setting and tranquil environs, Dodital is arguably one of the most beautiful high altitude lakes of North India. Dodital is named after the rare Himalayan Trout known as Dodi in local language. This lake is one of the very few water bodies the where Himalayan Trout are found. On one corner of the lake a beautiful temple is dedicated to Lord Ganesha. According to mythology this is the place where Lord Ganesha was born.
2	Kheda tal	It is situated at Hurri Compartment No. 1b. and Bhuki 4b.
3	Sahashtra tal	It is situated at Dharali Compartment No. 4b. and 3 km. far from Village Dharali.
4	Braham tal	It is situated at Sukhi Compartment No.1.
5	Bhu tal	It is situated at Sukhi Compartment No. 4b.
6	Barnala tal	It is situated at an elevation of 6500 ft. and 3km. far from village Barsu.
7	Gaumukh	Gaumukh, the terminus or snout of the Gangotri glacier from where Bhagirathi river originates, is one of the primary sources of the Ganges river. The place is situated at a height of 13,200 ft. It is one of the largest in the Himalayas with an estimated volume of over 27 cubic kiloliters. It is a popular Hindu pilgrimage site, along with Gangotri, as well as trekking destination.
8	Vasuki tal	It is situated at an elevation of 5230 mt. covering a periphery of 520 mt., and 11 km. from Gaumukh.
9	Tapovan Neelatal	Tapovan is an ideal location for the tourists looking for peace and adventure. Tapovan is located on an altitude of 4463m / 14640ft above the sea level.

S.No.	Name of Tal	Remarks
10	Kedar tal	Kedartal is an immaculate lake holding crystal clear water. The picturesque Kedartal is situated at the base of the Thalay Sagar (6,904 mts) and Brigupanth Peak (6,772 mts). The view of the reflections of Thalay Sagar peak on Kedartal is truly enchanting. Kedartal is one of the highest lakes in Uttarakhand, situated at an astounding altitude of 4,912 mts above sea level in. This emerald lake is the source of Kedar Ganga, an important tributary of Bhagirathi River.
11	Janak tal	It is situated at an elevation of 4115 mt. covering a periphery of 365 mt.
12	Tabul Top (Sukha tal)	It is situated at an elevation of 5225 mt. covering a periphery of 210 mt.
13	Old Sonam tal	It is situated at an elevation of 5362 mt. to 5373 mt.

(B) GIS MAPPING OF WATERSHED

(i) The soil map (GIS map) of district Uttarkashi indicating six soil erosion classes and area under each class, was received from Central Soil and Water Conservation Research and Training Institute Dehradun.



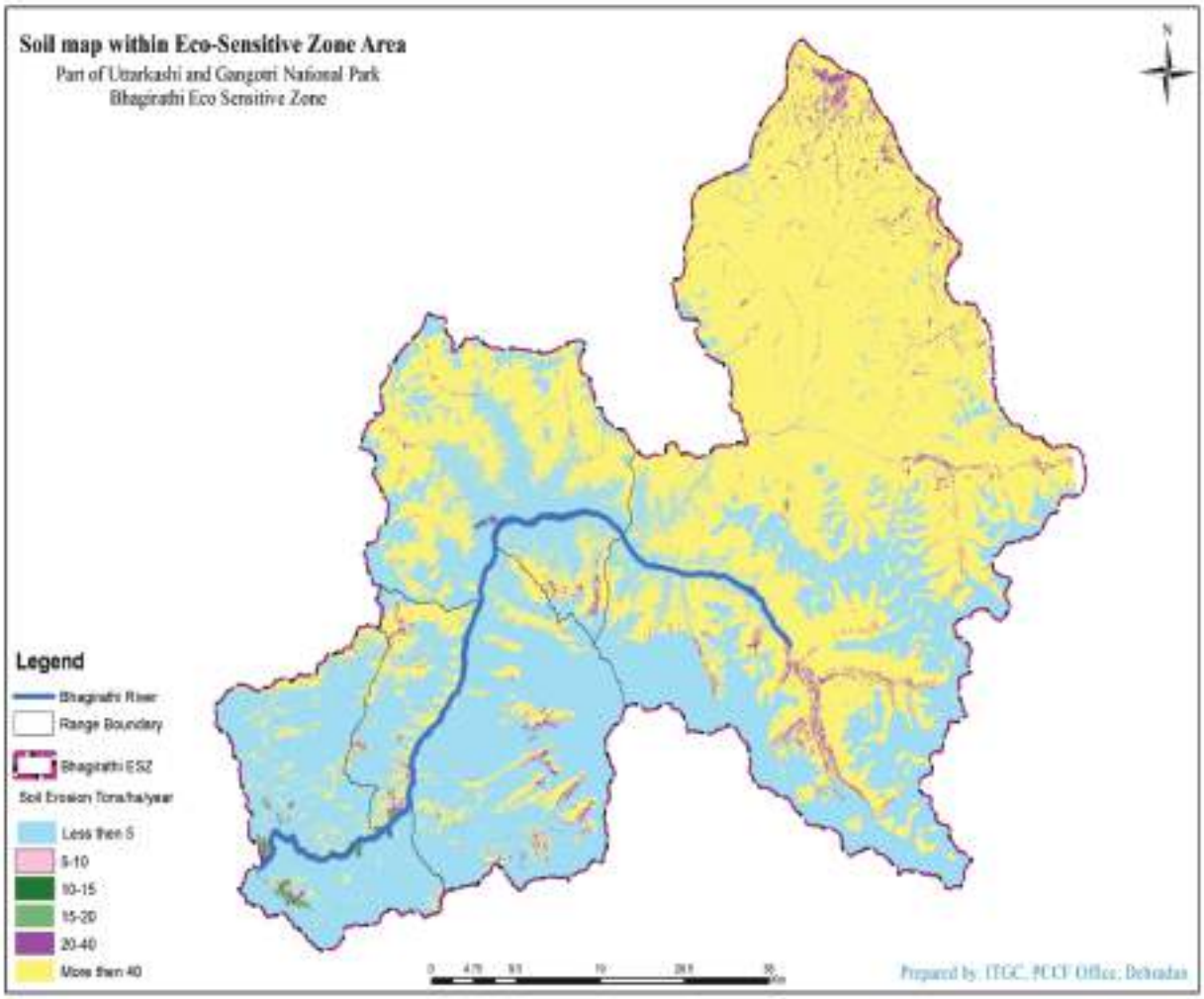
Map showing soil erosion classes of district Uttarkashi

(ii) GIS layer of Bhagirathi Eco sensitive zone area was superimposed on the above map and a total of 64 micro watersheds including 113 vulnerable streams were identified. Data for six soil erosion classes was calculated and accordingly GIS map indicating 64 micro watersheds was generated for the entire watershed using GIS technology.

Micro watershed area as per soil erosion classes

	Soil erosion in tons/ha/year						
MWS	Less than 5	5-10	10-15	15-20	20-40	more than 40	Total
Ginsigad	7871.7	9.5	11.5	12.4	81.0	2044.1	10030.2
Jadaphu	53.8	5.0	4.7	4.4	23.8	2087.6	2179.3
Kundigad	2739.8	0.5	1.0	0.8	6.5	341.5	3090.2
Indrawati	4036.1	214.9	209.2	104.0	37.4	237.1	4838.6
Kamargad	2677.2	0.4	0.2	0.5	4.9	106.6	2789.8
Monugad	1646.8	2.3	2.6	3.6	27.5	114.8	1797.5
Silla	1204.0	0.0	0.0	0.1	3.6	77.9	1285.6
Dugaddagad	4115.0	3.6	4.2	4.5	30.3	257.1	4414.7
Pillang I	1071.2	4.2	3.7	4.9	22.3	563.2	1669.5
Pokhri	1159.6	263.7	145.7	23.0	35.9	624.9	2252.8
Kamergad	1163.1	1.7	2.6	1.1	1.7	128.2	1298.4
Darani Gad	70.3	8.6	10.2	6.6	20.8	1500.9	1617.4
Choragad	8606.9	127.4	130.7	155.8	796.2	20847.0	30663.9
Siyangad	6344.2	17.8	45.9	85.4	166.7	8422.9	15083.0
Kakora Gad	5124.8	12.2	16.3	17.5	78.3	7484.7	12733.9
Jalandharigad	7408.0	19.8	24.0	23.3	91.6	9999.5	17566.1
Kansen	168.7	11.6	3.8	1.2	1.7	3.0	190.0
Pillang II	2323.9	3.4	4.7	6.5	40.2	206.6	2585.3
Nirakot	2153.1	20.9	8.9	4.5	12.4	56.7	2256.5
Andrigad	2069.2	23.9	43.5	7.7	5.1	52.8	2202.2
Netalgad	1158.6	7.5	7.6	4.1	28.9	330.8	1537.4
Uttarkashi	483.3	109.5	125.9	44.0	25.4	30.0	818.2
Gawangad	2524.3	13.9	11.0	14.5	31.4	407.3	3002.3
Ashiganga	2271.0	39.1	23.5	4.2	2.8	249.9	2590.5
Kunigad	2552.0	7.8	12.2	19.1	133.3	681.9	3406.3
Papargad	1034.4	3.4	3.4	4.3	37.7	287.0	1370.3
Pilgungad	9441.3	32.9	42.7	60.4	409.9	2166.7	12153.8
Mahargad	1155.6	91.1	44.7	8.0	37.3	291.5	1628.1
Jalangad	3542.3	2.2	2.2	3.3	19.8	184.3	3754.1
Kunjan	675.7	0.8	1.0	0.8	5.7	347.9	1031.9
Utro	3706.7	29.9	25.3	13.8	27.0	355.9	4158.6

	Soil erosion in tons/ha/year						
MWS	**Less than 5**	**5-10**	**10-15**	**15-20**	**20-40**	**more than 40**	**Total**
Gajoli	1844.0	0.6	1.7	1.1	6.9	497.1	2351.4
Dingad	7282.0	22.4	26.8	30.8	158.4	907.2	8427.7
Helgargad	973.6	0.8	1.1	1.1	8.6	356.5	1341.6
Kolagad	2772.0	1.2	1.5	2.3	18.1	424.5	3219.6
Soundhargad	2697.9	6.3	9.5	10.6	62.4	752.3	3538.9
Mamlapani	1339.3	4.9	3.0	3.9	19.1	601.6	1971.7
Rana	0.0	0.0	0.0	0.0	0.6	0.0	0.6
Kanoldiyagad	2286.1	17.3	20.8	24.8	175.0	2450.0	4974.2
Chirbas	1126.3	10.6	9.2	11.1	46.9	1587.8	2791.9
Lodgad	8189.0	1.6	1.7	2.7	25.0	1234.0	9454.0
Kedarganga	5782.3	22.3	22.6	24.6	121.8	2442.9	8416.4
Rudugairagad	5134.5	3.4	4.0	4.9	54.6	1442.9	6644.3
Bhelagad	1273.6	0.5	1.4	1.4	9.1	582.0	1868.1
Gaumukh	31329.6	259.8	296.7	339.8	1641.7	22653.2	56520.8
Miyanagad	2809.4	3.5	4.4	5.9	37.4	1818.1	4678.7
Gangotiya Nala	1479.3	5.3	6.4	5.7	10.8	210.4	1717.9
Telgad	1695.5	3.3	4.1	4.8	24.6	920.5	2652.7
Gangotri	3542.0	5.9	6.4	6.3	44.8	5174.5	8779.9
Kheragad	1524.2	14.4	17.7	16.9	83.4	721.6	2378.1
Dadugad	2907.2	33.7	38.6	34.3	179.2	2095.3	5288.2
Songad	5727.7	7.2	8.7	9.2	61.0	3932.6	9746.4
Gartang Gad	1246.5	2.4	2.0	2.1	11.1	1796.6	3060.8
Darani Gad	249.5	4.6	5.0	2.8	18.2	1496.3	1776.4
Kalaghati	1750.6	11.7	17.0	12.9	76.1	6004.3	7872.6
Guligad	1951.7	11.1	17.8	18.8	110.6	5644.3	7754.4
Lambigad	1839.8	3.4	4.4	5.2	41.7	5764.5	7659.0
Nilapanigad	964.5	66.9	77.5	79.0	471.1	17462.9	19121.9
Solam	160.0	19.1	18.6	20.2	91.9	7173.9	7483.7
Jadhang	24.3	9.4	11.0	9.7	51.0	3810.0	3915.3
Tripani	61.7	6.2	8.7	7.4	49.6	2813.7	2947.4
Jadhanggad	956.2	41.4	53.8	57.4	268.0	19510.5	20887.3
Baregudhgad	122.7	124.0	160.9	153.3	934.5	13376.1	14871.5
Raugmachgad	395.6	143.9	213.7	191.8	1128.6	15716.6	17790.2
Grand Total	**191991.1**	**1958.7**	**2049.2**	**1747.2**	**8288.8**	**211865.1**	**417900.0**



Map showing soil erosion classes in Bhagirathi Eco-sensitive Zone.

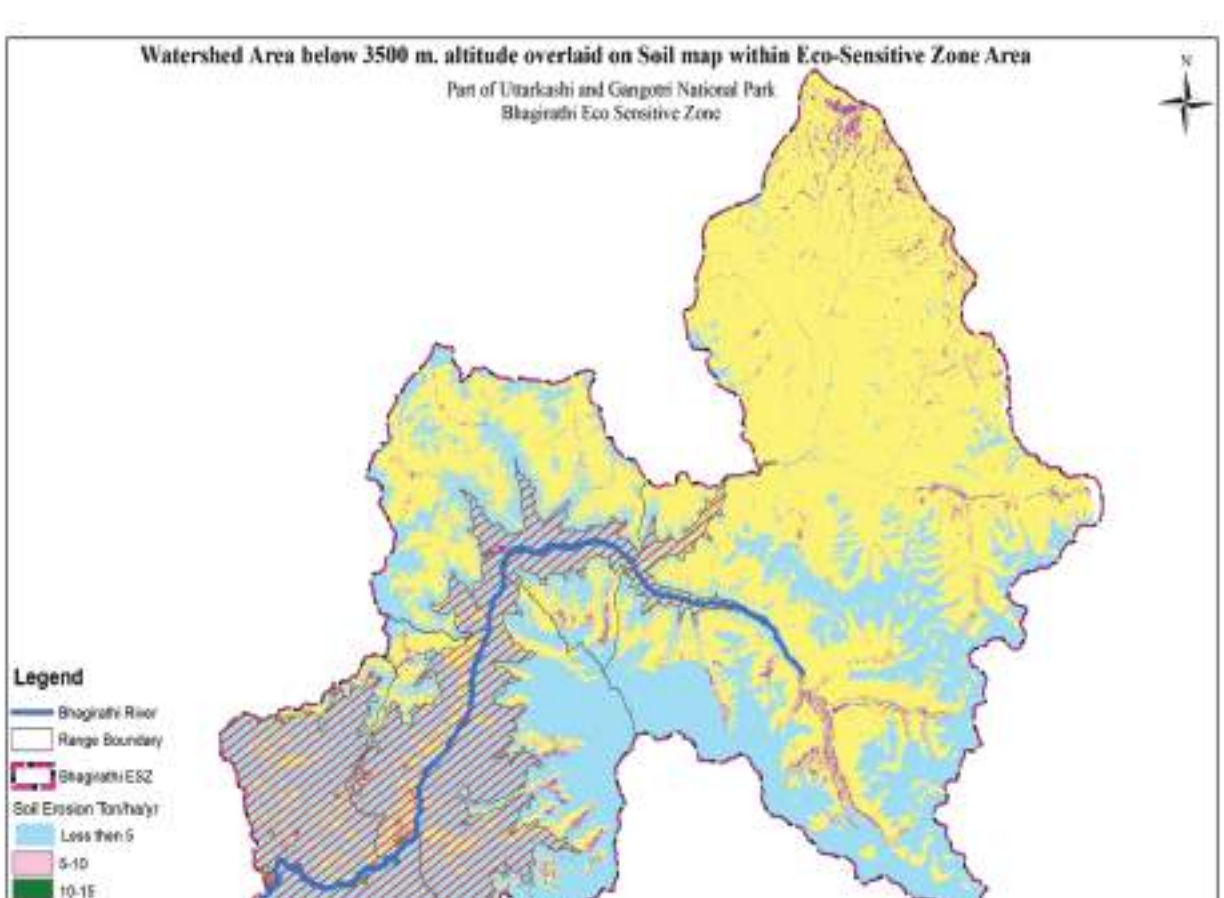
(iii) The area of the entire watershed above 3500 meter altitude is almost free from anthropogenic activities or any type of biotic pressure. Therefore, the watershed area below 3500 meter was considered for soil and water conservation intervention. The area below an altitude of 3500 meters of altitude was thus mapped and class wise soil erosion data for all the micro watersheds was accordingly calculated through GIS technology.

Micro watershed area as per soil erosion classes (below an altitude of 3500 meter)

	Soil erosion in tons/ha/year below 3500 mt						
MWS	Less than 5	5-10	10-15	15-20	20-40	more than 40	Total
Ginsigad	6765.12	1.53	2.16	2.34	17.73	546.48	7335.36
Jadaphu	0	0	0	0	0	0	0

	Soil erosion in tons/ha/year below 3500 mt						
MWS	Less than 5	5-10	10-15	15-20	20-40	more than 40	Total
Kundigad	1868.04	0	0.27	0.09	1.8	103.59	1973.79
Indrawati	4112.91	218.97	213.21	105.93	38.07	241.65	4930.74
Kamargad	2728.17	0.36	0.18	0.54	5.04	108.63	2842.92
Monugad	1083.69	0.45	0.09	0.36	1.89	18.99	1105.47
Silla	1220.85	0	0	0.09	3.51	76.5	1300.95
Dugaddagad	4092.84	2.88	2.34	3.06	22.86	196.47	4320.45
Pillang I	1089.54	4.23	3.78	4.95	22.5	571.95	1696.95
Pokhri	1181.7	268.74	148.5	23.4	36.54	636.84	2295.72
Kamergad	1185.21	1.71	2.61	1.17	1.71	130.68	1323.09
Darani Gad	15.03	2.25	3.33	2.07	3.42	16.38	42.48
Choragad	0	0	0	0	0	0	0
Siyangad	1210.86	7.29	26.82	60.84	43.83	86.13	1435.77
Kakora Gad	2153.97	3.96	3.6	1.8	5.49	124.56	2293.38
Jalandharigad	1330.38	8.28	6.21	5.22	10.98	76.23	1437.3
Kansen	171.9	11.79	3.87	1.26	1.71	3.06	193.59
Pillang II	2171.7	0.72	1.35	1.98	13.95	85.5	2275.2
Nirakot	2194.11	21.33	9.09	4.59	12.6	57.78	2299.5
Andrigad	2108.61	24.39	44.28	7.83	5.22	53.82	2244.15
Netalgad	1180.62	7.65	7.74	4.14	29.43	337.05	1566.63
Uttarkashi	492.48	111.6	128.34	44.82	25.92	30.6	833.76
Gawangad	2549.43	13.86	10.8	14.58	30.15	385.74	3004.56
Ashiganga	2314.26	39.87	23.94	4.23	2.88	254.61	2639.79
Kunigad	1044.81	0.09	0.18	0.27	3.87	153.09	1202.31
Papargad	1054.08	3.51	3.51	4.41	38.07	291.51	1395.09
Pilgungad	2064.33	4.05	4.32	5.22	27.36	332.01	2437.29
Mahargad	1131.48	91.08	42.93	5.13	21.42	195.3	1487.34
Jalangad	3494.88	0.81	0.9	1.44	7.74	132.12	3637.89
Kunjan	688.59	0.81	0.99	0.81	5.85	354.51	1051.56
Utro	3775.77	30.51	25.74	14.04	27.54	335.7	4209.3
Gajoli	1834.92	0.45	0.81	0.63	4.32	374.22	2215.35
Dingad	3523.23	1.71	1.8	2.61	4.95	29.34	3563.64
Helgargad	896.4	0.09	0.63	0.45	5.4	129.06	1032.03
Kolagad	1643.94	0.81	0.99	1.62	11.25	143.01	1801.62

	Soil erosion in tons/ha/year below 3500 mt						
MWS	Less than 5	5-10	10-15	15-20	20-40	more than 40	Total
Soundhargad	2468.34	3.51	6.21	7.38	42.48	322.74	2850.66
Mamlapani	1294.2	3.42	1.98	2.34	10.89	508.68	1821.51
Rana	0	0	0	0	0	0	0
Kanoldiyagad	973.89	0.81	1.26	1.26	11.97	459.99	1449.18
Chirbas	190.08	6.03	4.68	6.57	16.02	84.78	308.16
Lodgad	1130.31	0.09	0.18		1.44	232.74	1364.76
Kedarganga	128.25	0.99	0.36	0.72	2.34	26.46	159.12
Rudugairagad	102.96	0	0.18	0.27	1.08	15.03	119.52
Bhelagad	298.44	0.09	0	0.09	0.18	25.47	324.27
Gaumukh	0	0	0	0	0	0	0
Miyanagad	679.77	1.26	0.81	0.72	2.52	160.38	845.46
Gangotiya Nala	1430.19	5.31	5.85	5.76	10.8	74.61	1532.52
Telgad	1230.84	1.62	2.07	0.63	3.96	167.58	1406.7
Gangotri	590.4	3.51	2.43	1.8	9.18	212.31	819.63
Kheragad	647.91	2.07	2.79	1.35	2.79	40.77	697.68
Dadugad	1145.34	7.2	4.86	2.79	7.11	171.63	1338.93
Songad	1658.97	4.05	3.24	3.06	16.38	560.79	2246.49
Gartang Gad	585.63	1.44	1.17	1.08	3.06	158.85	751.23
Darani Gad	143.1	4.23	4.05	1.62	9.36	239.76	402.12
Kalaghati	555.48	6.48	8.82	5.22	22.68	577.17	1175.85
Guligad	0	0	0	0	0	0	0
Lambigad	0	0	0	0	0	0	0
Nilapanigad	0	0	0	0	0	0	0
Solam	0	0	0	0	0	0	0
Jadhang	0	0	0	0	0	0	0
Tripani	0	0	0	0	0	0	0
Jadhanggad	0	0	0	0	0	0	0
Baregudhgad	0	0	0	0	0	0	0
Raugmachgad	0	0	0	0	0	0.81	0.81
Grand Total	**79627.95**	**937.89**	**776.25**	**374.58**	**669.24**	**10653.66**	**93039.57**



Map showing soil erosion classes in various micro watersheds of BESZ (Below an altitude of 3500 meter)

(iv) GIS map was also generated for 113 vulnerable streams in 64 Micro watershed and the length of each stream below an altitude of 3500 meters was calculated accordingly. The length of all the streams was calculated accordingly.

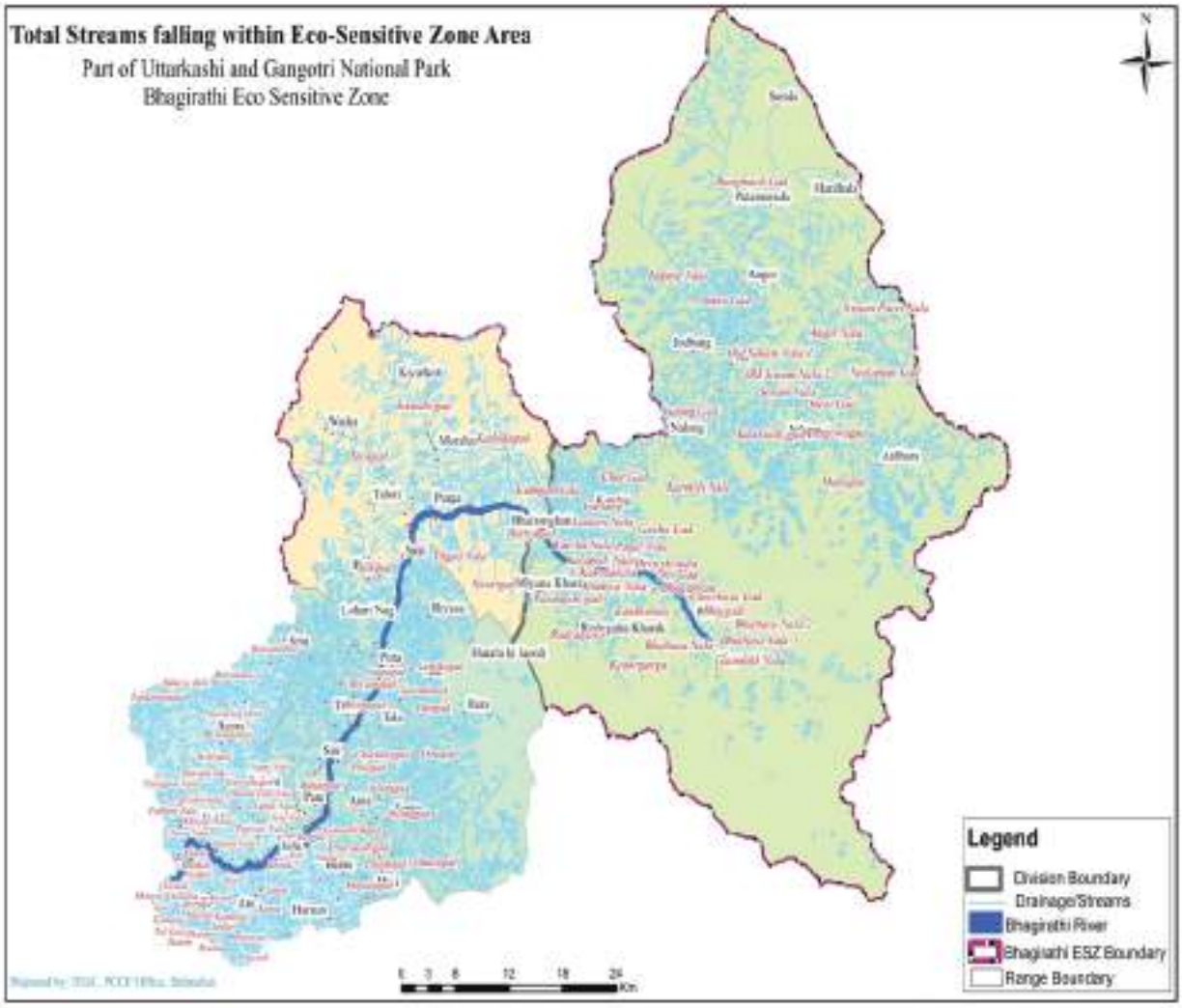
Streams/Nalas in BESZ along with length

Name of Water Source (Streams/Nalas)	Name of MWS	Length of Stream (in km)	Length of Stream proposed for treatment (below 3500mt. Altitude)
Kedar Ganga	Kedarganga	69.09429	8.35624
Rudragaira	Rudugairagad, Miyanagad	62.925414	17.544659
Ptangni gad	Miyanagad	48.031639	12.0428
Gumgum Nala	Kakora Gad	49.989769	21.73411
Kadoda Gad	Jalandharigad, Kakora Gad	119.308291	27.663434
Jalandri Gad	Jalandharigad	281.228452	56.431332

Name of Water Source (Streams/Nalas)	Name of MWS	Length of Stream (in km)	Length of Stream proposed for treatment (below 3500mt. Altitude)
Siya Gad	Siyangad	172.302782	58.188543
Til Gad	Telgad	26.342337	18.947091
Swari gad1	Kheragad	25.000323	33.043958
Hatiya Gad	Dadugad	95.396474	52.128971
Son Gad	Songad	101.874859	62.839374
Dugda Gad	Dugaddagad	114.553395	113.810632
Swari Gad	Soundhargad	34.411364	33.043958
Ghattu Gad	Pillang II	94.5133	91.654926
Gunja Gad	Mamlapani	39.665742	36.43628
Molyani Gad	Helgargad, Mamlapani	40.716078	40.203944
Helgu Gad	Helgargad	74.179615	64.380583
Chin Gad	Kolagad, Mamlapani, Helgargad	160.361555	150.124223
Lemtha Gad			0
Garam Kund	Kundigad, Mamlapani	42.986418	42.986418
Din Gad	Dingad	275.305291	207.830883
Charkhya Gad	Jalangad	48.967385	48.967385
Pula Gad	Jalangad	11.919534	11.919534
Jalang Gad	Jalangad, Kunjan, Mahargad, Papargad	170.350381	55.041557
Gawantok Gad	Silla	7.148285	7.148285
Panyasri Gad	Silla	12.757741	12.757741
Palam gad	Pillang II	18.905489	0
Pilang Gad	Pillang I, Silla	14.791811	14.791811
Bebrakhand	Ginsigad,Gajoli	79.124864	74.967196
Banjadi Khad	Ginsigad	122.607881	83.75037
Chadda Nala	Ginsigad	64.824083	64.824083
Paniyarlogshrot	Ginsigad	9.733249	9.733249
Rikherashrot	Gajoli	40.914404	40.914404
Parikabena gad	Gajoli	131.805944	131.805944
Kohri Gad	Ashiganga	42.167567	42.167567
Paniyara Nala	Ashiganga,Utro	5.390088	5.390088
Rawada Tok	Ashiganga,Utro	10.600453	10.600453
Pairigaun Nala	Utro	7.769385	7.769385
Pathhon Nala	Uttarkashi	15.179106	15.179106
Nawa Nala	Uttarkashi	2.227251	2.227251
Jakhni Nala	3.569393	Pokhri	3.569393
Thanda Pani Nala	Kamergad	34.13724	34.13724

Name of Water Source (Streams/Nalas)	Name of MWS	Length of Stream (in km)	Length of Stream proposed for treatment (below 3500mt. Altitude)
Haipta Nala	Netalgad		7.033259
Nagni Nala	Netalgad	7.033259	23.774996
Nelu Nala	Pokhri	2.276624	2.276624
Paniyari Nala	Netalgad	12.291088	12.291088
Ganwada Gad	Gawangad	46.839015	46.839015
Khilyari Nala	Netalgad	11.039188	11.039188
Ryala	Indrawati	14.201391	14.201391
Koti	Indrawati, Kansen	14.819244	14.819244
Haryali	Indrawati	27.299704	27.299704
Mastari	Indrawati	22.718312	22.718312
Kyan gou Toligad	Indrawati	19.169215	19.169215
Bongadi	Indrawati	11.202229	11.202229
Dhanpur	Indrawati	9.02739	9.02739
Dhobaha1	Indrawati	3.947328	3.947328
Jamak	Andrigad,Kamargad	80.400052	80.400052
Manera	Kansen	2.065004	2.065004
Kamar	Kamargad	18.121822	18.121822
Kankrari	Indrawati	14.67004	14.67004
Indrawati	Indrawati	6.079223	6.079223
Koti	Indrawati, Kansen	14.819244	0
Kuroli	Indrawati	4.663731	4.663731
Nirakot, Baroda	Uttarkashi, Nirakot	21.155334	21.155334
Sadha	Indrawati	1.099887	1.099887
Devrana	Indrawati	0.769388	0.769388
Nilada	Dugaddagad	13.501099	13.501099
Soragad	Dugaddagad, Pokhri	4.158653	4.158653
Chada	Nirakot	21.096959	21.096959
Bhatkali			
Silai	Nirakot	10.81285	10.81285
Thalan	Indrawati	16.035394	16.035394
Koti	Andrigad	5.795102	5.795102
Bayana	Andrigad, Pokhri	2.101278	2.101278
Silyana	Nirakot	17.948954	17.948954
Gangotri National Park			
Kedar Ganga	Kedarganga	69.09429	8.35624
Rudragaira	Rudugairagad	62.925414	17.544659

Name of Water Source (Streams/Nalas)	Name of MWS	Length of Stream (in km)	Length of Stream proposed for treatment (below 3500mt. Altitude)
patangni Gad	Miyanagad	48.031639	12.0428
Devrishi Nala	Gangotri	28.214603	2.137231
Kankhu nala	Chirbas, Gangotri	3.646859	3.646859
Kakoda Nala	Gangotri	13.528048	2.089006
Hamkiya Nala	Gangotri	4.496414	1.273245
Dev gad	Gangotri	40.87833	0.835875
Bhanglubasa	Chirbas, Gangotri	20.126119	10.628158
Cheer basa gad	Chirbas, Gangotri	30.398581	0
Bhujgadi	Gangotri	17.764338	0
Bhojbasa Nala	Gaumukh	3.959558	0
Bhojbasa Nala-2	Gaumukh	1.622118	0
Bhojbasa Nala-3	Gaumukh	3.230586	0
Gaumukh Nala	Gaumukh	13.176497	0
Karchha Nala	Kalaghati	20.696445	11.099272
Kalagadi Nala	Kalaghati	28.817546	5.900103
Pagal Nala	Kalaghati	16.310108	4.249679
Girchu Gad	Darani Gad, Kalaghati	71.671934	13.908854
Karmoli Nala	Darani Gad, Kalaghati	32.601043	21.769682
Dheni Gad	Nilapanigad	16.263996	0
Rigowa Gad	Nilapanigad	16.045343	0
Yala/Gully Gad	Jadaphu	39.090762	0
Neelapani Gad	Jadaphu, Nilapanigad	445.036153	0
Mana Gad	Lambigad, Choragad	671.510963	0
Sonam Nala	Solam	23.916794	0
Old Sonam Nala 1	Solam	24.041455	0
Old Sonam Nala 2	Solam	28.480127	0
Angar Nala	Nilapanigad	32.076487	0
Tripani Purvi Nala	Nilapanigad	21.337542	0
Chor Gad	Darani Gad	30.796177	0
Gartang Gailary Gad	Kalaghati, Gartang Gad	133.467852	0
Jadung Nala	Jadhanggad	30.764426	0
Jadung Gad	Jadhanggad, Darani Gad	366.658583	0
Sukra Gad	Jadhanggad	10.985418	0
Rangmach Gad	Raugmachgad	211.528699	0
		Total	**2408.64 Km**



Map showing stream's/ nalas in Bhagirathi Eco-sensitive Zone

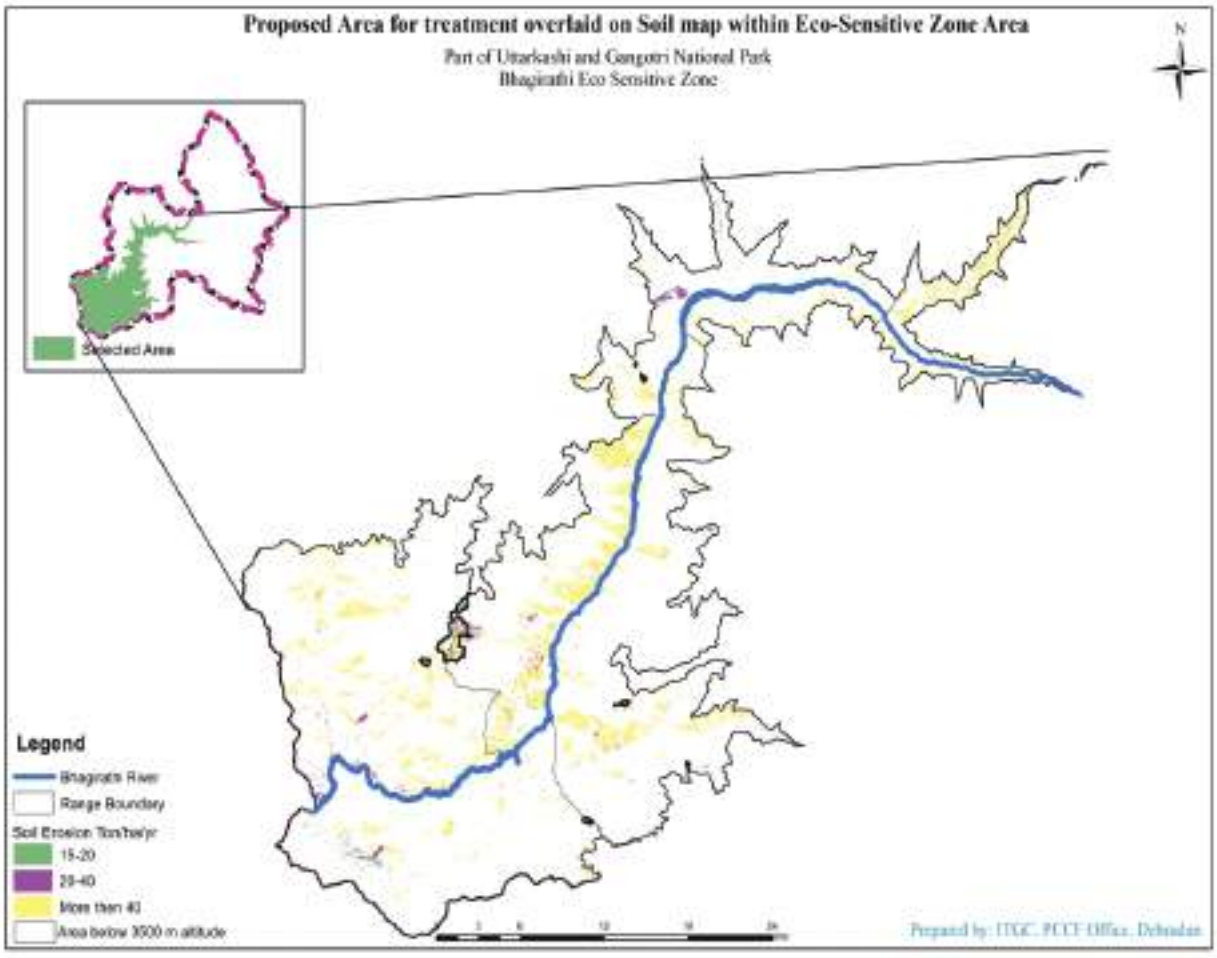
(C) DATA INTERPRETATION AND AREA PROPOSED FOR TREATMENT

(i) Soil erosion area below 3500 meter altitude:

As stated earlier, the GIS layer of BESZ was superimposed on the soil map (GIS map) of district Uttarkashi indicating six soil erosion classes provided by Central Soil and Water Conservation Research and Training Institute Dehradun to calculate the class wise data for different micro watersheds of BESZ.

The following classes of soil erosion have been taken for treatment of the catchment area below 3500 meter altitude:

S.No.	Soil erosion class	Rate of soil loss (Tons/ha/yr)	Area covered (Hectares)
1	Moderate severe	15-20	374.58
2	Severe	20-40	669.24
3	Very severe	More than 40	10653
	Total area taken for treatment		**11697.48**



Map showing proposed area for treatment under three soil erosion classes

(ii) Length estimation of streams below 3500 meter altitude

The length of 113 streams has been estimated by GIS technology. The total length of all 113 streams is 2408.64 km.

(iii) Estimation of treatment area of Tals :

The watershed area of 13 Tals has been calculated using GIS technology by including the area up to 200 meter around the bank of the Tal. The total treatable area of 13 Tals is shown in table below:

Name of Lake	Area of Tal (hectare) (As per Satellite data)	Area of Buffer (hectare) (Around lake boundary)
Dodital	2.7	27.646234
Kheda tal	0.25	19.295255
Bharnala tal	0.42	17.970606
Sahastra tal	1.4	21.54334

Name of Lake	Area of Tal (hectare) (As per Satellite data)	Area of Buffer (hectare) (Around lake boundary)
Kana tal	0.2	15.934583
Sattal	0.15	15.154635
Brahm tal	0.01	13.307846
Table top	0.54	18.488212
Vasuki tal	0.46	17.623488
Sonam tal	1.68	22.482004
Tapovan tal	1.34	22.52899
Kedar tal	9.07	42.833226
Janak tal	0.74	20.11
Total	**18.96**	**274.91**

(D) WATERSHED TREATMENT PRESCRIPTION

(i) Catchment Area Treatment of micro watershed:

S.No.	Name of Measure	Measure description	Dimension/Span	Number proposed/Ha.
1	Contour trenches/ Bunds/Terraces	These are mainly constructed across the slope for reducing the length of a slope, check the soil erosion and increasing the infiltration of water into the ground.	3m*0.3m*0.3m	100 per hectare
2	Gully Plugging	Pirul check dam/ Brushwood check dam	Suitable up to 1-meter span	20 numbers /hectare
		Gully plugging up to one-meter span by using stones.		
3	Percolation pits	These are small water harvesting structures to enhance the water availability and ground water recharge. The volume of the each pit is 600 liter calculated as per the forest department SOR	1.20m*0.9m*0.6m (600-liter capacity)	20 pits
4	The grass and shrubs species shall be sown in the area.			

Per hectare catchment area treatment cost has been calculated as per the forest department SOR and detailed estimate has been annexed as **Annexure-45.**

(ii) Tals-Catchment Area Treatment

The catchment area of tals shall be treated same as per the treatment plan described in table.

(iii) Streams /Nala Treatment

- Random rubble dry check dam and /or Create wire check dam has been prescribed for water flow management and soil conservation purpose of streams up to 5 meter span. The total length of 113 streams of 2408.64 km has been taken for treatment by means of random rubble dry check dam / create wire check dams in upper areas up to 5 meter span, whereas spurs have been describe for lower areas of the streams having wider span. The size of the spur is almost equal to the size of the create wire check dam.
- 4 Random rubble dry check dam / Crate wire check dam /Spurs (As per site condition) have been prescribed per 100 meter i.e. 40 structure for 1 km
- The cost of each structure has been calculated by averaging the cost of random rubble dry check dam and Crate wire check dam as follows:

Cost of 5 meter span create wire check dam	=	32145 Rs
Cost of 4 meter span Random rubble dry check dam	=	21288 Rs.
Average cost per structure = 53433/2	**=**	**26716.50 Rs Or say 26700 Rs**

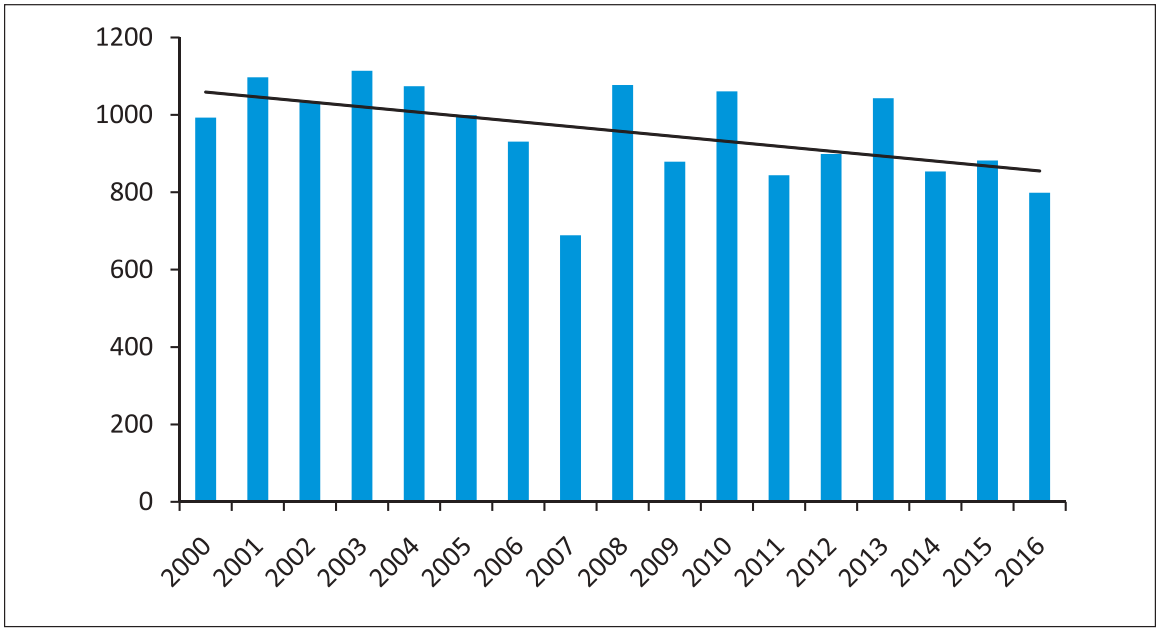
STATE OF GLACIERS IN THE BHAGIRATHI ECO-SENSITIVE ZONE

Glaciers in the Bhagirathi Eco-Sensitive Zone (BESZ) are a perennial source of water in the Bhagirathi river basin. In recent years there has been a lot of concern about the rapid melting of glaciers in the Himalayan region – variously referred to as the Third Pole of the world and the Water Tower of Asia. Hence national and international concerns have been expressed from time-to-time on the need to protect the Himalayan glaciers.

An affidavit filed by the Union Ministries of Water Resources and Environment & Forests and Climate Change (MoWR and MoEF&CC) on 21.12.2016 in the National Green Tribunal had called for the inclusion of a study on the current state of glaciers in the BESZ, as a part of the ZMP. In fulfillment of this recommendation, at the request of the GoU, a brief report titled "State of Glaciers in the Bhagirathi Eco-Sensitive Zone" has been prepared by Wadia Institute of Himalayan Geology. A brief Report on Gangotri glacier prepared by National Institute of Hydrology (NIH) has been Annexed as before.

The report highlights the extent of the glaciers in the Bhagirathi river basin, their distribution within the BESZ and their recession. It has presented data of the average annual area vacated between 1935 and 1996 by the Gangotri glacier, the largest glacier in the region. The highest rate was observed in the last reported period of 1990-1996, though the rate of recession of the snout has decreased in recent years.

Data gathered by the National Institute of Hydrology (NIH) at Bhojwasa, a little downstream of the snout of the Gangotri glacier (Gaumukh), since the year 2000, shows a decreasing trend in the total monsoon seasonal stream flow volume between 2000 and 2016.



Seasonal flow (May – October) recorded at Bhojwasa gauging site of NIH (flow values on y-axis are in million cubic metres) shows a decreasing trend.

The WIHG report mentions that glacial melt water streams also carry sediment loads, in suspension and as bed load. It states, "In general glacier melt stream, from even a small glaciers (5km^2), can transport as much as 4,000-5,000 tonnes of suspended sediment during the high discharge period of the melt season." High suspended sediment loads seriously hamper the functioning of hydropower stations downstream during periods of heavy rainfall.

The rapid recession of the Bhagirathi glaciers is dramatic and has numerous ecological consequences. Impacts of deglaciation include shifts in forest boundaries by altitude and upward movement of tree lines, changes in species, composition and vegetation types.

The rapid recession of glaciers allows high-elevation trees to become established above the current treeline and in subalpine meadows, reducing the diversity of herbaceous plants in open areas. Their shrinking will change cold air drainages, reduce moisture in glaciated basins during late summer, and increase stream temperatures, thus affecting temperature-sensitive aquatic invertebrates.

Glacier retreat can also alter sediment transport in streams and enhance the threat of catastrophic hazards like debris flow and landslides. The increased potential for Glacial Lake Outburst Floods poses hazards for settlements and infrastructure in the lower valleys. Mountaineering and trekking could also be affected adversely by reduced snow and glaciers cover and increase in natural hazards, endangering transportation on high-altitude routes.

Among the important recommendations of the Wadia study are:

- Strengthening of real time monitoring systems for glacier recession, mass volume changes, snowline fluctuations, and melt water discharge in the BESZ to identify the most glacial hazard prone areas, among other outcomes.
- Generation of guidelines and public awareness material for glacier related hazards.
- Restricting anthropogenic activities and tourist movement in the Gangotri glacier area identified as vulnerable.
- The use of green technologies for construction of roads, buildings and other large infrastructure projects must be made mandatory.

The State Government shall issue guidelines regarding Glaciers, in Cordination with Central Government and after proper consultation with Technical Agencies like ISRO, Uttarakhand Space Applications Centre (USAC) etc. The "Technical Guidelines for Himalayan Glaciers Inventory" by Space Application Centre Ahmedabad (ISRO) issued in December, 2006 shall be used for future reference.

3

CHAPTER

AGRICULTURE & ALLIED SECTORS

3
CHAPTER
AGRICULTURE & ALLIED SECTORS

INTRODUCTION

Agriculture is the primary source of livelihood in Bhagirathi Eco Sensitive Zone. Most of the villages and agricultural land are situated on the bank of river Bhagirathi or its tributaries. Out of the total agricultural land, i.e. 4827.274 hectare, less than 10 per cent is irrigated and therefore future potential in terms of bringing more land under irrigation is enormous. In addition to it the management of the water resources with watershed approach shall increase the availability of water for irrigation resulting in the increase in farm productivity in the area.

Economically, agriculture is the backbone of farmers in 89 villages of block Bhatwari under Eco-Sensitive zone. There are two main crop season in this region:

1. Kharif in which paddy, amaranthes, finger millets, maize, soybean, pigeon pea, and black gram crops are cultivated.
2. Rabi in which wheat, barley, gram, lentil, pea and mustard crops are cultivated.

In horticulture, apple is the main crop in the villages at higher altitudes, most of which is grown commercially. Other fruit species includes peach, pear and walnut etc. In addition to it the area is rich for vegetables production like potato, cabbage, pea, cauliflower, brinjal, lady finger, capsicum and cucurbits etc. and floricultural crops like marigold, rose etc. are also grown in the area.

In animal husbandry sector, rearing of animals for milk, meat and wool is being done by the farmers.

In fisheries sector, emphasis can be given to trout farming as the temperature and water quality of this zone is suitable for this venture. Mainly Rainbow trout and Brown trout are the candidate species for trout farming. At present trout farming is going on at Harsil, Barsu of this zone and in the carrying year the department

further is planning to construct more trout ponds. Area situated at a lesser height comparatively is suitable for carp culture. The candidate species of carp are Common carp, Grass carp and Silver carp. At present carp culture is going on in this area. The Department is planning to do more carp culture in this zone in the coming years.

OBJECTIVES

(A) Agriculture

- Sustainable development of Agriculture without affecting their natural environment and increase per unit productivity. And make agriculture more productive, remunerative and climate resilient by promoting location specific integrated/ Composite farming systems.
- Gradual shift to organic farming by eliminating the inorganic practices over a period of time as far as possible.
- To adopt comprehensive soil health management practices based on soil fertility maps, soil test based application of macro and micro nutrients, judicious use of fertilizers etc.
- Organizing demonstration, extension programme and training for the extension of new high-tech technology of modern agriculture.
- To optimize utilization of water resources through efficient water management to expand coverage for achieving 'per drop more crop'. and Enhance the physical access of water on the farm and expand cultivable area under assured irrigation (Har Khet ko pani),
- Increasing the reach of farm mechanization to small and marginal farmers and to the regions where availability of farm power is low, Promoting 'Custom Hiring Centre's and Farm Machinery Bank to offset the adverse economies of scale arising due to small land holding and high cost of individual ownership.
- Increase the rate of development of agriculture by formulating coordination with other allied department.
- Doubling the income of farmers by the year 2022.

(B) Horticulture

- To enhance the production and productivity of various horticulture crops by introduction of high yield and disease free planting material.
- To enhance the income of local farmers by using ultra high density plantation and improved seeds/planting material for livelihood support.
- To promote mechanization of horticulture to reduce cost of production and to enhance the area under irrigation through other interventions such as PMKSY.
- To increase the area and production of horticulture crops by adopting Cluster approach and formation of farmer interest group and federating them into a farmer producing organization (FPO).
- To set up the post harvest management infrastructure like cold store, cold room, gravity rope ways, etc.
- To establish small processing units to reduce post harvest losses.
- To ensure the increase in the farmer income by adopting non-farm activities like mushroom cultivation, bee keeping and production of vermi compost.
- To increase the area and production by extension and training programme for skill development.

- Top working technique in orchards to ensure the increase in productivity of senile orchards.
- To increase the production of horticulture crops by using protected cultivation such as poly house/ poly tunnels /vertical farming /anti hail net etc.
- Establishment of maximum small scale nurseries to ensure the production of quality planting material.

(C) Animal Husbandry

- Sustainable livestock development to check unwanted ingress of fauna.
- Preservation of locally available fodder species keeping exotic ingression at bay.
- Profitable livestock industry to contain emigration from the zone without disturbing its eco-system.

(D) Fishery

- To increase overall fish production in the area by encouraging and incentivizing the farmers for fish culture.
- To provide livelihood opportunities to the rural poor by means of fish culture and increasing their over all farm income.
- Improvement in food quality by the addition of protein to public diet.

CLAUSES RELATED TO AGRICULTURE AND ALLIED SECTORS AND COMPLIANCE STATUS

S. No.	Clauses of ESZ	Content of the clauses	Provision incorporated in Zonal Master Plan
1	Section 2 Sub section -4	The Zonal Master Plan shall provide for restoration of denuded areas, conservation of existing water bodies, management of catchment areas, watershed management, groundwater management, soil and moisture conservation, needs of local community and such other aspects of the ecology and environment that need attention.	For the compliance of these clauses the following development oriented schemes of Central and State government were being effectively implemented by the Agriculture deptt. National Mission for Sustainable Agriculture, Pradhan Mantri Krishi Sinchayee Yojna, Rastriya Krishi Vikas Yojna, Prampragat Krishi Vikas Yojna, National Food Security Mission, National Mission on Oil and Oil Palm and National Mission on Agriculture Extension and Technology in the all 89 villages of the Bhagirathi Eco Sensitive zone.
2	Sub section -5	The ZMP shall be prepared based on watershed approach. It shall also ensure that there is no attempt to tamper with the natural boundaries of the rivers and tributaries through the construction of any kind of structure on the banks of the rivers.	
3	Section3(b)(i)(2)	All steps shall be taken to prevent contamination or pollution of water including from agriculture	If the crop loss goes upto economic threshold level, safe and recommended use of plant protection measures (chemical and organic pesticides) should be carried out.
4	Section 3 (b) (v)	Introduction of exotic species	Increase the production and productivity of horticulture crop by new exotic varieties kept under permissible activities and also lateral bearing varieties of walnut, pear (Red Wartlet, Star crimson.) etc.
5	Section3(b) (viii)	Drastic change of agricultural system.	

6	Section 3 (c) (i)	Rainwater harvesting	Such activities will be promoted under watershed management, PMKSY and RKVY. Under H.M./ I.N.M/I.P.M practices and protected cultivation by using polly house, mulching, micro irrigation etc. will be used
7	Section 3 (c) (ii)	Organic farming	
8	Section 3 (c) (iii)	Green technology	

PRESENT STATUS

(A) Agriculture

The total geographical area of 89 villages with in Bhagirathi Eco-Sensitive Zone is 14411.20 hectares, out of which 4827.274 hectares constitute the total agricultural land. The table showing the agricultural statics has been annexed as **(Annexure-46)**

The average size of holding in the Block Bhatwari is around 0.75 hectares (Agriculture census 2010-11). Another future typical of hill farming is the small and scattered land holdings. Majority of the farmers belong to the category of small and marginal land holdings. Ninety five percent of the population depends on agriculture for their livelihood. The productivity of various crops is also low. Only 10 percent of area is irrigated out of the total agriculture land. Thus the department of agriculture is working on improving the sustainable productivity of various crops and irrigation facilities, providing scientific and modern techniques of cultivation by execution of different development schemes of government which are as follows:

Socio Economic Categories of Agriculture Land holdings

S. No.	Classes of Agriculture land holdings	No. of Agricultural land holdings	Area of Agricultural land h oldings (Hectare)
1	less than 0.50 hectare	4258	845.83
2	0.50 to 1.00 hectare	1253	897.49
3	1.00 to 2.00 hectare	1012	1424.12
4	2.00 to 4.00 hectare	462	1264.69
5	4.00 to 10.00 hectare	109	562.69
6	10.00 and more than 10.00 hectare	1	10.56
	Total	7094	5005.38

Categories wise Agriculture land holdings

S. No.	Categories	No. of Agricultural land holdings	Area of Agricultural land holdings (Hectare)
1	Schedule Caste	816	885.13
2	Schedule Tribes	114	37.57
3	Others	6164	4482.68
	Total	7094	5005.38

Execution of Schemes

District Plan : Under this plan the budget is allotted by District Planning Committee in different heads and the work is carried out accordingly as follows:

(a) Plant protection programme:- Under this programme distribution of plant protection items such as organic fertilizers, bio pesticides, micro nutrients and plant protection chemicals is done by providing 50 % subsidy to general category farmer and in 90 % subsidy to Scheduled caste and chedule tribe category farmers.

(b) Agriculture mechanization: In under this scheme of agriculture implements are distributed by way of providing 90 % subsidy with 40 % matching subsidy.

(c) Protection of agriculture crops from wild animals: In this programme fencing of agriculture lands by usung barbed wire is carried out.

(d) Soil and water conservation programme: - Under this protection of agriculture land from soil erosion by way of construction of crate wire protection wall, check dams etc are carried out.

State Sector Scheme

1. **Anusuchit jati/ jan jati bahulya gram krishi vikas yojana :** In this scheme agricultural development activities such as distribution of seed mini kits, vegetable seed mini kits, soil testing kits, distribution of power tiller/ power weeder, small agriculture implements, water lifting devices, vermi-compost pit construction, poly house establishment, farmer training and water conservation works are carried out in selected villages.

Central government plans/schemes

1. **National Food Security Mission :** This scheme aims to promote cultivation of coarse cereal and pulses crops. Further under this scheme, subsidized distribution of certified seeds of black gram, lentil, finger millet, maize, organizing cluster crop demonstration, subsidized distribution of plant protection chemicals, micronutrients, sprayers, water lifting devices alongwith farmer's trainings are also carried out.

2. **Rashtriya Krishi Vikas Yojana :** Under this scheme several programmes are executed which are as follows:-

(a) Crop production programme: Organize cluster demonstration of cereal crops, hybrid rice production demonstration cultivation of rice under system of rice intensification, distribution of certified seeds, plant protection chemicals, micronutrients and bio chemicals.

(b) Farm Mechanization : To promote use of modern agricultural equipments in agricultural fields, distribution of agricultural equipments, establishment of farm machinery bank.

(c) Promotion of organic farming and soil health programme : To promote organic farming by construction of vermi-compost pit, nadap pit, farmer training, organic certification, and distribution of organic inputs.

(d) Protection of agriculture from wild animals : In this programme fencing of agricultural land with barbed wire is done to prevent (damage caused to) agricultural crops by the wild animals.

(e) Extension and training programme : For the extension of various developmental schemes of government. 'Krashak Mahotsva' is organized in kharif and rabi crop season at every nyaya panchayat level and training programmes are also organized at village level in every crop season.

3. National Mission on Sustainable Agriculture: Sustainable agricultural productivity depends both on quality and availability of natural resources like soil and water. Agricultural growth can be sustained by promoting conservation and sustainable use of these scarce natural resources through appropriate location specific measures.

(a) Rain-fed area development: The development of un-irrigated agricultural land is taken up under rain-fed area development programme by demonstrating various integrated farming system and value addition and recourse management works.

(b) Soil health card scheme: Under this scheme 526 soil samples are collected for testing of soil health and about 2750 soil health cards are distributed to the farmers with fertilizer recommendation

4. National Mission on Agricultural Extension and Technology

(a) Agricultural technology management agency: Crop demonstration, village level exposure visit, farmer training, farm field school, and kisan shri prize etc

(b) Sub Mission Seed and Planting Material: Distribution of cereal crop seeds at 50 per cent subsidy and distribution of pulse/oilseeds at 60 per cent subsidy to create seed village.

(c) Sub Mission on Agricultural Mechanization: There is a strong co-relation between farm power availability and agricultural productivity. The sub mission will mainly cater to the needs of the small and marginal farmers through institutional arrangements such as custom hiring, mechanization of selected villages, subsidy for procurement of machines and equipment, etc.

(d) Sub-Mission on plant protection: It included in NAMET envisages increase in agricultural production by keeping the crop disease free using scientific and environment friendly techniques through promotion of integrated pest management.

5. National Mission on Oilseed and Oil palm: National mission on oilseed and oil palm envisages production of vegetable oils sourced from oilseeds, oil palm through distribution of certified seeds, distribution of mini-kits, distribution of plant protection chemicals, micronutrients , distribution of plant protection equipments etc.

6. Pradhan Mantri Krishi Sinchayee Yojna: Pradhan Mantri Krishi Sinchayee Yojana with the motto of 'Har Khet Ko Paani' and 'per drop more crop' is implemented for ensuring optimal use of our water resources to prevent the recurrence of floods and droughts.

7. Border Area Development Programme: Soil and moisture conservation activities have been proposed under this programme.

(B) Horticulture

The total area under horticultural crop is 3037.22 hectares out of which 744.22 hectares of area consists of apple crop whereas other fruit crops are harvested on 125 hectares of land. The total area under vegetable crops is 2168 hectares. The table showing horticultural crops statistics has been annexed as **(Annexure-47)**

At present there are two cold storage units of 1000 MT setup by the Uttarakhand Govt. at Jhala (Harsil). Jhala C.A cold store also has 200 M.T normal cold storage capacity. With the use of these storage structures the farmers will get better remuneration for their produce in the market by off season selling. There is potential to set up the horticulture and agriculture market and kisaan integrated pack houses for promoting horticultural crops in this area. In future there may be other constructions like agricultural produce marketing shops or Kissan Mandies or other fixtures from time to time as per the requirement to promote the horticulture and agriculture in the district.

Different developmental programmes which are executed in the notified area of Bhagirathi Eco-Sensitive Zone are as follows:

District Plan

(a) Production of quality planting material

(b) 50% subsidy on various horticultural equipments and tools

(c) 100% transportation subsidy on various horticultural inputs such as- plants, equipments, tools, seedlings etc.

(d) 75% subsidy on insecticides to control Kurmula (White Grubs) insects

(e) Provision of quality planting material as per the requirement of farmers

(f) 60% subsidy on plant protection chemicals, insecticides and pesticides.

State Plan

(i) 50% subsidy on packing material such as plastic crates, corrugated boxes, plastic kiltas etc.

(ii) 75% subsidy on orchard fencing. Its purpose is to protect orchards from wild animals.

(iii) Purchase of "C" grade apple under market support price scheme.

(iv) Production of quality planting material in Government nurseries for local Farmers.

(v) Free saplings to farmers so that they can plant them on freely available /barren land such as Gram Panchayat, Schools, Govt. Hospitals, Block Offices etc.

(Orchard fencing to protect orchard from wild animals)

(Apple- Golden Delicious)

(vi) **Human Resource Development**

- Capacity building training of staff officials
- Training and exposal visit of farmers within and outside the State.

(vii) **Bee Keeping**

- Support farmers with bee hives to promote cross pollination in crops during flowering season.
- Training of farmers and distribution of boxes and beehives on 50 % subsidy to promote honey production.

(viii) **Mushroom Cultivation**

- To ensure the nutritional security and income generation of small and marginal farmers.

(ix) **Post Harvest Management**

- Establishment of Gravity rope ways for transportation of horticulture produce in remote areas.
- Construction of pack houses for sorting, grading and packing of farmer produce.
- Establishment of cold room and cool chamber to reduce post harvest losses and enhance shelf life of perishable products. Distribution of corrugated boxes for packing of different types of fruits.
- Weather based crop insurance on subsidized premium by notified insurance company.

(Power Operated Rope Way)

Centrally Sponsored Schemes :

Horticultural Mission for North East and Himalayan States (HMNEH)

(i) Area Extension and Establishment of New Orchards and Cultivation of Commercial Fruit Crops

(a) High Density Plantation- Subsidy rate Rs. 30000/- Per Hectare.

(b) Normal Plantation- Subsidy rate Rs. 18000/- Per Hectare.

(Apple Orchads at Vill. Sukkhi)

(Vegetable cultivation)

(ii) Area Extension and Production of Commercial Vegetable Crops

- Assistance on quality hybrid seed-subsidy rate Rs. 25000/- per hectare.

(iii) Area Extension and Production of Commercial Spice Crops

- Assistance on quality seed -subsidy rate Rs. 50000/- per hectare.

(iv) Rejuvenation of Old and Senile Orchards : Subsidy rate Rs. 20000/- per hectare.

(v) On Farm Water Management : 50% assistance for creation of water resource as ponds, tanks etc on own land of farmers.

(vi) Mechanization of Horticulture : 50% (Central Govt.) subsidey to farmers on various implements such as power pruner, brush cutter, power tiller, power weeder etc.

(Rejuvenation of old and senile orchards)

(Creation of water resource such as pond, tanks)

(vii) Training of Farmers in prestigious Institutes such as Horticulture Universities, KVKs, and Research Institutes within and outside the state.

(viii) Erection of pack houses - for safe storage of various fruits as well as vegetable crops 50% subsidy to individual farmers for erection of pack house (9mX6m). Max. assistance Rs 2.00 Lac.

(ix) Protected Cultivation – 80% (50% Central and 30% State share) subsidy to individual farmers for erection of poly houses up to 500 Sqm for commercial production of various off season crops such as capsicum, tomato, and flowers etc

(Distribution of Power Operated Machines)

(Vegetable cultivation under polyhouse)

Unit cost of erection of poly houses

Upto 500 Sq.mtr 50% of total cost Rs. 1219.00 per Sq.mtr.

> 500Sq.mtr. upto 1008 Sq.mtr total cost Rs 1075.25 per Sq.mtr.

> 1008 Sq.mtr.up to 2080 Sq.mtr total cost Rs. 1042.49 per Sq.mtr.

> 2080 Sq.mtr. upto 4000 Sq.mtr total cost Rs. 970.60 per Sq.mtr.

(x) Distribution of anti hail net and bird Net : To provide 50% subsidy on anti hail net @ Rs. 17.50 per sq. mts. for the protection of horticultural crops from hail and birds.

(Protection of crops from hail and birds)

(Creation of vermi compost unit)

(xi) Promotion of organic farming : To promote the organic farming, setting up of vermi compost unit is permitted. The details are given below.

- **Creation of Vermi Compost Unit**

  Assistance of 75% (State) subsidy is provided for the construction of vermi compost unit. Size (10x8x2.5) ft. is approved under the scheme. The cost of the construction of the each unit will be Rs.33,300.

  To promote organic farming in the notified area under Eco Sensitive Zone we need to provide vermi compost unit to each and every farmer in this area, so that the requirement of the chemical fertilizer can be minimized. A detailed estimation of funds required to provide such vermi compost unit are given as-

Total number of farmers in the ESZ	=	800
Cost per unit (10x8x2.5) ft	=	Rs. 33,300
Farmer's share per unit	=	Rs. 8,325
State Government's share per unit	=	Rs. 24375
State Government's share required = 800xRs 824375	**=**	**Rs 1, 95, 00,000**

(xii) Establishments of small nursery : For the production of quality planting material model/small nurseries are established under HMNEH Scheme on farmer's own land.

Assistance provided is @ 50% of Rupees=15.00 lacs per hectare

model nursery 4.00 ha. and small nursery -2.00 hectares.

(Establishment of small nursery for good planting materials)

(xiii) PMKSY "Per drop more crop " – Under PMKSY "Per drop more crop "

component the assistance is provided as per the following details:

(xiv) Scheme assistance is as follows

S.No	Component	Rate of Assistance				Max. assistance limit	Cost of the installation of drip/sprinkler is dependant on the spacing of crops	Category of Beneficiaries
		General farmers		For small and marginal farmers				
		Central	State	Central	State			
Micro Irrigation								
a.	Drip irrigation	50	10	50	10	5 Hectares	-	General, Small,
b.	Micro sprinkler	35	10	50	10	5 Hectares	-	Marginal, SC, farmers
c.	Mini sprinkler	35	10	50	10	5 Hectares	-	

(C) Animal Husbandry

As per 19th livestock census 2012, Livestock population in the villages under Eco Sensitive Zone includes 19156 cattle, 3029 buffalo, 20979 sheep, 14017 goats, 164 horses, 709 mules, (Total 58054 Livestock) and 2739 poultry birds. A copy of the same has been annexed as **(Annexure-48)**

District Plan : Under this plan allotment of budget is done by district planning committee in different items and execution of work done are are as follows :

(a) Procurement of vaccine and medicines for animal treatment
(b) Organization of animal treatment camps
(c) Cattle exhibition under rural extension programme
(d) Intensification of fodder development programme
(e) Backyard poultry distribution under SCP
(f) Strengthening of veterinary hospitals, A.I. centers and L.E.O. centers

State Sector Scheme

(1) Establishment of Cows, sheep and goat units under SCP and TSP.
(2) Establishment of Sheep and goat units under Ahilyabai Holkar scheme.

Central government plans/schemes

(a) Assistance is provided to control the animal diseases under ASCAD.
(b) Foot and Mouth disease control programme (FMD-CP).
(c) Livestock census- done quinquennially.
(d) Livestock insurance scheme under **National Livestock Mission**.
(e) Establishment of one Innovative Mother poultry unit for distribution of chicks to beneficiaries under **National Livestock Mission**.
(f) Motivation of masses by giving them awards for exemplary livestock rearing, Institutions excelling in animal husbandry under **National Livestock Mission**.

Other Programme / Schemes

(a) Co-ordination with Integrated livelihood support project for fodder development.

(b) Associations in programmes like Krishak Mahotsav.

(c) Temporary Veterinary Hospital at Gangotri during Yatra season.

(d) Wool shearing and animal treatment camps are organized by USWDB.

(e) Insurance of shepherds by USWDB.

(f) Distribution of logistics like tent and torches to shepherds by USWDB.

(g) **Border Area Development Programme :** Under this programme Machine shearing of wool and modern dipping tank for Sheep is proposed.

(h) Agriculture Technology Management Authority (ATMA) organizes field level demonstrations, training programmes of livestock owners, visit to elite institutions for their capacity building.

Livestock resources of 19156 cattle's, 3029 buffalo, 20979 Sheep, 14017 goats, 164 Horses, 709 Mules, (Total 15054 Livestock) and 2739 Poultry birds spread over the all villages of Eco sensitive zone.

District Plan : Under this plan allotment of Budget is done by district planning committee in different items and execution of work is as follows.

(a) Purchase of vaccine and medicines for animal treatment.

(b) Organization of animal treatment camps.

(c) Mass dipping and drenching of sheep and goat.

(d) Cattle exhibition under rural extension programme.

(e) Intensification of fodder development programme.

(f) Backyard poultry distribution for special components.

(g) Distribution of cattle, sheep and goats at subsidised rates.

(h) Strengthening of veterinary hospitals, A.I. centres and L.E.O. centres.

State Sector Scheme

(a) Rewarding the progenies of A.I..

(b) Ahilyabai Holkar scheme for Sheep and goat.

(c) Schemes for livestock Development.

(d) Scheme for prevention and control of disease.

Central government plans/schemes

(1) Rastriya Krishi Vikas Yojna- Beneficiaries are selected from the weaker section of scheduled caste and tribes and Cows, sheep and goats units are provided at subsidized rate.

(2) National Livestock Mission :

(a) There are schemes for insurance of animals.

(b) Assistance is provided for control of animal diseases under ASCAD.

(c) Foot and Mouth disease control programme (FMD-CP).

(d) Livestock census- done quinquennially.

(e) Motivation of masses by giving them awards for exemplary livestock rearing, Institutions excelling in animal husbandry.

(f) Integrated livelihood support project.

(g) Associations in programmes like Krishak Mahotsav.

(h) Establishment of one Innovative Mother poultry unit for distribution of chicks to beneficiaries.

(i) Animal Disease control check post is set up at Gangotri.

(j) Temporary Hospital at Gangotri during Yatra season.

(k) Wool shearing and animal treatment camps are organized by USWDB.

(l) Insurance of Shepherds.

(m) Distribution of logistics like tent and torches to Shepherds.

(n) Border Area Development Programme- Under this programme sheep's are distributed to needy farmers of border area.

(o) Advanced Livestock Development is promoted through Insemination of Cows by sexed Semen.

(p) Agriculture Technology Management Authority (ATMA) organizes field level demonstrations, training programmes of livestock owners, visit to elite institutions for their capacity building.

(D) Fishery

At present farmers are benefitted with following schemes of the department. Individual farmer is benefitted by construction of ponds and getting training at village level every year. Last year trout farming was started at Barsu, Harshil and this year also trout farming units construction is proposed at Jhala, harshil and brasu in this region. Through various departmental activities, with a total of about 22 ponds, in the district, a total of about 7 quintals average fish production is achieved per year. Apart from this ponds for carp fish production are also constructed and culture of carp fish is going on in this region. In financial year 2017-18 pond construction schemes have been sanctioned in Nyaya Panchayat Harsil, Bandrani, Gangori and Mustiksaud. Under Bhagirathi Eco–sensitive zone one fish farm at Gangori is functional from where fish seed is provided to fish farmers of the district every year.

District Plan : Under this plan allotment of budget is done by District planning committee for execution of work and the activities listed in district plan are as follows:

(a) Seminars for public awareness : Under this programme conferences based on fish conservation is organised at the village near the river bank to create awareness among people about safe methods of fishing which will help to improve the fish bio- diversity in the rivers and natural water bodies.

(b) Fish seed ranching : Under this scheme collection of fish seed is done from river side and river tributaries from the place which are cut off from main flow of the river. Then the collected fish seeds ranching is done to increase the fish

holdings in the rivers and natural water bodies in the presence of departmental officers, gram pradhan, BDC members and other local people.

(c) Publicity and extension : Under this programmne the method of protection of fish in the natural water bodies are publicised through print media and departmental literatures..

State Sector Scheme :

(a) Scheduled Caste Sub-Plan: In this scheme farmers belonging to Scheduled Caste are benefitted through subsidy for construction of pond of area 100 square metres. Other than this, the department provides training and organizes conferences at village level to provide information about departmental schemes and also create awareness about other departmental activities.

(b) Construction of pond in hilly areas : Under this scheme farmers of all categories are benefitted for construction of pond of 50 square meters area, and 50 percent subsidy is being given per unit. The deparment also organizes village level conferences and training programmes to make create awareness and sensitize people about departmental schemes and method of safe fishing & innovative fishing techniques. Five days field trip are also organized for practical knowledge enhancement of farmers by taking them to progressive farmers site and fisheries farms.

(c) Construction of Ideal Fish Ponds in hilly areas: Under this scheme the department provides 50 percent subsidy to the farmer to construct pond of 200 sqmtrs.

(d) State fisheries input scheme: Under this scheme farmers engaged in fisheries activities are benefitted by providing various fish inputs i.e. fish feed, fishing net, hand net, hapa and kits on subsidized rates.

Central government plans/schemes :

(a) Cold water Fisheries Development (Blue Revolution) : Under this scheme farmers of all categories are benefitted to construct trout raceways. This particular scheme is for the regions which lie in more than1400 metres above MSL and the water in that area for aquaculture should be cold (temperature less than 20^0c). Under this programme, subsidy for general category is 40 percent and subsidy for schedule caste, schedule tribes and female beneficiaries is 60 percent. Apart from this, earthen running water units of 100 sq. metre are also constructed in the scheme and subsidy is provided at above mentioned rates.

(b) Blue revolution (skill development/ training programme) : Under this scheme training is provided for skill & entrepreneurship development of fish farmers so that they can maximize their gains and income through fisheries activities. This programme is 100 percent spo**n**sored by the Central Government.

FUTURE STRATEGY

Future planning for 5, 10, 15 years along with physical and financial outlay of different schemes has been discussed in the end of this chapter.

(A) Agriculture

Prampragat Krishi Vikas Yojna: Gradual shift to organic farming shall be achieved through organic practices like construction of vermin compost pit, organic conversion of land, distribution of organic seeds, organic fertilizers and bio-pesticides, farmers

training and jevik krishi mela and promoting cultivation of local indigenous crops like finger millet, pearl millet, foxtail millet, barnyard millet, proso millet, kodo millet and buck wheat (*Fagopyrum esculentum*) etc. A total of 600 hectare of land has certified organic where as the rest of 3920.97 hectare shall be covered gradually over a period of time. Out of 3920.97 of land the department targets to cover 1700 hectare of land for organic farming, Under various government schemes whereas the remaining land shall be converted to organic farming by cultivating the local farmers through various outreach programmes.

(1) **Rashtriya Krishi Vikas Yojna :** For comprehensive development of agriculture taking into account agro-climatic condition, natural resource and technology ensuring more inclusive and integrated development of agriculture. Crop production activities such as distribution of high yielding varieties seeds, cluster demonstration, system of rice intensification, distribution of plant protection chemicals, micro nutrients, bio fertilizers, bio pesticides, farm mechanization, promotion of organic and soil health management, establishment of collection centers, extension and training programmes has been proposed in this scheme. The proposed budgetary outlay is described in the work plan.

(2) **National Food Security Mission :** To promote cultivation of coarse cereal and pulses crops distribution of certified seeds of black gram, lentil, finger millet, maize, rajma at subsidies rates, organize cluster crop demonstration, distribution of plant protection chemicals and micronutrient at subsidies rates and, farmer training etc. Budgetary outlay is described in the work plan.

(3) **National Mission For Sustainable Agriculture :** For the development of rain-fed area with cluster approach integrated farming system, value addition and resource management and soil health management work are proposed under this scheme. The budgetary outlay is described in the work plan.

(4) **Pradhan Mantri Krishi Sinchayee Yojna :** Pradhan Mantri Krishi Sinchayee Yojana with the motto of 'Har Khet Ko Paani' and 'per drop more crop' is implemented for ensuring optimal use of our water resources to prevent the recurrence of floods and drought. The management of the water resources on a watershed approach for increasing the availability of water for irrigation, so the activities related to soil, moisture and water conservation are proposed under this scheme. Budgetary outlay is described in the work plan.

(5) **Sub Mission on Agriculture mechanization :** The sub mission will mainly cater to the needs of the small and marginal farmers through institutional arrangements such as custom hiring, mechanization of selected villages, establishment of farm machinery bank's, establishment of finger millet processing unit, dal mill, rice mill, crop dryer for value addition, subsidy for procurement of machines, and equipment, etc. Budgetary outlay is described in the work plan.

(6) **District Plan :** This scheme also play important role in the development of agriculture in the area from its various component viz. plant protection and distribution of bio fertilizers and micronutrient, subsidy on agriculture implements and soil and moisture conservation works. Budgetary outlay is described in the work plan.

(7) All programme will run through cluster approach through Farmer's federation or SHG.

(8) Promotion and extension of organic farming, use of vermi compost/Shivansh manure/fertilizer, training programme, organic certification, establishment of vermi compost unit, marketing of organic produce and jevik krishi mela proposed under Prampragat Krishi Vikas Yojana.

(9) Promotion of indigenous crop for food security purpose and to increase per unit production of indigenous crop are proposed under National Food Security Mission Programme and Prampragat Krishi Vikas Yojana.

(10) To increase in the production and marketing of Harsil's rajma, we have proposed the programme on the cluster basis in National Food Security Mission Programme.

(B) Horticulture

For the horticultural development of the Bhagirathi Eco Sensitive Zone following developmental programs/ schemes are proposed as follows and budgetary outlay is described in the work plan.

(1) Area extension under all fruit plants as per the climatic conditions of fruits and vegetables.

(2) High Yield vegetable cultivation

(3) Floriculture

(4) Spices cultivation

(5) Rejuvenation of old and senile orchards with proper plantation of the pollinator varieties

(6) Establishment of low cost irrigation tanks

(7) Production and use of Vermi compost/ Shivansh manure/fertilizer

(8) Protected cultivation such as poly house anti hail net, shade net, plastic mulching technology, vertical farming etc. are used for enhancing the production of horti produces

(9) Establishment of nursery

(10) Providing assistance to farmers through District Plan

(11) Orchards management by using bio fertilizers and bio pesticides

(12) All programme run in cluster approach through Farmer's federation or SHGs

(13) Production of rare variety of plants produced through Tissue culture method. Establishment of Tissue Culture Unit purposed in B.A.D.P

(14) Promotion of seed production of various vegetables and flowers, i.e. potato, cabbage, cauliflower, radish, pea etc.

(15) Establishment of processing unit for the value addition of "C" grade fruits and vegetables. For this purpose the establishment of processing unit proposed in various scheme such as C.S.R., State Sector and centrally sponsored schemes

(16) Various training programme are proposed for integrated horticulture development under various ongoing schemes as District/State/Centrally sponsored. These programmes have a mandate of ensuring the skill development and promotional activities for establishment of fruit and vegetable based small scale processing centre and industries.

(C) Animal Husbandry

For the livestock development of the Bhagirathi Eco Sensitive Zone following developmental programs/ schemes are proposed and budgetary outlay is described in the work plan.

(1) **Distribution of cow units, sheep unit, goat Unit –** Distribution of cow units, sheep unit, goat unit through state sector SCP, TSP Scheme, Ahilyabai Holkar scheme and other schemes etc.

(2) **Distribution of Backyard Poultry units –** SCP scheme under district plan

(3) **Prevention and control of contagious diseases –** Through vaccination campaigns, treatment and awareness camps

(4) **Increase in productivity of livestock by strengthening the nutritional and health status of animal –** through distribution of mineral / nutrient mixes and good quality fodder development

(5) **Capacity building of livestock rearers –** through trainings, demonstrations and visit to elite institutions

(6) **Strengthening of value addition chain of livestock products** – through wool shearing camps

(7) **Improvement of fodder and livestock resourses –** through distribution of fodder seeds and artificial insemination of indigenous livestock with high yielding breeds

(8) **Reduction of risk involved in livestock production –** through livestock insurance schemes

(9) Department will also work with **farmer's interest groups, federations** organized under **ILSP/ Ajiwika / ATMA** and **Central Sheep and Goat Co-operative** of the district for the livestock development

For the livestock development of the Bhagirathi Eco sensitive zone following developmental programs/ schemes are proposed as follows and budgetary outlay describe in the work plan.

(10) **Distribution of Cow units, Sheep unit, Goat Unit –** Distribution of Cow units, Sheep unit, Goat Unit through state sector SCP, TSP Scheme, Ahilyabai Holkar Scheme and other Schemes etc.

(11) **Prevention and control of contagious diseases –** Through vaccination campaigns, treatment and awareness camps

(12) **Removal of deficiencies by strengthening the nutritional status of livestock –** through levied and subsidized distribution of nutrient mixes and medicines

(13) **Capacity building of livestock rearers –** through trainings, demonstrations and visit to elite institutions

(14) **Strengthening of value addition chain of livestock products –** through wool shearing camps

(15) **Improvement of fodder and livestock resources –** through distribution of fodder seeds and artificial insemination of indigenous livestock with high yielding breeds

(16) **Reduction of risk involved in livestock production –** through livestock insurance schemes.

(D) Fishery

Department aims to promote and execute fisheries activities in cluster based approach through cooperatives for establishing fish farming activity as an occupation and giving momentum to fish farming in the district. For this department is making primary & central level co-operative committees which will promote and execute various fisheries activities in the district. Other than this to make females more strengthened through fish farming, deparment is forming *Mahila Self Help Groups* who will execute fisheries activities through construction of pond and for this, funds will be made available through MNREGA and ABHIKARAN. Trout fisheries is limited to few states & demand of trout fish is very high and it fetches pretty high prices in the market in comparison to other fish. This valley is having climatic conditions favourable for trout fish farming, so department is focusing to identify & develop trout farming villages/zones with a view to make these areas known as trout fishing zones of

the state. For commercial trout farming, this activity is also proposed to be conducted through societies. Establishment of trout hatchery is also proposed in the valley to meet out the growing demand of trout fish seed.

Due to climatic changes owing to various natural & man made activities, the natural fish, fauna and fish biodiversity has been badly affected in this area. There are many hydroelectric power projects running in this valley which have caused the destruction of natural breeding grounds and habitat of native fishes. The migratory routes of the fishes have also been deteriorated. Other reasons include illegal fishing methods adopted by local people. So there is utmost need to create awareness at route level as department alone can't protect & conserve these natural water bodies without public support. Department has started a scheme to utilize biggest natural resource i.e. rivers as a source of employment and income generation. Under this programme identified river zones which could be used for angling activities, will be allotted to local groups. This will on one hand create employment & check migration while on other hand will result in conservation of rivers thereby promoting angling tourism. For making fish farming more profitable farmers will be provided fingerling as stocking material for which necessary steps are taken for making assured availability of fish fingerlings within the district.

Proposed work plan for development of Eco-sensitive zone

Trout farming in Eco Sensitive Zone : Construction of trout raceways of volume 50 m^3 of minimum of 20 raceways in a cluster. Imparting training and organizing seminars for awareness to protect the environment by applying safe method of fishing in the natural water bodies like rivers and its tributaries. This activity is especially for the region having high altitude of more than 14000m) and availability of water having temperature less than 20^0c. Twelve units' trout fish ponds have already been constructed in the region of Eco-sensitive zone for the production of trout fish.

Construction of carp fish ponds : This activity is for the region having low altitude and water temperature comparatively higher. Through different schemes, ponds of area 50 sq metre, 100 sq metre & 200 sq. metre will be developed & mostly this activities will also be carried out in cluster based approach.

Fish farming inputs : To improve the fish farming system inputs like fish seed, fish feed, fishing net, hand net, hapa, kits will be provided to farmers on subsidized rates.

Fish Diversification : Farmers will be provided with better & high yielding fish seed of different culturable fish species, like Jayanti rohu, Amur carp, improved Catla which have shown better growth results.

Skill development training programmes : Fish farming is a skilled activity where promising results are obtained only if it is done scientifically. Hence, keeping this in view, training will be imparted to fish farmers for uplifting their fish farming skills.

Value addition for fisheries produce : To benefit landless people through fisheries activities, it is proposed to train them in making various value added fish products. Fish mobile outlet are also proposed to be set up to make fish products readily available to the masses of the valley.

4 CHAPTER

RURAL DEVELOPMENT

4

CHAPTER

RURAL DEVELOPMENT

INTRODUCTION

Rural Development in India is one of the most important factors for the growth of the rural Indian economy. It essentially focuses on planning and strategies for the development of rural areas under central and state government schemes. These schemes are based on two factors, that about two thirds of the population still lives in villages and there cannot be any progress as long as rural areas remain backward and backwardness of the rural sector would be a major impediment to the overall progress of the economy. Agriculture, animal husbandry and allied activities are the primary contributors to the rural business and economy.

Bhagirathi Eco sensitive zone (BESZ) comprises of 88 villages of Bhatwari block in uttarkashi district which is the northernmost district of Uttarakhand. The population of the BESZ is 56405 as per 2011 census and more than 80% of the population is rural population. Presently different central & state sponsored schemes are being implemented in BESZ, for development of rural economy and creation of rural infrastructure. The Rural development department is implementing and executing programmes for self-employment, wage employment, rural housing, rural connectivity and other area development Programmes.

OBJECTIVES

1. To improve the quality of life of the rural people by alleviating poverty through the instrument of self-employment and wage employment programmes.
2. Providing community infrastructure facilities such as drinking water, electricity, road connectivity, health facilities, rural housing and education.
3. Promoting decentralization of powers to strengthen the Panchayati raj institutions.

VISION

Achieving a balance between development and natural conservation so as to maintain eco-logical balance in the region and at the same time providing quality life to the rural people.

PRESENT SCENARIO

The department of Rural Development implements the following programmes. For the welfare, self-employment, housing and other developmental needs of residents of eco sensitive zone:

Housing schemes- PMAY, Deen Dayal Awas yojna, Credit Cum subsidy Housing scheme for providing individual houses for rural poor.

MGNREGA- (Mahatma Gandhi National Rural Employment Guarantee Act)- Provides 100 days unskilled manual work in a financial year to adult members of a household. At least 60% of the work undertaken in MGNREGS is linked to agriculture and allied activities like development of land, water and trees. Shelf of projects for four years is prepared in open Gram Sabha meetings which are revised every year. By providing 100 days of guaranteed labour this scheme is useful in preventing migration from villages. Women participation is encouraged in this scheme. Capacity building of rural Women SHG's through various non-government org. has been taken into account to raise nurseries and generate income. Individual assets like Poultry shelter, goat shelter, cattle shelter, Individual Households Laterines are also done under MNREGA. Water recharge structures like trenches, farm-ponds, mini percolation tanks in community lands, check dams, percolation ponds and percolation tanks are proposed under MGNREGA scheme.

Gram Panchayat development Plan is prepared in Gram Sabha open meetings every year. This plan is vetted through three tier structure of Panchayat. Besides this, the annual plan of MGNREGA is prepared in gram Sabha open meetings with active involvement of residents of villages. Every Gram Panchayat has its own 5 year plan, vetted by block and district Panchayat. This plan is revised every year as per need and necessity of gram Panchayat.

Project Life- MGNREGA aims to promote self reliance and improving the skill base of MGNREGA workers.

NRLM- (National Rural Livelihood Mission) - Aims to reduce poverty by enabling rural households to access gainful self employment and skilled wage employment opportunities resulting in a sustainable livelihood. Self employment is provided through Self help groups under NRLM and Aajivika Livelihood activities. Activities of these SHG's are mainly related to agriculture and dairy. These groups are formed with proper rule and regulation. In Bhatwari block ILSP a joint venture of IFAD is implementing Aajivika project. These groups are women centric and Self-employment is provided to local people keeping women at centre stage. Outlet of Kissan has been established to sell the products of SHGs.

BADP- (Border Area Development Programme and Uttarkhand Seemant Evam Pichda Kshetra vikash yojna) aims to meet the special development needs of the people living in the remote and inaccessible areas situated near the international border. The aim is also to saturate the border areas with the entire essential infrastructure through convergence of all BADP, State and local schemes.

MPLADS, MLALADS - These are local area development schemes, in which on recommendations of Hon.MP/MLA different development works are carried out.

BIOGAS- Biogas is to promote production of renewable energy from animal waste and agricultural residue.

Besides this Education, Health, Agriculture, Horticulture, and Fishery, Dairy, Co-operative, Panchayati Raj, Swajal Department etc are the integral part of rural development. Details of these departments have been discussed in different chapters of zonal master plan.

FUTURE STRATEGY

The Rural development department has been working on the up liftment of the rural people as its primary aim. The department has its focused approach on MGNREGA, rural housing, BADP, and other schemes.

The department has certain indicators for specific scheme, under which the target and the outcome has to be achieved.

1. **Houses and sheds for domestic and self-employment schemes**- The infrastructure creation under the heading will be of traditional ethnicity and concept. The sheds will be constructed in the same manner, minimizing the use of wood in it. Hollow cast iron, concrete cemented bars and pre fab structures will be incorporated there in to increase the strength of the structure as well as safety of the people living in it.

2. **Rural connectivity**- The most emphasized aspect in rural area is the internal road connectivity. These internal roads are bridle paths or c-c roads with the width of not more than 5 feets. The mechanism for the connectivity requirement and monitoring is an important part of rural development department. The future strategy of the department is to make internal connectivity available to each and every household in the form of a ring road type of mechanism. This ring road will be connected to the village road or the district road at a common point.

3. **Agriculture and allied activities**- Since incorporation MGNERGA is facilitating the rural population in terms of support system for livelihood. Since migration has been a problem in hilly areas, so the future strategy for agriculture and allied sector becomes the prominent one. Protection work on Land holding and safety of the cultivable land will be the main concerns of the department to focus on the outcome. Wild boar and monkeys have become a potential threat for the rural farmers, so department focuses on the methods of safety of the crops. Protection work along the field and wire messing along the field will be taken up to ensure the safety of the crop.

4. **Rural infrastructure**- Need based resources are created in the village in various schemes. These properties are used by villagers as per their individual or community based needs. So far these infrastructures are not a direct part of livelihood, but the department aims at constructing the infra resources on tourism, sports, adventure sports based projects. These will be prepared in convergence with village development program and can become a part of livelihood framework of the village.

5. **Capacity building, Skill development and training**- One of the components of Rural development is empowerment of rural women, SHG's and rural youths through its various schemes. NRLM focuses on use of available resources to generate a source of income for the rural people. The future strategy lies on extensive and micro level approach for preparation of projects as per the needs of local people. The skill development mission and PMKVY will be targeted schemes to meet the requirement.

WORK UNDER THE ABOVE MENTIONED PROGRAMMES

S.N.	Types of work	Clause	Comments
1	Residential/ Non-Residential houses	Clause no-2(7)-The construction of various buildings, hostels, resorts in the Eco-Sensitive Zone shall strictly follow the traditional concepts and architecture of the area. Clause no-(12)- No change of land use from green uses such as horticulture areas, agriculture, tea gardens, parks and others like places to non green uses shall be permitted in the Zonal Master Plan, except that strictly limited conversion of such lands may be permitted to meet the local needs including civic amenities and other infrastructure development in larger public interest and national security with the prior approval of State Government with due study of Environmental Impacts and complying with their mitigation options and subject to finalisation of Zonal Master Plan.	There is need for constructing residential and non-residential houses for below the poverty line resident families of notified Eco-Sensitive Zone. The construction of these houses will be done following the local traditional concepts and arts. The construction will be carried out in the demarcated residential habitation.
2.	Rural connectivity	Clause no 2(10) - The Zonal Master Plan shall encourage development of walking paths for tourism, pilgrimage and local use. (19) Hill roads.- The following guidelines shall be framed for the construction and maintenance of hill roads and incorporated in the Zonal Master Plan namely:- (i) For construction of any road including untarred in the Eco-Sensitive Zone of more than 5 km length (including the extension or widening of existing roads). (ii) Provision shall be made in the design of the road for treatment of hill slope. Instabilities resulting from road cutting cross drainage works and culverts using bio-engineering and other appropriate techniques and by including the cost of such measures in the cost estimate of the proposed road. (iii) The debris shall not be dumped down the Khad or slopes but shall be subsumed in the construction of roads and the provision shall also be made for disposal of unused debris in appropriate manner at suitable and identified locations so as not to affect the ecology of the area adversely and the debris shall be treated and landscaped using bio-engineering and other appropriate techniques and the cost of such measures shall be included in the cost estimate of the proposed road.	The length of footpaths/roads will not be more than 5 km and the unused material in the processes will not be dumped in the slopes. Along the footpaths/ roads there will be sufficient provision for drainage. The construction of these footpaths/road will be not done in fault zone and land sliding area. Bridle Paths, C-C roads, internal roads etc are constructed within the village, so there is no need of cutting trees

S.N.	Types of work	Clause	Comments
3	Land development, agriculture and horticulture related work	Clause no-(12)- No change of land use from green uses such as horticulture areas, agriculture, tea gardens, parks and others like places to non green uses shall be permitted in the Zonal Master Plan, except that strictly limited conversion of such lands may be permitted to meet the local needs including civic amenities and other infrastructure development in larger public interest and national security with the prior approval of State Government with due study of Environmental Impacts and complying with their mitigation options and subject to finalisation of Zonal Master Plan.	This work will be carried out mainly under MGNREGA. Under this the land of BPL families will be developed so as to make it suitable for agriculture and horticulture purposes. To provide irrigation facility there will be need of minor canals and farm ponds.
4	Tourism site development/ beautification of parks	2(21)-Man-made heritage Buildings, structures, artifacts, temples, streets, areas all precincts of historical or architectural or aesthetical or cultural or environmental significance shall be dentified and plans for their conservation, shall be prepared within one year from the date of publication of this Notification and incorporated in the Zonal Master Plan. Guidelines and regulation shall be drawn up by the State Government to regulate building and other activities around the heritage structures or sites so that the special character and distinct ambience of the heritage structure or site and area are maintained.	In the notified area the natural heritage and man-made places will be developed without causing any damage to the environment. During the process of development the basic structure of heritage site will not be changed.
5	Playground/ helipad construction	Clause no-(12)- No change of land use from green uses such as horticulture areas, agriculture, tea gardens, parks and others like places to non green uses shall be permitted in the Zonal Master Plan, except that strictly limited conversion of such lands may be permitted to meet the local needs including civic amenities and other infrastructure development in larger public interest and national security with the prior approval of State Government with due study of Environmental Impacts and complying with their mitigation options and subject to finalisation of Zonal Master Plan.	In the notified area for the youth play grounds will be developed and these play grounds will be used as helipads also. For these projects agriculture/ horticulture/ green forest land will not be used. These playgrounds proposed shall be near villages only on the basis of proposal of Gram Sabha.

S.N.	Types of work	Clause	Comments
6	Skill development training		For promoting the self employment of residents of the notified area, up gradation of skills related to agriculture, the horticulture, animal husbandry, handloom etc is proposed. No plastic material will be used in the training of skill development
7.	Solar energy	(3) (c)- Eco-friendly activities in the Eco-Sensitive. Zone.- The following activities shall be promoted in the Eco-Sensitive Zone: (i) Rain Water harvesting (ii) Organic farming (iii) Green technology (iv) Walking tourism (v) Micro hydel projects for local use (vi) Solar energy for local use (vii) Local bio-resource based industry	According to the Provision (vi) of point 3 (c) of notification number 2429/date 18 Dec2012 of Ministry of Environment and Forests of the Government of India. There is provision for permission of use of solar energy.
9	Rural bridge construction		Since in the notified area there was a natural calamity in the years 2012-13 and 2013-14 therefore there is a need for reconstruction of damaged bridges which were already proposed in the action plan of BADP and other programmes. Slopes will not be destabilized while construction is being done.
10	Micro hydro power	(3) (c)- Eco-Friendly activities in the Eco-Sensitive Zone:- The following activities shall be promoted in the Eco-Sensitive Zone: (i) Rainwater Harvesting (ii) Organic Farming (iii) Green technology (iv) Walking tourism (v) Micro Hydel projects for local use (vi) Solar energy for local use (vii) Local bio-resource based industry	A micro hydro power plant has been proposed under BADP for the security sector. This will be used by the border forces. Construction of this project will not involve diversion of the river.

BORDER AREA DEVELOPMENT PROGRAMME (BADP)

- Main objective of BADP is to meet the special developmental needs and well being of people living in remote inaccessible areas situated near the international border and saturate border areas with essential infrastructural facilities.
- Important role in checking migration, promoting employment opportunities and creating a sense of security.

Under the BADP the following category of works will be implemented:

Name of Sector	Scheme
1-(a) Infrastructure-I	(i) Construction and strengthening of approach roads, link roads, bridges, culverts, foot bridges, foot suspension bridgs, helipads in hilly and inaccessible areas having no road connectivity
(b) Infrastructure first-II	(i) Safe drinking water supply

Name of Sector	Scheme
(c) other Infrastructure	(i) Development of infrastructure for weekly haats/bazaars and also for cultural activities etc. in border areas
	(ii) Creation of new tourist center.
	(iii) New and renewable electricity- Biogas/biomass gasification, solar wind energy and mini hydel projects, systems/devices for community use and related activities
	(iv) Development of infrastructure for industries-small scale, local inputs viz handloom, handicraft, furniture making, tiny units, blacksmith works etc. and food processing industry
	(v) Promotion of rural tourism/border tourism
	(vi) Protection of heritage sites
	(vii) Retaining walls in hilly areas to protect the link roads and public building
	(viii) Drains/Gutters as a part of water disposal system etc
2. Health Department	(i) Construction of houses for doctors, paramedics and other officials engaged in health sector in the border villages
	(ii) Building infrastructure (PHC/CHC/SHC)
	(iii) Provision of medical equipment of basic/elementary type
	(iv) X-ray, ECG machines, equipment for dental clinic, pathological labs etc can also be purchased
	(v) Setting up of mobile dispensaries / ambulances in rural areas by Govt./ panchayati raj institution including tele medicine
	(vi) Construction of boundary walls / barbered wire fencing around HSCs/dispensaries in border villages
3. Special/Specific area schemes	(i) Model village composite development of at least one village of sizeable population surrounded by five-six or more villages close to the border
	(ii) Promotion of organic farming
	(iii) Warehouses for foodgrains and fodder in hilly areas particularly in snow bound areas
	iv) E-chaupals, agri-shops, mobile media vans etc
4. Activities in the field of sports	(i) Development of playfields
	(ii) Sports infrastructure in border village for activities such as boxing, archery, shooting, martial arts, judo, karate and other popular games including adventure sports
5. Agriculture and allied sectors	(i) Animal husbandry and dairying, pisciculture, sericulture, poultry farming/ fishery/pig/goat/sheep farming, farm forestry, horticulture/ floriculture
	(ii) Construction of irrigation embankments, or lift irrigation or water table recharging facilities (including minor irrigation works)
	(iii) Water conservation programmes, social forestry, parks. Gardens in government and community lands or other surrendered lands including pasturing yards
	(iv) Veterinary aid centres, artificial insemination centres and breeding centres.
	(v) Skill development training to farmers for the use of modern/scientific techniques. (forward integration)
6. Social sector	(i) Construction of community centre, Anganwadis, cultural centers / community halls, common shelters for the old and handicapped, construction of transit camps/staging huts/waiting sheds/ rain shelters with toilets, Kisaan sheds with toilets at the gates of fencing etc
	(ii) Construction of boundary walls/ barbed wire fencing around public building including Anganwadis

Name of Sector	Scheme
	(iii) Rural sanitation/toilet block in border villages (particularly for women), public places (including slum areas), SC/ST habitations, tourist centres, bus stands etc. Thrust should be on separate toilets particularly for women.
	(iv) Swatch Bharat Aabhiyan in border villages
	(v) Capacity building programmes by way of vocational studies training of youth for self-employment and skill upgradation of artisans, weavers, farmers etc
7. Education	(i) Construction of houses for teachers and other officials engaged in education sector in the border villages
	(ii) Primary/middle/secondary/higher secondary school buildings (including additional rooms)
	(iii) Construction of hostels / dormitories, public libraries and reading rooms
	(iv) Construction of computer labs with necessary infrastructure and internet connectivity.
	(v) Construction of science labs with necessary infrastructure
	(vi) Construction of toilets in schools including toilets for girls
	(vii) Construction of boundary walls/bed wire fencing around schools, hostels/dormitories, playgrounds, libraries and reading rooms

Following works done in Border village Jadong

S.No	Work name	Block	year	Cost (in lakh)
1.	Construction of pipe line and storage tank by waterfalls for supplying water in village Jadong	Bhatwari	2016-17	5.00
2.	Establishment of 5 kilo watt solar power plant in village Jadong .	Bhatwari	2016-17	15.00
3.	Construction of C.G.I seat hut in village Jadong	Bhatwari	2016-17	8.00

5 CHAPTER

URBAN DEVELOPMENT

5
CHAPTER

URBAN DEVELOPMENT

A. NAGAR PALIKA PARISHAD UTTARAKASHI

INTRODUCTION

Urban areas situated in Eco-Sensitive Zone include Nagar PalikaParishad, Barahat and Nagar Panchayat, Gangotri. These two urban bodies are located near international boundaries of India and China. Nagar Palika, Barahat was established by Govt. notification dated 24 November 1962. Nagar Palika Parishad, Barahat has an area of approximately 14.71Sq. Km (includes 2.2 Sq.Km area of merged villages). According to Census 2011, total population in the Palika is 17475 population has been increased to 27102 after area expansion of NPP Uttarakashi. After Route to Gangotri passes through Nagar Palika Parishad area and several famous religious places are located in the Palika area. It has 11 urban wards and many rural areas which come under the eco-sensitive zone such as Pata, Sangrali, Bagiyal Gaon, Gangori, Ganeshpur, Maneri, etc. are adjacent to the Palika area. People of these villages daily commute to Nagar Palika areas for their livelihood. Owing to these factors, Barahat Palika Parishadbears extra load of cleaning and providing civic facilities.

Nagar Panchayat Gangotri was constituted vide notification no. 7869/9-1-85-19 NA (220)/85 dated 06-06-1986 issued by Government of Uttar Pradesh. This Nagar Panchayat extends from Jangla to Lanka, Bhairo Ghati, Gangotri to Kanak Gufa, covering an area of about 8 square kilometres. As per the Census of India, 2011, the population of this remote Nagar Panchayat was 110. Thousands of pilgrims visit Maa Ganga at Gangotri Dham during the season. For instance, 97068 pilgrims in year 2014, 2,83,114 in year 2015, 448251 in 2016 and 8,01,799 pilgrims in year 2017 visited Gangotri Dham. Bhagirathi Shila and Patangana are the other famous tourist spots located at Gangotri Dham.

Education is a vital component in Nagar Palika area and nearby villages which fall under the Eco Sensitive Zone. According to census 2011, literacy rate of Uttarkashi district is 72%, with male literacy rate of 82% and female literacy rate of 61%. Literacy rate here is less than 7.63% in comparison to that of Uttarakhand. Literacy

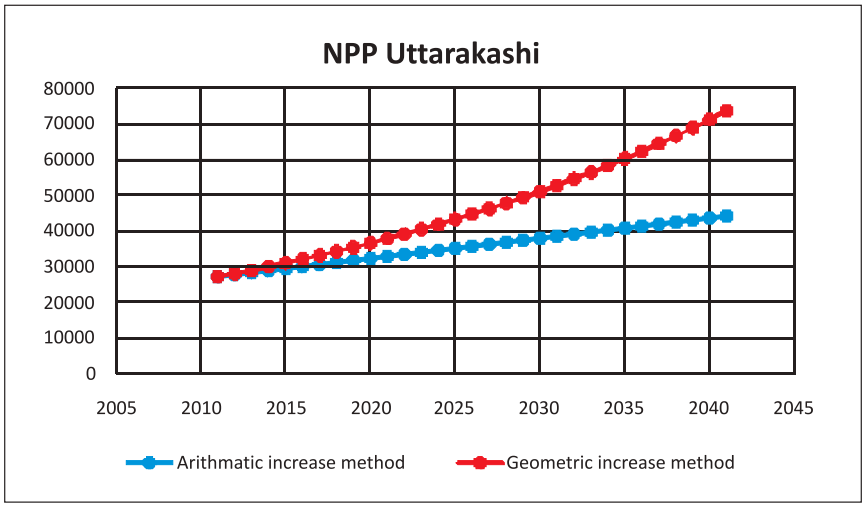
rate of Barahat urban area is 88.72%. In which male literacy rate is 94.84% and female literacy rate is 81.46%. Presently center Govt. sponsored scheme SSA and RMSA are operational for ensuring the quality of education.

Other components related to urban development including water supply, health and sanitation have been covered in other relevant chapters.

Population of NPP Uttarakashi :

Horizon Year	Arithmetic increase method	Geometric increase method	Floating population
2011	16218		
2011	27102*	27102	271020
2021	32788	37818	327883
2031	38475	52771	384747
2041	44161	73636	441610

*2011 population includes population of villages merged in NPP Uttarkashi in 2017



Population projection graphical representation

VISION

To ensure quality life for urban population, while maintaining the environmental standards of the pristine Bhagirathi watershed.

OBJECTIVES

1. To ensure hygienic, clean and litter free environment across the town, where waste is treated as a resource, managed scientifically in an environmentally sustainable manner and zero Waste reaches landfills.
2. To provide adequate services in term of safe drinking water, proper roads, regular electricity to local population and tourists/pilgrims.
3. Planning the two urban areas in an away so as to facilitate responsible tourism and quality pilgrimage in the area.
4. To generate "civic sense" amongst the masses to uplift the city's sanitation and personal hygiene conditions and raise the hopes for a sustainable common future through extensive IEC programs.

   To improve the quality of life of all towns and cities with emphasis on preservation of their heritage

PROVISIONS OF BESZ

Provisions of BESZ has been enlisted below:

Clauses	Content of the clause	Status	Provision incorporated for compliance
3(a)(ix)	Use of plastics bags in shops, commercial establishments, tourists' spots etc. and manufacturers, wholesalers, distributors, retailers etc., selling products in non biodegradable containers shall implement a scheme for the buy-back and recycling of their containers and/or packaging.	Prohibited	Go No 94/IV(2)-Sha.Vi-2016-35(Sa)/15, dated 13 Jan. 2016, Go No 94/IV(2)-Sha.Vi-2016-35(Sa)/15, dated 13 Jan. 2016, Go No 94/IV(2)-Sha.Vi-2016-35(Sa)/15, dated 13 Jan. 2016, GO No 2187/IV(2)-श0वि0.2016-35(को0के0)15 T.C., Dated 29 Dec 2016, -pertaining to ban of plastic use, IEC activity, prohibition on disposal of municipal solid waste in water bodies, scientific disposal of organic/inorganic waste, construction-debris, ban on chemical and radioactive waste, penalty of Rs. 5000/- against violation of prescribed environmental norms, ban on open defecation etc. Urban Development Department has notified "The Uttarakhand Anti Littering And Anti-Aplitting Act, 2016.All the District Magistrates has been directed to implement the "Uttarakhand Anti Littering And Anti Splitting Act, 2016". Under this act, violators are to fine from Rs. 500 to 5000 with or/and imprisonment up to 6 months).
3(b)(ix)	Regulated activities in Eco Sensitive Zone – the following activities shall be regulated in the Eco-sensitive zone as per the prevalent act and rules "sign boards and hoarding"	Regulated	Sign boards and hoardings are minimum in number, light in weight, regulated and as per norms.
3(b)(xiv)	Solid Wastes – (1) The solid waste disposal in eco-sensitive zone shall be carried out as per the provision of the Municipal Solid Waste (Management And Handling Rules, 2000 issued by the Central Government vide notification number S.O. 908 (E) dated 25 Sep. 2000 and amended from time to time. (2) The Monitoring Committee shall identify sites for disposal of solid waste and its constructions as per the provisions of the Hazardous Waste (Management And Handling) Rules, 1989 issued by the Central Government vide notifications no. S.O. 594(E), dated 28th July 1989 and amended from time to time. (3) The local authorities shall draw up plans for the segregation of solid waste into biodegradable and non biodegradable components. (4) The biodegradable material may be recycled or preferably through composting or vermin culture, (5) The inorganic material may be disposed off in an environmentally acceptable manner at identified sites;	Regulated	Go No. 504/IV(2) Sha.Vi-2016-35(Co.K.)/15, dated 05 April 2016-Direction to stop burning of MSW. Nagar Palika Parishad, Barahat has earmarked two places for scientific disposal of municipal waste (i) Nagar Palika has approx 0.1504 hect. land at Tekhla ward no. 05 for disposal of segregated degradable waste which may be recycled preferably through vermi culture. (ii) Nagar Palika has space at Maszid Mohall ward no. 06 where non bio-degradable components will be disposed off through compactor machine and will be sent to recycling plant (iii) Segregation hall and composting pits are also proposed at Maszid Mohall.

PRESENT SCENERIO

A. Solid waste Management Status

- Nagar Palika Parishad, Barahat-Uttarkashi had a population of 27102.The daily floating population is approximately 3000 during Chardham Yatra period (April to October). Nagar Palika Parishad, Barahat is divided into 11 urban wards. Nagar Palika Parishad, Barahat has 28 permanent and 42 daily wage based Pariyavaran Mitra for carrying out cleaning and sanitation activities. Nagar Palika Parishad, Barahat has 0.1504 hect. Land at Tekhla for disposal and recycling of organic waste from municipal area. Space at Maszid Mohalla, has been earmarked for disposal of non-degradable waste and it has been planned to establish here transfer station, segregation hall and compost pits. Nagar Palika Parishad, Barahat has two garbage tempos for door to door collection of waste and one hydraulic truck which collects waste from various municipal dustbins. 26 dustbins have been placed at identified places of urban wards, including national highways. Nagar Palika Parishad, Barahat has bylaws for door to door collection of solid waste and user charges are being collected from households and commercial establishments. There are 25 registered small and medium restaurant and 54 hotels in different part of Nagar Palika Area.
- Nagar Palika Parishad, Barahat has 04 vehicles which collects about 7.6MT of solid waste every day from 11 wards and bring it to segregation point, Maszid Mohalla.
- There are 20 sanitation workers working at segregation point who segregate the solid waste as degradable and non-degradable.
- After segregation, the biodegradable waste is carried to Tekhla disposal site and it is disposed in a scientific manner.
- Non-biodegradable waste is sent to the recycling plant at Rishikesh.
- 26 dustbins has been placed in across the city.

Waste generation projection

Horizon Year	Per Capita, gm / day	Daily waste generation MTPD
2011	280	7.6
2021	317	10.4
2031	364	14.0
2041	419	18.5

B. Sanitation

Objectives of Swatchh Bharat Mission (Urban) include elimination of open defecation, eradication of manual scavenging, modern & scientific municipal solid waste management, to effect behavioural change regarding healthy sanitation practices, generate awareness about sanitation and its linkage with public health and capacity augmentation for ULBs to create an enabling environment for public sector participation in capital expenditure, operation and maintenance.

S.No	Description	Number of seats existing	Proposedseats in next 5 Year
1	Public/Community toilet	85	40
2	Individual Toilet	100% covered	144

The existing IHHL has been connected to sever lines/septic tank (as per CSP Uttarakashi). The city has been declared Open defecation free in accordance with Swachh Bharat mission Urban.

C. Town Planning

- As per the following Letter no. 1896/V/2/05(A)/2017 dated 17-11-2017 **(Annexure-49)** and GO no. 1799/V-2/2017-05(A)/2017 dated 13-12-2017 **(Annexure-50)** the District Development Authority under the chairmanship of the commissioner Garhwal Division Uttarkashi has been constituted for preparing a master plan for urban areas including Uttarkashi and Gangotri. Once the Master Plan is prepared, it shall be incorporated in the Zonal Master Plan in the future.
- Town planning is aimed at ordering the use of land and setting of buildings and communication routes so as to secure the maximum practicable degree of economy, convenience and beauty. Barahat town has developed from rural setting hence its roads, drains, house buildings and shops are not located in a planned way. This has resulted in some difficulties in developing the area in a planned manner. It is proposed to include 16 periphery villages into Barahat Municipal area.Due to rapid urbanization and migration of population the capacity needs to be increase in the future.

Infrastructure/resources required in future (Estimated)

Sl. No	Name of resources	Present Status	5yrs	10yrs
1	Houses	3084	10000	12000
2	Multi Level Parking	2 (small parking)	2	4
3	Restaurants	25	40	65
4	Hotels	54	75	100
5	Dharamshalas	03	08	12
6	Beautification of Spaces	2	10	25
7	Parks	0	2	4
8		**Roads**		
	Pakka roads	6.50 km	10.0 km	12 km
	Kachcha roads	12 km	24 km	40 km
9	Drains	4000 metres	8000 mt	10000 mt

FUTURE STRATEGY

It is planned to achieve the objectives of hygienic, clean and litter free environment across the town and Urban infrastructure development in an environmentally sustainable manner. Following strategies are envisaged :

- Proper management of MSW in compliance with Solid Waste Management Rules, 2016, and in accordance with urban Municipal Solid Waste Management Action Plan for State of Uttarakhand,2016.
- Adopt the principles of the integrated waste management Hierarchy that promote reduce, reuse and recycling, followed by material recovery and energy recovery. Land filling is considered only as a last option.
- Waste segregation at source will be mandatory as per the SWM Rules, 2016.
- Promote decentralized waste management to decrease pressure on land requirements for future waste management.

- Maximize reuse, recycling and material recovery.
- Centralized resource recovery from the waste stream post collection through proven waste processing technologies like –Composting.
- Promote Reuse and recycling through extended producer responsibility and through producers of packaging material as stipulated in the SWM Rules, 2016.
- Implement disposal bans on materials that limit opportunities to achieve reuse, recycling or energy recovery.
- Expand the monitoring and enforcement of disposal bans and enhance with effective communications to raise awareness of the bans.
- Investigate financial and regulatory barriers which prevent or discourage the reuse of materials.
- Rigorous IEC activities in all the ULBs to create community awareness regarding effective waste management.
- Comprehensive citywide sanitation planning with an integrated approach of Solid and Liquid waste management has been prepared for NPP Uttarakashi.
- Sustained Open Defecation free environment and scientific management of Faecal sludge.
- Ensure safety and security of proposed infra structure as per model building bylaws considering national codes and regulations.

ADDITIONAL PROVISIONS

1. The following provisions have been also made in building by-laws to ensure Natural Resource Management and safety pertaining to the structural stability of the structures.
    - Essential services provisions to check Natural Resource Management eg. Rainwater Harvesting, Waste water recycling, energy conservation and solar water heating shall be as per norms in the byelaws.
    - Structural safety provisions-
        (a) Compliance of Building Codes is Mandatory.
        (b) Architect/structural Engineer shall certify the compliance of building codes.
        (c) No construction is allowed on slopes having gradient of 30 degrees or more.
        (d) Due to vulnerable and unstable strata of the hills, only single basement for parking is allowed in minimum plot size of 2000sq.mt.

B. NAGAR PANCHAYAT GANGOTRI

PRESENT STATUS

Besides Nagar Panchayat, several Government Departments are carrying out various development activities in Gangotri, namely irrigation, Uttarakhand Power Corporation Limited, Forest, Ureda and Drinking Water. Nagar Panchayat Gangotri looks after sanitation and lighting of roads/pathways, Irrigation Department constructs and maintains river Ghats while issue of ensuring regular power supply is looked after by Uttarakhand Power Corporation Limited and Ureda.

Activities, Clauses and Provisions pertaining to Solid Waste Management, Ban on Polythene etc. have been explained in portion dealing with Nagar Palika, Barahat.

SOLID WASTE MANAGEMENT

Around 5 quintals of solid waste is collected on a daily basis in Nagar Panchayat area. Segregation of solid waste is carried at a place near parking space at Gangotri. Dry waste is turned into compacts through processing in a compact machine and then it is sent for selling. Organic, biodegradable waste is deposited underground in waste pits.

BAN ON POLYTHENE BAGS

As per the order of Hon'ble Supreme Court no. 48/10-3-17-13(11)2001 dated 11-01-2017, bags made from plastic/thermocol, plates, glass, cup, packing material are totally prohibited in GangotriDham. There is a provision of fine of Rs. 5000/- on any person using, storing or selling polythene.

Directions for Pilgrims Visiting Gangotri Dham : Following directions have been displayed for pilgrims including Kawadyatris visiting Gangotri Dham :

1. Prohibition on use of soap and shampoo while taking bath in the river Ganga
2. Prohibition on leaving clothes behind after bath in the river Ganga
3. Prohibition on use of non-vegetarian food and intoxicants in the Gangotri area
4. Prohibition on hunting in the Gangotri area

Parking : Two vehicle parking areas have been constructed in Gangotri Dham, which have capacity of 200 small vehicles.

Public Toilets : Nagar Panchayat Gangotri has constructed 18 seater public toilets at various locations in GangotriDham. Additional toilets are required in view of the increasing number of pilgrims.

Drainage System : Soak pits have been constructed on Nagar Panchayat land at Gangotri for safe disposal of waste water from homes/shops/hotels. There is no drainage system in Gangotri Dham.

Proposed Intervention

S. No.	Plan	Physical Target	Financial (in Crore)	Physical targets as per time scale	
				5yr	10 yr
1	Construction of office building	2	3.00	1	1
2	Construction and maintenance work of road/pathways in Gangotri Nagar Panchayat	LS	2.00	1	1
3	Construction of trenching ground for waste disposal	2 No.	1.00	1	1
4	Construction of hightech toilets	2 No.	1.00	1	1
5	Solar lights for roads	300	1.00	150	150
	Total	**-**	**8.00**	**-**	**-**

Above works are important for ensuring facilities for pilgrims.

EDUCATION DEPARTMENT

Under Right to Education-2009, education is compulsory for every child. For enhancement of quality education for children we need strong infrastructure. So we require school buildings, additional class rooms, kitchen cum stores, science and computer labs, toilets etc.. This infrastructure must be provided in Eco-Sensitive Zone under SSA, RMSA, BADP and other schemes.

PRESENT STATUS- URBAN AREAS

NUMBERS OF SCHOOLS UNDER ECO-SENSITIVE ZONE

School	Primary	Upper Primary	High school	Intermediate
Govt.	8	4	1	2
Private	4	7	2	2
Aided	0	0	0	1
Total	**12**	**11**	**3**	**5**

NUMBER OF STUDENTS IN SCHOOLS UNDER ECO-SENSITIVE ZONE

School	Primary (class 1st to 5th)	Upper Primary (class 6th to 8th)	High school (class 09th to 10th)	Intermediate (class11th to 12th)
Govt.	271	177	268	431
Private	2535	1371	811	480
Aided	0	25	51	44
Total	**2806**	**1573**	**1130**	**955**

NUMBER OF TEACHERS AND OFFICIAL STAFF

School	Primary	Upper Primary	High school	Intermediate
Govt.	16	11	22	22
Private	170	35	38	13
Aided	0	3	3	4
Total	**186**	**49**	**63**	**39**

STATUS OF INFRASTRUCTURE-URBAN

Govt. School	Total number	Dilapidated	Without facility
Building	15	0	0
Additional class rooms	2	0	0
Science labs	2	0	1
Computer labs	3	0	0
Toilets blocks	15	0	0
Kitchen cum stores	13	0	1
Total	**50**	**0**	**2**

Government Departments/Agencies involved: Departments such as Municipality, Rural Works Department, Rural Development and also School Management Committees are concerned with construction and maintenance of various premises/buildings/ facilities of Education department.

FUTURE STRATEGY

PROPOSED FUTURE CONSTRUCTION : URBAN

Govt. School	New Construction	Re-Construction	Major repair	Total
Building	0	0	3	3
Additional class rooms	0	0	0	0
Science labs	1	0	0	1
Computer labs	0	0	0	0
Toilets blocks	0	0	2	2
Kitchen cum stores	1	0	0	1
Total	**2**	**0**	**5**	**7**

To enhance quality education in ESZ we need infrastructure to ful fill new construction like school buildings, computer labs, science labs, toilet blocks, kitchen cum stores, approach pathways to link school premises with the nearby population, both urban and rural.

6

CHAPTER

IRRIGATION

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CHAPTER
IRRIGATION

INTRODUCTION

Bhagirathi Eco-Sensitive Zone contains 89 villages most of which depend upon agriculture as a primary source of income. Total agriculture land in Bhagirathi Eco-Sensitive zone constitutes 4827.274 hectare out of which 443.433 hectare is irrigated area. In spite of having a large number of streams/water resources in the area, only a small amount of water has been tapped for irrigation. Most of the agriculture area has been left by the villagers because of lack of a proper irrigation infrastructure which has led to gradual migration from most of the villages over a period of time. This chapter aims to establish and enhance more and more irrigation network, so as to bring more non-irrigated land under irrigated one.

Irrigation Division Uttarkashi has a mandate to plan, develop, maintain, operate, manage and monitor different modes of environmentally sustainable and socially acceptable irrigation and drainage systems from small to larger scale surface systems and from individual to community groundwater schemes.

The area of the Bhagirathi Eco-Sensitive Zone is severely prone to various disasters like floods, landslides, cloud bursts avalanches etc. The re-construction and disaster mitigation works are very much required for rehabilitation of the area. Likewise, the preparedness for disaster also require many works like: River training works such as river channelization, river bank protection, anti-erosion schemes etc. to protect the populated area and agricultural lands, so that the loss of properties caused by flooding is reduced. Till now, the Department has established 18 minor canals in more than 32 villages and in addition to it 41 Flood Protection schemes have been established by the department.

VISION & OBJECTIVES

- Providing irrigation facilities to each and every field of the culturable area for enhancing crop production, resulting increase in income of farmers to eliminate poverty and raising their standard of living.

- For providing irrigation facilities, construction and maintenance of gravity canals, lift irrigation and other schemes.
- Under the Disaster Management/Mitigation, for preventing damages caused to the lives and properties the construction of flood schemes for river bank protection, anti-erosion and channelization of rivers/streams.
- Construction and maintenance of various drainage works.
- Construction and maintenance of bathing ghats/crematorias to facilitate pilgrims and locals.
- Monitoring the discharge and behaviour of rivers/streams to assess, mitigate and control the disaster.
- Assistance in implementing and regulation of various acts of Government of India and States like Flood Plain Zoning Act, Ganga Rejuvenation Act etc.

APPLICABLE CLAUSES OF NOTIFICATION FOR IRRIGATION DEPARTMENT

Clause no.	Guidelines of notification	Provision in project for Compliance
2 (4)	The Zonal Master Plan shall provide for restoration of denuded area, conservation of existing water bodies, management of catchment areas, watershed management, groundwater management, soil and moisture conservation, needs of local community and such other aspects of the ecology and environment that need attention.	For conservation of Bhagirathi and its tributaies and other water bodies existing in Bhagirathi Eco-Sensitive Zone watershed has been covered under National Ganga Council constituted under the provisions of the Environmental Protection Act (EPA, 1986) vide. Notification No. S.O.31879(E) dated 07.10.2016. The Act envisages five tier structures at national, state and district level to take measures for prevention, control and abatement of environmental pollution in river Bhagirathi and its tributaries being within a radius of 15 km and to ensure continuous adequate flow of water, so as to rejuvenate the river ganga
2 (5)	The Zonal Master Plan shall be prepared based on watershed approach. It shall also ensure that there is no attempt to tamper with the natural boundaries of the river and tributaries through the construction of any kind of structures on the banks of the river and tributaries.	Irrigation Department do not construct any kind of structures which tampers the natural boundaries of the river and tributaries. However, as per **Clause 3 (C) (viii)** of the notification under disaster mitigation River training works such as river channelization, flood protection walls, anti-erosion schemes/slope stabilization works etc. are constructed by the Irrigation department for the following purposes: 1. For protection of towns, villages, agriculture land and other properties which are situated along the Bhagirathi river and its tributaries. 2. In this zone there is problem of bank erosion due to floods in river Bhagirathi and its tributaries for which anti-erosion schemes are proposed and constructed in order to protect number of villages/towns and their properties situated along the bank of river. These structures constructed along the flow at existing bank of river and do not interfere with the flow of river in the ESZ. 3. Occurrence of landslides due to litho-tectonic characteristics of the Himalayas is common in this zone. During floods debris of these landslides is carried by river which either erodes the banks or gets deposited in the river bed itself. To guide and confine the river flow into the main course and to regulate the riverbed configuration. River Channelization/River cleaning (removal of excessive RBM) are necessary.

Clause no.	Guidelines of notification	Provision in project for Compliance
		In consideration of above all points, and as discussed by the committee in the meeting dated 02.05.2018 such type of river training works such as: - River Channelization, Flood Protection works, Anti Erosion Schemes/Slope Stabilization etc. shall be under Regulated Category. Government of Uttarakhand has enacted "Uttarakhand Flood Plain Zoning Act-2012 vide Notification No.31/XXXVI(3)/2013/68(1)//2012 Dated 28 January 2013 to demarcate the flood plain areas and to declare the use of land Prohibited, Regulated and permitted. Where, the flood plain includes water channel, 25,50, 100-year return period flood and adjoining area which is susceptible to erosion or Maximum Probable Flood. National Disaster Management Authority has issued some guidelines regarding "Regulation and Enforcement of Flood Plain Zoning" which need to be taken into consideration to arrive at Scientific and reasonable conclusion. As the said studies referred in NDMA guidelines need expertise in this field. In compliance of Flood Plain Zoning Act-2012, the flood plain zoning work is being carried out by Irrigation Department. In first phase a pilot project of 10 Km stretch from Gangori to Badethi Chungi in Uttarkashi District was selected. For the above stretch flood plain zoning survey & study work was carried out by NIH, Roorkee and the demarcation work was conducted by the Irrigation Department. In the above 10 Km stretch Flood Plain Zoning has been notified vide notification No. 829/II(2)-2018/06(66)/2016 dated 11.05.2018 (enclosed as **(Annexure 51)**. In the Remaining Stretch from Gangotri to Uttarkashi flood plain zoning work is being carried out by the Irrigation Department.
2 (20)	Natural Heritage: - The sites of valuable natural heritage in the Eco-Sensitive Zone shall be identified, particularly scenic beauty, confluence points of river, water falls, pools, springs, gorges, groves, caves, open areas, wooded areas, points, walks, rides, bridle paths etc. and plans for their conservation in their natural setting shall be incorporated in the Zonal Master Plan.	All Ghats in ESZ are of religious/Mythological importance. The maintenance/restoration of these Ghats are done by the department for their conservation and are frequently used by millions of pilgrims as well as locals for religious purpose. In Gangotri and Uttarkashi town limited pucca (permanent cemented) works for repair/restoration of Ghats along the Bhagirathi river will be carried out with proper guidelines which are necessary for the safety of people. Therefore, these works shall be under Regulated Category. In the remaining stretch maximum effort for development of Bathing/Cremation Ghats will be carried out by landscaped areas like parks with trees, hedges, grasses, etc.
3 (a) (ii)	Abstraction of river water for any new industrial purpose.	There are 2 small industries which are abstracting Ganga from river Bhagirathi for holistic purpose. The Principal Secretary Irrigation, GOU, has already granted permission for the same vide letter no:-189/नौ–1–सिं0(विविध)(27)/03/06-06-2005 and no:- 1509/II–2005–17(36)/05/07-07-2005 (Govt. order enclosed as **(Annexure 52 & 53)**. This comes under thrust industry category and gives employment for livelihood of local people. According to said clause the abstraction of river water for new industrial use is prohibited but these two industries are running since 2005. Hence shall be kept under permitted category.

Clause no.	Guidelines of notification	Provision in project for Compliance
3 (b) (i)	The extraction of ground water shall be permitted only for the agricultural and domestic consumption of the bona fide occupier of the plot and also for institutions of public utility and the sale of ground water shall not be permitted except with prior approval of the "State Ground Water Board".	The construction/restoration of minor canals and lift/tube well Irrigation systems are done by the department to provide irrigation water to agricultural crops of local inhabitants in ESZ and it also provides employment and financial support to the people. According to this clause this activity is permitted. The extraction of ground water for sale is a regulated activity. Department has neither created nor proposed such type of activity in ESZ.

PRESENT STATUS

Minor Canal Schemes

There are 18 existing minor canal systems that provide irrigation water to agricultural crops of local inhabitants in Eco-Sensitive area and it also provides employment and financial support to the people. The list of the existing minor canal system has been appended in part 2 of Zonal Master plan. These minor canal system require regular repair and maintenance which should be carried out from time to time. As per Para 3(b) (i) of the notification, extraction of ground water is permitted for the agricultural and domestic consumption of the bona-fide occupier of land. Hence construction of irrigation/drinking water supply schemes in eco-sensitive area is permitted.

Livelihood schemes

According to Hindu religion “Ganga jal” is used in various religious functions and is considered to be holy. It is in great demand in India as well as in foreign countries. M/s Gangotri Mineral Water (P) Ltd. in Jhala and M/s Uttarkashi Mineral Water (P) Ltd. in Ongihas already been permitted by Govt of Uttarakhand to draw 20,000 litres and 10,000 litres of Ganga jal per day from Bhagirathi river respectively since last decade. This comes under thrust industry category and gives employment to local people also. This should be kept under “permitted category” **(Annexure-52 & 53)**.

Flood protection work schemes

In the said eco-sensitive zone, river Bhagirathi and its tributaries flow in steep and hilly areas. These rivers derive their water from the melting of glaciers and from rains. Due to heavy rainfall and cloud burst events during monsoon these rivers carry a huge quantity sediments and debris. As the Himalayan rocks are soft in nature and moreover the zone being susceptible to earthquake disturbances, there are more cases of landslides and increased rock falls. The lean discharge and maximum recorded flood discharge (Flood recorded at Maneri Dam on 06.08.1978) of river Bhagirathi is in the order of 25 cumecs and 4250 cumecs respectively. This flood discharge ranges from 50 to 160 times the lean discharge. Higher the river discharge higher will be the sediment load.

This large variation in discharge and sediment load poses numerous problems such as : increase in flood levels, deposition of debris on one bank, silting of reservoir, meandering of river, splitting up of river into a number of interlaced channels etc. Due

to deposition of sediments on the outer bank, the river tends to leave its original course and flows along a new course and thus the inner bank gets eroded. River training works such as river channelization, river bank protection etc. are reconstructed by the irrigation department on the banks of river so as to guide and confine the flow into the main course, to regulate the riverbed configuration and thus protect the area/properties along the bank.

There are 41 existing and 9 new proposed schemes in the eco-sensitive zone, the details of which have been enclosed in part 2 of Zonal Master Plan. Reconstruction and restoration of bank protection/river channelization works are necessary to protect life and property of local inhabitants as well as for conservation of existing water bodies. Most of the times during high floods when land and property of local people or of the govt. is in danger, there is urgent need for protection works otherwise it may cause heavy damage and even the river course may be diverted to inhabited areas.

A number of villages and their properties are situated along the bank of river in eco-sensitive zone. Every year the river Bhagirathi and its tributaries heavily erode banks during monsoon and reduce the already scarcely available agricultural land. Unlike in the plains the development of the villages is restricted to specific areas and the available space in the valley along the banks of river is also acute. In the view of acute land problem, the bank protection work against erosion by river is inevitable and will also help in the development of villages as well as ensure their livelihood security.

Another benefit of river bank protection wall is that behind it walking paths for tourism and pilgrimage and local use can be constructed which shall comply to para 2-(10) of notification. In view of above facts, the river bank protection works has been kept under regulated works category.

CHAPTER 7

ENERGY

7 CHAPTER

ENERGY

INTRODUCTION

Uttarakhand is the 27th State of India, formed after bifurcation of Uttar Pradesh on 9th of November, 2000. Geographically, the State is spread over 53480 Sq. Kms with 13 revenue districts and 15761 inhabited villages. Nearly 86% of the area is hilly, and 65% of the area has forest cover and the rest comprises of the Terai areas.

The State is endowed with abundant renewable sources for generating electricity. Most of this could be harnessed through environmentally clean, small, medium & large hydroelectric projects.

The total estimated hydro-power potential of Uttarakhand State is approximately 25000 MW. Considering the sustainable development goal only 17000 MW capacity is feasible and the same has been allotted to various agencies like Central Public Sector Undertakings(CPSUs), State-owned utilities, UJVN Limited, Uttarakhand Infrastructure Projects Company (UIPC), Uttarakhand Renewable Energy Development Agency (UREDA) and Independent Power Producers (IPPs). Out of this only 3982 MW has been harnessed so far and 2523 MW is under construction. Projects of 3734 MW capacity are under various stages of clearances.

At present annual energy demand of the state is about 13000 MU out of which the state power generation utility generates about 35% of total demand. Approximately 40% of demand is fulfilled through CGS (Central Generating Stations) and 30% power is procured through open market which costs approximately Rs 1000 Crores per year. There is a huge gap between power demand and supply in the state.

In the Bhagirathi Eco-Sensitive Zone ten small hydro projects (upto 25 MW) with an aggregate installed capacity of 82.5 MW and approximately investment cost of Rs. 756.05 Crores are on hold. Apart from these, 5 large and medium hydro-projects of total installed capacity 1651 MW and investment potential of Rs. 7697 crore have been put on hold by the decisions of NGRBA dated 1.11.2010 and Hon'ble supreme court in the matter of Civil Appeal no. 6736/2013 dated 13.08.2013 respectively. These projects were under various stages of construction and development.

For a small and juvenile state like Uttarakhand where other resources are very limited, surrendering this investment opportunity means a lot but GoU has decided to show a magnanimous gesture by honouring the GOI notification, the views expressed by some of the members of NGT committee and also reiterate its commitment towards maintaining the sanctity of holy river Bhagirathi. No hydroproject of more than 2MW is being included in the plan

OBJECTIVE

The Zonal Master Plan of the Energy department has been prepared with an objective to meet the requirement of power, for the residents of Bhagirathi Eco Sensitive Zone, which will be harnessed in a sustainable and environmental friendly way through the development renewable energy projects. Tourism and hydropower are the two major growth drivers for the state. Development of hydropower projects upto 2 MW capacity will go a long way in providing employment to the people of BESZ which in turn will help in checking migration from the remote villages of this strategically important area.

VISION OF ENERGY DEPARTMENT, GOVERNMENT OF UTTARAKHAND FOR BESZ AREA

1. To provide 24X7 continuous power in the BESZ area.
2. To electrify every household in the BESZ. To achieve 100% rural electrification infrastructure for electrification of villages & hamlets.
3. To supply clean, cheap and reliable power to the local people residing in BESZ.
4. To make the State reliant in generation Sector.
5. To harness the clean and green power potential of BESZ area in a sustainable and environmental friendly manner.
6. To provide reliable & efficient transmission network in BESZ area.

The State Government has taken up some initiatives for sustainable development of hydro-power projects under which Cumulative Environmental Impact Assessment (CEIA) studies for Alaknanda and Bhagirathi river basins have been completed.

Further as per the decision taken in the point no 4.3 of minutes of the 21st expert committee for the consideration of Zonal Master Plan of Bhagirathi Eco-Sensitive Zone (ESZ) on 31st August, 2016 in the Ministry of Environment, Forest and Climate Change New Delhi, Carrying Capacity Study in respect of hydro power projects in Bhagirathi Eco Sensitive Zone has been conducted through IIT Roorkee in collaboration with National Institute of Hydrology, Roorkee and HNB Garhwal University, Srinagar.

The draft report has been submitted by IIT Roorkee, vide letter number AHEC/C-960/2926, dated 25-11-2017. The draft is being studied by UJVNL and the final report will be submitted to GoU after incorporation of the modifications, if any, suggested by UJVNL. The salient conclusions of the reports of Carrying Capacity Study are

(i) The water resources carrying capacity is large enough, (ii) Across the ESZ landscape the commissioned hydropower projects did not show any significant impact on the terrestrial biodiversity carrying capacity in three major aspects, viz. Relative Richness, Absolute Richness and Gross Primary Productivity (GPP) and the project Zones of Influence (ZOI) are having similar carrying capacity as the adjoining areas, (iii) For Aquatic biodiversity, assessment of carrying capacity using periphyton, benthic invertebrates and fish as bio-indicators and the productivity/respiration (P/R) ratio calculated for all the stretches/ sections of Bhagirathi ESZ has revealed that they represent a healthy ecosystem and (iv) Ambient air quality results indicate that ambient air quality in the ecologically sensitive zone is good. The increase in the levels of different air pollutants due to various construction activities will be small and restricted within close vicinity of construction sites.

The conclusions and recommendations chapter of the report is enclosed as **(Annexure-54)** for reference.

Uttarkashi is a remote district of the state which shares international borders with Tibet. The deficiency in availability of power in Uttarakhand, lack of other employment opportunities, and migration of population from border areas is resulting in security issues in this border district of strategic importance.

Uttarkashi district has the famous shrine Gangotri within BESZ, which is visited by lakhs of devotees annually. Electricity is the basic need of the people for both local residents and pilgrims. The BESZ area comprises of 88 villages with a population of 67332 as per the 2011 census. Present resources available for electricity supply are not sufficient and hence the proposed 10 small hydro power projects are of great importance for the sustainable development of the area.

Prohibition of development of hydroelectric projects in the Eco-Sensitive Zone will severally impact the development and economy of the region.

Apart from loss of access to clean and reliable power due to prohibition of hydro projects above 2 MW in the Bhagirathi Eco Sensitive Zone, the provisions of the notification with regard to development of hydropower will have a adverse impact on the development of the region on account of following factors:

(i) Direct and indirect employment loss to the local population in remote and border areas resulting in migration.
(ii) Impact on sustainable development
(iii) Unavoidable litigation with project proponents/ stakeholders

Development of small hydro power projects provides a clean and renewable source of power generation, requires minimum rehabilitation and resettlement as well as negligible environmental problems. They contribute in upliftment of the rural masses, in remote and inaccessible areas. They also contribute in solving the low voltage problem in the remote hilly areas and help in reducing the losses in transmission and distribution.

However, as stated above, honouring the spirit of the provisions in the BESZ notification, views expressed by some of the members of NGT committee, no SHP of more than 2 MW is being included in the plan.

The Energy Department of Government of Uttarakhand has four agencies namely:

1. UJVNL-The hydropower generating utility
2. PTCUL-The power transmission utility
3. UPCL-The power distribution utility
4. UREDA-The renewable energy development agency

UJVN LIMITED

UJVN Limited was incorporated as a company by the Government of Uttarakhand on 14th February 2001, under the Companies Act 1956. UJVN Ltd. manages hydropower generation at existing power stations, organizes development and promotion of new hydropower projects with the purpose of harnessing already identified and yet to be identified hydropower resources of the State of Uttarakhand. UJVN Ltd. is one of the large hydropower companies of the country operating more than 13 power stations of different capacity with a total installed capacity of 1289 MW and of different life span varying up to 100 years. Currently, UJVN Ltd. is in the process of developing 13 new large hydropower projects and 31 new small hydro projects. The company has also undertaken renovation, modernization and upgradation of its old and existing plants. The Government of Uttarakhand has designated UJVN Limited as nodal agency for allotment of projects to the private developers and monitoring of all hydro projects in Uttarakhand state.

PHYSICAL STATUS OF ALL THE SMALL HYDROPROJECTS IN BHAGIRATHI ECO SENSITIVE ZONE

Commissioned SHP		Under Construction SHP		Under Implementation SHP	
Project	**Agency**	**Project**	**Agency**	**Project**	**Agency**
Pilangad-I (2.25 MW)	UJVNL	Assiganga – I(4.5 MW)	UJVNL	Songad (7MW)	UJVNL
Harshil (200 KW)	UREDA	Assiganga II(4.5 MW)	UJVNL	Pilangad-II (4MW)	UJVNL
Kedar Ganga(20 KW)	UREDA	Kaldigad (9MW)	UJVNL	Siyangad (11.50MW)	Harsil Hydro Ltd
Rudraganga(150 KW)	UREDA	Limachagad (3.5 MW)	UJVNL	Kakoragad (12.50 MW)	Harsil Hydro Ltd
Total 2.62 MW		Swarigad (2MW)	UJVNL	Jalandharygad (24 MW)	Harsil Hydro Ltd
		Total 23.50 MW		**Total 59.00 MW**	
Grand Total :	**85.12 MW**				

STATUS OF PROPOSED SHPS IN BESZ

S.No	Project Name & Capacity	Agency	Financial Status		Physical Status
			Total Project Cost (Rs. in Crore)	Expenditure Incurred (Rs. In Crore)	
1	Asiganga-I (4.50 MW)	UJVNL	63.55	33.36	82% work completed
2	Asiganga-II (4.50 MW)		62.62	23.09	30 % work completed
3	Kaldigad (9 MW)		99.55	27.10	30 % work completed
4	Suwarigad (2 MW)		16.09	2.95	Work awarded
5	Limchagad (3.50 MW)		26.6	3.47	Work awarded
6	Pilangad-II (4MW)		40.0	0.0	DPR prepared
7	Songad (7 MW)		96.17	0.21	DPR prepared
8	Siyangad (11.5 MW)	Harsil Hydro	198.4	0.65	DPR approved
9	Kakoragad (12.5 MW)		77.37	0.73	DPR approved
10	Jalandharigad (24 MW)		75.7	1.55	DPR approved
	Total		**756.05**	**93.11**	

The notification, dated 18-12-2012, pertaining to BESZ, prohibits setting up of new hydroelectric power plants (dams, tunneling and construction of reservoir) and only includes development of microhydel projects for local use, solar energy for local use and local bio resource based industry.

During the meetings, of the expert committee constituted by NGT, held on 20-11-2017, 09-12-2017, 09-01-2018 and 22-05-2018, some of the members expressed their disagreement with the proposal of SHP of more than 2 MW in BESZ, as the same is not included in the notification. They also conveyed this opinion through emails which are annexed as Annexures 15A, 15B, 17A, 17B, 19A, 19B, 23A, 23B etc.

Thus honouring the spirit of notificatiion, views expressed by some of the expert members and also honouring the joint affidavit of MoEF&CC and MOWR&GD, GOI, Energy Department GoU has not included any hydro project of more than 2MW in the plan, although it means sacrificing the investment potential of around Rs 739.96 crores and the sunk cost of about Rs. 90.16 crores.

For a small and juvenile state like Uttarakhand where other resources are very limited, surrendering this investment opportunity means a lot but GoU has decided to show a magnanimous gesture by honouring the GOI notification and also to reiterate its commitment towards maintaining the sanctity of holy river Bhagirathi.

Location map of 10 Small Hydro Projects in BESZ.

UTTARAKHAND POWER CORPORATION LTD. (UPCL)

Uttarakhand Power Corporation Ltd (UPCL), formerly Uttaranchal Power Corporation Ltd was incorporated under the Companies Act, 1956 on February 12, 2001 consequent upon the formation of the State of Uttaranchal. UPCL caters to the Sub –Transmission & Distribution Secondary Substations & Distribution Lines 66 KV & below in the State.

UPCL - the frontline state power distribution utility & service provider of quality & reliable power supply to over 1.89 million consumers of electricity spread over the 13 districts of Uttarakhand. UPCL is also the first electrical utility in India to initiate women empowerment by employing local women through self help Groups, as franchisees, for meter reading, bill distribution and revenue collection.

At present following works of UPCL are going on in the BESZ area i) construction of 33/11 KV substation at Jhala, Harshil, ii) laying of LT aerial bunch cable (ABC) at different villages and places of Uttarkashi & Bhatwari towns, iii) different renovation & system strengthening works in present assets for giving continuous 24X7 cost effective electric supply at competitive rates & to restore electric supply in case of landslide & snowfall in Block Bhatwari.

POWER TRANSMISSION CORPORATION OF UTTARAKHAND LTD. (PTCUL)

As per the provisions of Electricity Act, 2003, Power Transmission Corporation of Uttaranchal Ltd. was created to handle power transmission business and registered as a Government Company under Section 617 of Companies Act, 1956 on 27th May, 2004. It started functioning w.e.f. 1st June, 2004.

UTTARAKHAND RENEWABLE ENERGY DEVELOPMENT AGENCY (UREDA)

The Uttarakhand Renewable Energy Development Agency (UREDA) has been established in July, 2001 exclusively to promote renewable energy sources, for which the state has tremendous potential. UREDA has been encouraged to take a leading role

in the development of the renewable energy sector in line with the guidance of Ministry of New and Renewable Energy and the conductive platform for the promotion of energy conservation. In Uttarakhand, operation and execution of various schemes based on non-conventional energy resources is handled by Uttarakhand Renewable Energy Development Agency (UREDA) through local panchayat, volunteer organizations and district administration. The implementation of renewable energy programmes in the state of Uttarakhand, conferences and workshop conducted towards awareness and technological modifications, Provision of promotional measures for the renewable energy development and other activities carried out, all have been successful in meeting their objectives. UREDA has framed guidelines on following work components/ programmes-

- Guidelines of operation and maintenance for watermill programme
- Handbook of watermill programme in Uttarakhand
- Family size biogas plants
- Improved watermill (Gharat)

These guidelines will be helpful for all the implementing agencies and also for the local people in BESZ area. At present 3 micro hydel projects of total 3000 KW is under operation. UREDA has also proposed 10 MHP's in the ESZ to provide Green and Clean Energy to the local villagers and habitations with the involvement of Panchayati Raj Institutions as per the policy issued by the State Govt. in 2015 for development of Micro & Mini Hydro project capacity up to 2 MW. Under this policy, MHP capacity up to 2000 KW are reserved for PRI's.

The total requirement of electricity at Gangotri Shrine is being provided by UREDA from its 170 KW Micro hydro project. For Energy Saving UREDA has installed LED lights for reduction in peak demand and also distribute LED bulbs to the household and other institutions under Demand Side Management (DSM).

The proposed list of micro and mini hydro projects in ESZ are as follows:-

S.N.	Name of the project	Capacity (MW)	Sub-tributary/Gadera
1	Bhairo Gad	0.10	Bhairo Gad
2	Basunga gad	0.15	Basunga gad
3	Sora gad	0.15	Sora gad
4	Bangori gad	0.10	Bangori gad
5	Indrawati gad	0.10	Indrawati gad
6	Swari gad	0.20	Swari gad
7	Varuni gad	0.15	Varuni gad
8.	Hulgu gad	0.20	Hulgu gad
9.	Jalandari gad	0.50	Jalandari gad
10.	Khir gad	0.10	Khir gad
	Total	**1.75**	

In addition to micro and mini hydro projects certain other activities are being operated by UREDA and some more are proposed to be included in the master plan of BESZ. The details of these activities are as follows:-

1. 12 numbers traditional water mills have been upgraded in the villages of ESZ. These upgraded water mills are being using for grinding of grains, spices and also generating electricity for providing Livelihood to the local villagers. Up- gradation & modernisation of 12 another traditional water mills has been proposed.
2. For community lighting total 77 numbers of Solar Street lights have been installed in various villages in BESZ by UREDA and further, installation of 100 numbers of solar street lights are being proposed.

3. 4-5KW roof top grid interactive solar power plants are being proposed to cover 500 families.
4. For strengthening the storage of apple in the BESZ area, UREDA has proposed 3 mobile solar cold storage for the area.
5. 50 Solar dryers for drying the seeds, fruits or other horticulture/ agricultural products are being proposed.
6. 250 number of bio gas plants of 2-3 m3 capacity is being proposed.

OBSERVATIONS ON BESZ NOTIFICATION

- The ten SHPs (below 25 MW) under different stages of construction/ implementation were allocated to developers prior to issuance of ESZ Notification dated 18.12.2012. No new projects more than 2 MW is being proposed in the BESZ.
- The HEP up to 25MW have been categorized as Small Hydro project by Ministry of New and Renewable Energy GOI.
- SHP up to 25MW have been categorized under White Category as per CPCB Guidelines of 2016 (Table G-5; Sl No. 35)
- GoU had requested for modification in the provisions, pertaining to development of Small Hydroprojects (upto 25 MW, as per MNRE categorisation), as contained in the BESZ notification dated 18.12.2012. In this connection two meetings were convened by MoEF&CC on 31.08.2016. & 18.12.2017, where GoU had represented for modification in above provisions.
- Notifications of different ESZ in neighbouring Himachal Pradesh like those of Sechu –Tuan ESZ HP (28th Sept 2017), Page 21 Sl No. 36, Rakcham – Chitkul ESZ HP (26th July 2017), Page 20 Sl. No. 45, Talra ESZ HP (21st November 2017), Page 21 Sl. No. 36, Pong Dam ESZ (16th Nov 2015), Page 7 Sl. No. 35, has kept non polluting industries (White Category of CPCB Guidelines, 2016) under Promoted Activity List.
- The draft notification, for Gangotri National Park, issued by MOEF&CC on 16th April 2018, has kept the Small scale non Polluting Industries (as per CPCB guidelines of Feb 2016) under the Regulated Activities (Sl.No. 14 in the table on page No. 21).
- It is worth mentioning that "National Park" is the highest level of protection given to any ecologically sensitive area under the existing constitutional provisions in this country. Further, the Gangotri National Park area is much upstream as compared to the lower reaches of BESZ and is closer to Gangotri and Gaumukh. If in the notification non polluting White Category industries (which also includes small hydropower projects below 25 MW), have been kept under the Regulated Category Activities then why they should not be included under regulated activities category in BESZ notification. Both the notifications i.e. the one pertaining to BESZ and the other pertaining to Gangotri National Park have been issued by the same section of the same ministry (MOEF&CC) of Govt. of India, hence, considering the fact that most of the 10 proposed SHP are on the middle and lower reaches of BESZ, they should be included under Regulated Activities category in the BESZ notification as well.
- The Geological and Seismo-tectonic set up of ESZs in adjoining Himachal Pradesh is similar to that of BESZ.
- All the earlier proposed 10 SHPs in BESZ are below 25MW and none of them has a Dam, Barrage (meaning no obstruction/ barrier) or Reservoir to cause any significant Environmental Hazard. Moreover none of them is in the main Bhagirathi river.
- The dimension of structures for a 2MW SHP is similar to that of a SHP below 25MW hence the construction methodology will be the same. There is no scientific and technical basis of fixing a limit of 2MW as the upper limit of generation capacity as the latter is governed by the available discharge and head in the given stretch of the stream.
- E Flow will be maintained as per the guidelines of MOEF&CC, GoI. However, in compliance of NGT order dated 09.08.2017 GoU has issued a Government Order dated 05.06.2018 to developers of hydro-power projects to release a minimum 15% of average lean season flow from dam/ weir and barrage of the projects.

- All the existing Standard practices will be followed during the design and construction of SHP.
- These SHPs may usher in new frontiers for development of local villagers and offer employment opportunities for them which will have long term positive effects in the remotely located area of strategic importance.

FUTURE PLANS OF ENERGY DEPARTMENT IN BESZ

Ten mini and micro hydro projects of UREDA are being proposed in the master plan of BESZ which are under permitted category. Up-gradation and installation of traditional Gharat/ water mills, Street lights Grid Interactive Rooftop solar power plants, mobiles Solar Cold Storage and Solar dryer are also being proposed in the Master plan of BESZ.

UPCL has proposed following works in BESZ area i) system improvement work proposed in Gangotri town under IPDS, ii) electrification works in different villages in Block Bhatwari under DDUGJY, iii) replacement of old and damaged conductor from Gangotri to Harshil, iv) transmission system shall be constructed after application for grid connectivity by proposed generators & approval from appropriate authority/ regulator in accordance with BESZ notification, v) construction of 33/11 KV substation at Jhala, Harsil.

PTCUL will plan the transmission system for HEPs in BESZ area after receiving the grid connectivity application for proposed generators & subsequently field report by PI wing of PTCUL based upon Geographical location of HEP, availability of land, right of way etc. Then detailed load flow study will be carried out for planning the transmission network in the BESZ.

In spite of the reasons (stated under the observation) above, to keep the spirit of the provisions contained in the BESZ notification, honouring the views expressed by some of the members of NGT committee and in order to maintain the sanctity of holy river Bhagirathi, GoU has not included any SHP of more than 2MW in the ZMP of BESZ. The details of land requirement & salient features of proposed SHP i.e. Suwarigad (2MW) is enclosed as **(Annexure 55 & 56).**

RESPONSE TO THE COMMENTS OF MEMBERS OF NGT COMMITTEE

Shri Ravi Chopra

1	जल विद्युत परियोजनाओं के प्रति अपनी असहमति इस आधार पर व्यक्त की गयी कि क्षेत्रान्तर्गत ऊर्जा की आवश्यकता का आंकलन नही किया गया है एवं ऊर्जा के अन्य विकल्पों का कोई उल्लेख नहीं किया गया है।	वर्तमान में भागीरथी ईको सेंसिटिव जोन क्षेत्र में 7000 विद्युत उपभोक्तओं हेतु विद्युत की मांग लगभग 24 मिलियन यूनिट प्रतिवर्ष है। दीन दयाल उपाध्याय ग्राम ज्योति योजना के अन्तर्गत भविष्य में भटवारी ब्लाक के 48 तोकों के विद्युतीकरण प्रस्तावित है। इसके अतिरिक्त आईटीबीपी एवं सेना के द्वारा भारत चीन सीमा की विभिन्न स्थानों पर विद्युत संयोजनों की मांग की जा रही है। गंगोत्री धाम के ग्रिड से जुडने एवं आल वेदर रोड के निर्माण के उपरान्त इस क्षेत्र में धार्मिक तीर्थाटन में सम्भावित वृद्धि से विद्युत की मांग बढने की सम्भावना है। ऊर्जा के वैकल्पिक स्रोतों यथा सोलर के माध्यम से विद्युत उत्पादन की संभावना के अधिक से अधिक दोहन करने हेतु यथासम्भव प्रयास किया जायेगा।

Padmshree Shri Chandi Prasad Bhatt		
1	पर्यावरणविद द्वारा हिमालयी क्षेत्र की भौगोलिक क्षेत्र की भौगोलिक परिस्थितियों के सम्बन्ध में अपने अध्ययन एवं भ्रमण अनुभवों से प्रतिभागियों को अवगत कराते हुए यह उल्लेख किया गया कि पूर्व में बडे बॉध/ जलाशयों से हुए अथवा संभावित खतरों के सम्बन्ध में विशेषज्ञों के द्वारा अध्ययन किए गए हैं और भागीरथी ईको सेंसिटिव जोन का मास्टर प्लान तैयार करते समय विशेषज्ञों के निष्कर्षों एवं संस्तुतियों का भी संज्ञान लिया जाना चाहिए। दिनांक 20.11.2017 को आहुत बैठक के कार्यवृत्त के अनुसार	No Big dam is proposed
2	पिंलगाढ, हर्षिल, केदारगंगा तथा रूद्रगंगा परियोजनाओं को छोडकर शेष परियोजनाओं के सम्बन्ध में उनकी असहमति है क्योंकि इन क्षेत्रों में 2010, 2012 एवं 2013 में बाढ़, भूस्खलन की घटनायें होती रही हैं और क्षेत्र संवेदनशील है। दिनांक 09.01.2018 को आहुत बैठक के कार्यवृत्त के अनुसार	The dimension of structure in case of SHPs and mini/ micro Hydro projects is very small and in general they don't disturb the stability of slopes, which can eventuality cause landslides. Considering the spirit of the provisions contained in the BESZ notification dated 18.12.2018 and honouring the views expressed by some of the members of NGT committee, Energy Department has not included any SHP of more than 2 MW in the ZMP of BESZ.
3	भारत सरकार द्वारा 2012 में अधिसूचना जारी कर भागीरथी इकोसेंसिटिव जोन के मास्टर प्लान बनाने के लिए स्पष्ट दिशा निर्देश दिए हैं। अतः विचार विमर्श मास्टर प्लान के लिए इन्हीं दिशा निर्देश के अनुरूप होना चाहिए।	As state above in point no. 2
4	मुख्य रूप से ऊर्जा से सम्बन्धित योजनाओं को लेकर मेरा मानना है कि सूक्ष्म योजनाओं को ग्राम सभा के नेतृत्व में ही बनाया जाना चाहिए। इनका स्वामित्व ग्राम सभा या ग्राम समाज का होना चाहिए।	Government of Uttarakhand has already notified a policy for development of micro and mini hydro projects upto 2 MW in which development of these projects are reserved for the PRIs (Panchayati Raj Institutions) in the state.
5	बडी परियोजनायें इस क्षेत्र में सिर्फ खतरों एवं आपदाओं को बुलावा देने की तैयारी मानी जायेगी। इसलिए प्रस्तावित क्षेत्रीय महायोजना में वर्णित ऊर्जा की क्रम संख्या 5 से 14 तक की परियोजनाओं के निर्माण के बारे में मैं सहमत नहीं हूँ।	Considering the spirit of the provisions contained in the BESZ notification dated 18.12.2018 and honouring the views expressed by some of the members of NGT committee, Energy Department has not included any SHP of more than 2 MW in the ZMP of BESZ.
लघु जल विद्युत परियोजना के सम्बन्ध में		
6	(अ) केदारगंगा, रूद्रगैरा एवं हर्षिल परियोजनाओं के सुचारू संचालन हेतु समय–समय पर आवश्यकतानुसार लघु जल विद्युत परियोजनाओं के रिनोवेशन एवं वर्तमान संरचना में बिना आधार भूत बदलाव किये बगैर क्षमता वृद्धि की संभावना होने पर क्षमता वृद्धि (02 मेगावाट तक) की जानी उचित रहेगी।	Incorporated in the future plan proposed by UREDA for the master plan of BESZ.
7	(ब) ईको सेंसटिव क्षेत्र में निम्नलिखित स्थलों पर उपयुक्तता के आधार पर लघु जल विद्युत परियोजनाओं के सर्वेक्षण कराये जाने तथा इनका निर्माण ग्राम पंचायतों के सहयोग से कराये जाने की आवश्यकता है।	As per point no. 2.
8	(स) ईको सेंसटिव जोन क्षेत्र में स्थापित पारम्परिक घराटों का सुदृढीकरण/ उच्चीकरण हेतु इनमें नई टरबाईनें/रनर स्थापित करने एवं इनमें विद्युत उत्पादन की सम्भावनाओं का सर्वेक्षण कर उपयुक्त स्थलों पर घराटों का उच्चीकरण किया जाना उचित होगा।	Incorporated in the future plan of UREDA

9	2. सौर ऊर्जा से सम्बन्धित योजनायें/उपकरणों की स्थापना (अ) रूफटाप सोलर पावर प्लान्ट की स्थापनाः– क्षेत्र में ग्रामवासियों द्वारा अपनी विद्युत आवश्यकता हेतु सौर ऊर्जा के प्रयोग को बढावा देने एवं अतिरिक्त विद्युत उत्पादन को ग्रिड में प्रवाहित कर अपनी आजीविका/आय का एक स्रोत विकसित करने के दृष्टि से इस क्षेत्र में ग्रामवासियों के भवनों में आगामी 05 वर्षों में प्रतिवर्ष 500 इस प्रकार कुल 2500 नम्बर रूफटाप सोलर पावर प्लान्ट स्थापित कराये जाने उचित होंगे।	Provision has been made for the installation of additional 500 grid interactive roof top solar power plants in the master plan of BESZ.
	क्षेत्र में अधिकतर ग्रामवासियों के पास सिंगल फेस विद्युत कनेक्शन हैं। इसके दृष्टिगत ग्रामवासियों को 04 किलोवाट क्षमता तक के संयन्त्र दिये जाने पर विचार किया जा सकता है जिससे इनसे उत्पादित अतिरिक्त विद्युत को सिंगल फेस के माध्यम से ग्रिड में प्रवाहित किया जा सके। इस योजना के अन्तर्गत प्रथम चरण में सूखीटाप से उत्तर की तरफ अवस्थित 08 ग्रामों सूखी, झाला, जसपुर, पुराली, बगोरी, हर्षिल, मुखवा एवं धराली को एवं तदोपरान्त ग्राम नैताला, गणेशपुर, सैलाड एवं अन्य ग्रामों को लिया जाना उचित होगा। एक 04 किलोवाट संयन्त्र की अनुमानित कीमत रूपये 2.50 लाख आती है, इस प्रकार इन संयन्त्रों पर प्रतिवर्ष कुल रूपये 50.00 करोड की धनराशि की आवश्यकता होगी।	Provision for installation of 3 solar mobile cold storage has been made.
	(ब) सोलर कोल्ड स्टोर की स्थापनाः– इस क्षेत्र में पैदा होने वाले विभिन्न कृषि/फल उत्पादों यथा सेब, खुमानी, आलू के समुचित संरक्षण की व्यवस्था न होने के कारण इन उत्पादों के खराब होने की सम्भवना होती है एवं किसानों को इसका समुचित मूल्य नहीं मिल पाता है। इसके दृष्टिगत क्षेत्र में प्रथम चरण में सौर ऊर्जा से संचालित 03 मोबाईल सोलर कोल्ड स्टोरेज स्थापित किये जा सकते हैं। संज्ञान में आया है कि 15–20 टन क्षमता के मोबाईल सोलर कोल्ड स्टोर भारतीय बाजार मे उपलब्ध है एवं इनकी लागत लगभग रू 20.22 लाख प्रति कोल्ड स्टोर है। प्रथम चरण में हर्षिल, मुखवा एवं झाला क्षेत्रों हेतु इस प्रकार के 1–1 मोबाईल सोलर कोल्ड स्टोर लिया जाना उचित होगा जिनका संचालन/रखरखाव स्थानीय स्तर पर गठित समितियों/संघों के माध्यम से कराया जा सकता है। इनकी उपयोगिता का अध्ययन कर भविष्य में इस प्रकार 03 नम्बर कोल्ड स्टोरों की स्थापना के लिये लगभग रूपये 60.00 लाख की आवश्यकता होगी।	
10	स्थानीय स्तर पर उत्पादित होने वाले कृषि/फल उत्पादों के संरक्षण हेतु इन्हें सोलर ड्रायर के माध्यम से सुखाकर संरक्षित करने एवं आफ सीजन पर इनसे अधिक मूल्य प्राप्त होने की सम्भवना के दृष्टिगत क्षेत्र में सोलर ड्रायरर्स की स्थापना हेतु सर्वेक्षण कर तदानुसार कार्यवाही की जा सकती है।	Provision for installation of 50 solar dryers has been kept to the future plans proposed by UREDA.
11	बायोगैस संयन्त्रः– क्षेत्र के कम ऊचाई/घाटी क्षेत्रों में ग्रावासियों जिनके पास पर्याप्त पशुधन हो के आवास पर 2–3 घन मी0 क्षमता के पारिवारिक बायोगैस संयन्त्र जिनकी लागत लगभग रू 25,000.00 से रू 30,000.00 होती है, स्थापित किया जाना उचित होगा इससे ग्रामवायियों की अपनी घरेलू ऊर्जा आवश्यकता की पूर्ति होगी एवं घरेलू ईधन के रूप में उनकी जंगलों पर निर्भरता भी कम होगी। इसके साथ ही इस प्लान्ट से निकलने वाले गोबर (स्लरी) में उर्वरक तत्व (विशेषतः नाईट्रोजन तत्व) अधिक होने के कारण इसके उपयोग से उनकी कृषि उत्पादकता भी बढने की सम्भावना होगी। इस प्रकार के 50 बायोगैस संयन्त्र प्रतिवर्ष इस प्रकार आगामी 05 वर्षों में 250 बायोगैस संयन्त्र स्थापित किये जा सकते हैं। इन पर प्रतिवर्ष लगभग रू 12.50 लाख का व्यय आयेगा।	Provision of 250 bio gas plants has been made in the master plan of BESZ.

Proffessor Vinod Tare, IIT Kanpur

1	जल विद्युत परियोजनाओं की स्वीकृति में ईको सेंसिटिव जोन की भावना, स्थानीय ईकोलोजी एवं जैवविविधता की सुरक्षा के साथ कोई समझौता न किया जाय और इनके संरक्षण में जो भी व्यय वहन करना हो, उसका प्राविधान परियोजना में होना चाहिए।	Considering the spirit of the provisions contained in the BESZ notification dated 18.12.2018 and honouring the views expressed by some of the members of NGT committee, Energy Department has not included any SHP of more than 2 MW in the ZMP of BESZ.
2	The Carrying capacity Studies for 10 HEP"s should be reviewed by multi-stakeholder group including WII, FRI and Clean Ganga.	Carrying capacity study for BESZ area was done by the consortium of AHEC, IIT Roorkee, NIH, Roorkee and HNB Garhwal University, Srinagar. The draft Report has been submitted. Necessary decision has to be taken by the Expert Committee constituted by NGT.
3	Boundary conditions (longitudinal, lateral and vertical connectivity of rivers/streams, proper tunneling techniques, disposal of debris) for development of hydropower projects should be clearly stated upfront in this chapter). Same comments as for previous chapters.	The details desired are incorporated in the Carrying Capacity Study in respect of Hydro Electric Projects in Bhagirathi Eco Sensitive Zone.

Dr. S. C. Katiyar

1	River basin serves as migrated route for golden masheer and snow trout, whose abundance has become now very low.....On account of the presence of existing dam across Bhagirathi river near Uttarkashi, the upward movements of masheer and snow trout species have also been reduced or stopped". It is once again reiterated that development of only mini and micro hydro power projects (up to 2MW) only, 10 projects of UJVNL as listed in ZMP should be de-listed.	Considering the spirit of the provisions contained in the BESZ notification dated 18.12.2018 and honouring the views expressed by some of the members of NGT committee, Energy Department has not included any SHP of more than 2 MW in the ZMP of BESZ..
2	In view of the above, it is once again reiterated that development of only micro and mini hydro power projects (up to 2 MW) only should be considered within the BSEZ. As such, 9 out of 10 projects of UJVNL as listed in ZMP should be de-listed.	Considering the spirit of the provisions contained in the BESZ notification dated 18.12.2018 and honouring the views expressed by some of the members of NGT committee, Energy Department has not included any SHP of more than 2 MW in the ZMP of BESZ.

Satya Kumar, WII, Dehradun

1	वर्ष 2012 से पूर्व निर्मित योजना के फ्लड में बह जाने के दृष्टिगत Trench weir technology आधारित इन योजनाओं के स्थायित्व में आंषका व्यक्त की गयी	यूजेवीएन लि0 द्वारा वर्ष 2012 एवं 2013 की बाढ में असीगंगा एवं पिलनगाड पर स्थित लद्यु जल विद्युत परियोजनाओं के छतिग्रस्त परियोजना स्थलों का आंकलन विभिन्न तकनीकी एवं भूवैज्ञानिक विशेषज्ञों द्वारा करवाया गया है एवं विशेषज्ञों द्वारा लि0 द्वारा नदी के लेवल में आये परिवर्तन के दृष्टिगत दिये गये सुरक्षा एवं परिकल्प हेतु सुझाव दिये गये हैं। Carrying capacity study for BESZ area was done by the consortium of AHEC, IIT Roorkee, NIH, Roorkee and HNB Garhwal University, Srinagar. (Refer page 144 of Chapter-7, Vol-I)

Dr. D.P. Mathuria, ED, NMCG, MoWR&RD

1	Keeping limitations of less than 2 MW w.r.t. HEP"s in the ESZ notification is a misnomer. A holistic decision can only be taken once site specific Environment Impact Assessment is done for every individual project keeping in view the regional ecological consideration. **As per MoM dated 9.01.2018**	A Carrying Capacity study has already been done by UJVN Ltd. By the consortium of IIT, Roorkee, National Institute of Hydrology and HNB Garhwal University. Recommendation of this report has already been provided in page 139 of ZMP of BESZ.

Comments of Shri Ravi Chopra received on 17.06.2018 and its Reply

S.No	Comments	Reply
1	**An outrageous misrepresentation has also been recorded in para 5 of the Minutes of the May 2, 2018 meeting claiming that members have recommended that HEPs up to 25 MW should be allowed as a regulated activity.** This proposal violates clause 3a (i) of the December 2012 BESZ Notification. It has not been amended by the Central Government in its April 17, 2018 Notification of amendments to the original Notification despite the strong demand of the state government for relaxing this clause. This proposal and other similar proposals have been consistently opposed by several members of the committee.	In the said meeting a brief presentation was delivered by Dr. Harish Bahuguna on the design modification and the provision of E-flow in the proposed Small Hydro Projects. Dr. Tare also supported the provisions and suggested that, if construction of weir shall be constructed without disturbing the morphology of the river and provision of E-flow shall be maintained in the rivers than construction of SHP shall be allowed in the BESZ. In this regards in the 3rd meeting of Expert Body held on 09.01.2018 Mr. D.P. Mathuria representative of MoWR, GoI also mentioned that "Inclusion of hydro projects only upto 2 MW in BESZ notification is misnomer. Inclusion of hydro-projects in master plan shall be on the basis of recommendations of EIA of hydro projects. The amendments vide dated 17.04.2018 issued by MoEF&CC proves that the earlier BESZ notification dated 18.12.2012 had some discrepancies which needs to be amended. Considering the spirit of the provisions contained in the BESZ notification dated 18.12.2018 and honouring the views expressed by some of the members of NGT committee, Energy Department has not included any SHP of more than 2 MW in the ZMP of BESZ.
2	The chapter begins with the contention that Uttarakhand state, Uttarkashi district and the BESZ face power shortages which affects the economic development of the local population. This is neither factually true nor quite relevant since a basic objective for the formation of the BESZ and the subsequent Gazette Notification was to ensure the preservation of the pristine Bhagirathi and its watershed in the Goumukh to Uttarkashi stretch.	At present State of Uttarakhand is purchasing power of worth 1000 crore every year outside form the state, which is a burden to the hilly state having limited resources.
3	The draft ZMP has proposed the construction of 10 hydro electric projects – HEPs ($2 \leq MW \leq 24$) with a total installed capacity (I/C) of 82.5 MW. Also proposed are transmission lines and distribution works in the BESZ. In its single-minded focus on the 10 HEPS, however, the Energy chapter makes no mention of ensuring EFlows downstream of existing projects, particularly Maneri-Bhali I & II. EFlows are essential for maintaining the river's health and enabling it to carry out its natural functions.	The member has mixed up the issue of commissioned and proposed hydro projects. Neither the Notification of GoI nor the ZMP speaks about commissioned HEP. Moreover, it is stated clearly in ZMP that in all purposed SHP's E-Flow, as mentioned by GoI will be maintained. However, in compliance of NGT order dated 09.08.2017 GoU has issued a Government Order dated 05.06.2018 to developers of hydro-power projects to release a minimum 15% of average lean season flow from dam/ weir and barrage of the projects.

4	The power needs and capacities of Uttarakhand, Uttarkashi district and the BESZ were known to the GoI when the resolution to form the BESZ was approved by the NGRBA. Hence not approving the proposed 10 HEPs was a considered decision. Furthermore, the matter was raised afresh by the GoU at a meeting of the ESZ Expert Committee of MoEF & CC 18.12.2017). The latest Gazette Notification (April 16, 2018) amending earlier clauses of the BESZ Gazette Notification makes no amendment to increase the acceptable size to >2MW as proposed by GoU. **Hence the proposal to build the 10 HEPs must be dropped.**	NGRBA never indicated to ban SHPs below 25 MW. Only three hydropower projects namely Loharinagpala, Pala Maneri, & Bhaironghati HEPs which were large projects on main Bhagirathi river were stated to be discontinued in the 2nd meeting of the NGRBA. There was no decision either by the GoM or in the 2nd NGRBA meeting to prevent implementation of small hydropower projects on the tributaries of river Bhagirathi. In this meeting it was also clarified by Hon'ble Minister, MoEF&CC that *"the activities to be prohibited and the activities to be regulated will be duly identified and listed in the notification, which will be issued after due consultations'.* There is absolutely no scientific or technical basis in fixing a limit of 2 MW for development of SHP in BESZ. However, in the spirit of the provisions contained in the BESZ notification dated 18.12.2018 and honouring the views expressed by some of the members of NGT committee, Energy Department has not proposed any small hydro projects of more than 2 MW capacity in the BESZ.
5	At present the BESZ has two HEPs (MB-I &MB-II) with an I/C of 394 MW and 4 small HEPs with total I/C of 2.62 MW. Further, the rear end of the Tehri reservoir (I/C 1000MW) also lies in Uttarkashi district. The power produced by the existing projects in the BESZ alone is adequate to meet the current and future needs of the entire Uttarkashi district, let alone the BESZ. The BESZ need has been estimated at just a few MW (~3 MW or 24 MU) in the final ZMP draft	The electricity generated from MB-I &II is distributed equally to the state and from Tehri Project, Uttarakhand state gets only 12% from the total electricity generated. Uttarakhand state has limited resources for revenue and income generation. Implementation of SHP in BESZ area will ushers development to the local area which are remotely located. Development of remote area is of vital importance considering the strategic importance of the area close to the international border.
6	There is no guarantee that all the power generated by the 10 proposed HEPs will be available only for the BESZ or Uttarkashi district. Almost 60 per cent of their capacity will be generated at three stations by an IPP who is only obliged to give the state 12 percent of the power produced (equivalent to an I/C of <6MW). The total new capacity to be generated by the state utilities is barely 10 per cent of the current installed capacity. Its loss can be made up by reducing the usual transmission and distribution losses (generally above 20 per cent of the generated power) and using alternate renewable energy sources.	SHP's are renewable sources of energy. However, in the spirit of the provisions contained in the BESZ notification dated 18.12.2018 and honouring the views expressed by some of the members of NGT committee, Energy Department has not proposed any small hydro projects of more than 2 MW capacity in the BESZ.

7	At earlier meetings of the present committee it was pointed out that the construction of the 10 proposed small HEPs violates the Gazette Notification. Shri Chandi Prasad Bhatt had also pointed out that the 10 proposed HEPs lie on tributaries of the Bhagirathi. Most of them have recent histories of flash floods with ensuing destruction of existing projects and downstream ecological damage. In the light of this record, several committee members recommended that HEPs with I/C > 2MW not be constructed, in keeping with the Gazette Notification guidelines.	There is absolutely no scientific or technical basis in fixing a limit of 2 MW for development of SHP in BESZ. Hence this is not acceptable to UJVNL. The dimension of structure in case of SHPs and mini/ micro hydel projects is very small and in general they don't disturb the stability of slopes, which can eventually cause landslides. However, in the spirit of the provisions contained in the BESZ notification dated 18.12.2018 and honouring the views expressed by some of the members of NGT committee, Energy Department has not proposed any small hydro projects of more than 2 MW capacity in the BESZ.
8	**Alternative Recommendations:** Instead of HEPs, Shri Chandi Prasad Bhatt and Dr. Chopra had proposed that alternate sources of renewable energy like solar power and biogas be considered. The BESZ Gazette Notification recommends promotion of solar energy for local use (para 3.c.vi). But the Uttarakhand Energy Department has paid lip service to this suggestion (see Compliance Notes para below). Shri Chandi Prasad Bhatt had also proposed upgrading the Harsil HEP to 0.8 or 1.0MW and renovating the 2.25 MW Pilang Gad-I HEP. But there is no cognizance of this recommendation.	Energy deptt has given due cognizance to the recommendation of Shri Chandi Prasad Bhatt and have mentioned about proposed installation of 100 solar street light, proposal of installations of roof top grid interactive solar power plants for 500 families, proposal of 3 mobile solar cold storages, proposal for 50 solar dryers and proposal of 250 numbers of bio gas plants in the ZMP of UREDA.
9	If not sanctioning the 10 HEPs caused a loss of revenue to the state the committee members proposed that the state seek Payment for Ecological Services grants or a green bonus from the Centre. It was also proposed that a separate chapter be added on Payment for Ecological Services. This suggestion too has not been followed up.	Not in the purview of Energy Deptt.
10	**Compliance Notes:** Various recommendations and suggestions of the committee members on the Energy chapter contents have been responded to on pp138-140 of the final ZMP draft and in the Compliance Report of May 2, 2018. These responses indicate the obduracy of the GoU on the issue of the construction of the 10 small HEPs. Installation of 500 roof top solar photovoltaic power units for street lights, three mobile solar powered cold storage units and installation of 250 biogas plants in five years have been mentioned in the Compliance Report. This is tokenism compared to the investment for the proposed 10 HEPs	GoU has been very considerate to the suggestion given by members of NGT committee. If honoring the suggestion of committee members means obduracy and tokenism to one of the fellow committee member then GoU has nothing to comments on that. However, in the spirit of the provisions contained in the BESZ notification dated 18.12.2018 and honouring the views expressed by some of the members of NGT committee, Energy Department has not proposed any small hydro projects of more than 2 MW capacity in the BESZ.
11	**Conclusions:** In light of the above **it is reiterated that no HEP with an I/C of >2MW can be permitted in the BESZ. It is once again recommended that the GoU looks at alternative renewable sources of energy, to meet local power needs so that BESZ can set an example for the rest of the state and country.**	However, in the spirit of the provisions contained in the BESZ notification dated 18.12.2018 and honouring the views expressed by some of the members of NGT committee, Energy Department has not proposed any small hydro projects of more than 2 MW capacity in the BESZ.

8

CHAPTER

PUBLIC HEALTH & SANITATION

8
CHAPTER

PUBLIC HEALTH & SANITATION

INTRODUCTION

District Uttarkashi Medical Health and Family Welfare Department is providing medical health & family welfare services to the public residing in Eco-Sensitive Zone. Major factor which affects health are sanitation, safe drinking water, nutrition and immunization. Inter-departmental coordination is very important for providing medical and health services at the village level. ANM sub-centre is very important where basic healthcare service to pregnant women and children is necessary. In sub-centres immunization and delivery is conducted. If we can provide safe drinking water and good sanitation many water borne diseases e.g. Cholera, Diarrhoea, Dysentery, Typhoid and Hepatitis can be prevented. This area is very remote and disaster-prone and people are depends on health care services only in public sector hospitals/health facilities e.g. Sub-center, SAD, PHC and District hospital. District hospital also comes in this Eco-Sensitive Zone. Our maternal mortality rate and infant mortality rate are higher than the national. To provide essential health services to people residing in the Eco-Sensitive Zone for that purpose new infrastructure construction and upgradation shall be done e.g. Sub-centre, SAD and PHC and biomedical waste disposal pits/incineration plant shall be deployed in future.

Despite the fact that there are still a large number of non-covered and partially covered habitations in the State, growing acceptance of demand driven water supply schemes in the State is heartening from the perspective of WATSAN reforms. . The State Government has planned for saturating all these habitations by water supply scheme till 2022. The target for sanitation has been achieved in 09 Nov, 2016. A part of the Mid Term Development Plan (MTDP), nearly 25-30% funds will be received from the World Bank as International Development

Association (IDA) credit on soft terms. The primary stakeholders are the public at large under the guidance of democratically elected three tier Panchayati Raj Institutions (PRIs) specially the Gram Panchayats (GPs). The formation of user water and sanitation sub committee (UWSSC) and village water and sanitation sub committee (VWSSC) for manage and maintain water supply as well as sanitary facilities in Gram Panchayat. The UWSSCs/VWSSCs are play the cutting-edge role in implementation, collection of water charges, operation of schemes and maintenance of schemes.

Swachh Bharat Mission (SBM) in the State has taken off and demand for individual household sanitary latrines is increasing day by day, yet, the campaign requires a greater effort for motivating people. Keeping this challenge in view, local cultural groups are being engaged for education, information and cultural activities and the local shopkeepers are being involved as stakeholders for providing rural toilet pans in the remote villages. The stress is now being laid on "Behavior Change" and for this behavior change communication has been adopted. The focal point of IEC is inter personal communication. IEC activities urban areas are driven by Urban development authorities which are described in "Chapter Urban Development" We are confident of good results in the near future as the whole program is being approached in an integrated manner, i.e. both drinking water and sanitation simultaneously. Thus, focusing on a saturation approach for each individual village (Gram Panchayat), this is expected to yield better completion results for villages in maintaining Open Defecation Free status.

As pollution in river Ganga and its tributary has been engaging the attention of the Hon. National Green Tribunal and CPCB also, therefore the National River Conservation Directorate, New Delhi has issued an instruction to the respective State Governments to prepare a detailed report for abatement of pollution of the river at the earliest.

There are four departments working in the sector of Public Health and Sanitation as mentioned below:

1. Uttarakhand Environment Protection & Pollution Control Board
2. Department of Health and Family Welfare
3. Swajal
4. Uttarakhand Peyjal Nigam

VISION & OBJECTIVES

1. Health and Family Welfare, Uttarkashi

District Uttarakashi medical health and family welfare dept is providing health related services to the public residing in eco sensitive zone, which is highly disaster prone and shares the international border of china/Tibet. Major factors affecting health are sanitation, safe drinking water, nutrition, safe ANC/PNC services and immunization. The right to good healthcare must be addressed using modern technology, innovative approaches and by active participation of the community. To improve health services at remote village areas (reduce MMR, IMR, improve prenatal and neonatal health services) we need to continously upgrade skills of our frontline workers, ANM/ASHA/AWW and traditional birth attendants, and fulfill the shortage of human resource where needed. Also the 108 ambulance and departmental ambulance service needs to be strengthened.

To provide these essential health services upgradation of existing facilities and new infrastructure construction may be done, along with biomedical waste disposal pits/incineration plants may be deployed in the future.

2. Swajal

Water supply and harvesting

- Achieve full coverage of rural habitation in the state with a minimum of 40 LPCD. As per new guidelines of GOI under National Rural drinking water programme the service level of water supply is upgraded 55 Litre per Capita Per Day (LPCD) for stand post and 70 LPCD for private connection.
- Achieve full and independent coverage of habitations inhabited by socially marginalized groups.
- Address quality affected habitations on a priority basis.
- Promote long-term sustainability of drinking water supply sources and systems including provision for rain water harvesting, ground water recharge, ground water management, improved O&M standards and cost recovery.

Sanitation

- Strive towards elimination of open defecation and construction of individual/ cluster household latrines.
- Address personal and household sanitation, issues including individual cleanliness, water management and safe disposal of domestic liquid and solid wastes.
- Achieve full coverage of schools with sanitation facilities.
- Promote construction of integrated sanitation complexes for addressing requirements of women.
- Facilitate in the setting up of rural sanitary marts to address supply chain issues.

Guidelines

Swajal work under following Guidelines

- SBM(G) guidelines (http://swachhbharatmission.gov.in/sbmcms/writereaddata/images/pdf/Guidelines/Complete-set-guidelines.pdf)
- Revised guidelines of National Rural Drinking Water Program 2013 (http://mdws.gov.in/sites/default/files/NRDWP_Guidelines_2013.pdf)
- Solid Liquid and Waste Management (SLWM) (http://swachhbharatmission.gov.in/sbmcms/writereaddata/images/pdf/technical-notes-manuals/SLWM-Guidelines.pdf)
- Menstrual Hygiene Management (http://swachhbharatmission.gov.in/sbmcms/writereaddata/images/pdf/technical-notes-manuals/MHM-Guidelines.pdf)
- Current Mandate as notified by GoUK:

3. Uttarakhand Peyjal Nigam

DRINKING WATER SUPPLY

- To provide drinking water to the people residing in the Eco Sensitive Zone 70 LPCD through private connection and 55 LPCD for general public through stand post as per guidelines of Ministry of Drinking Water, Govt. of India.

SEWERAGE TREATMENT

Treatment of the house hold liquid waste being generated in the urban area, by means of establishment of Sewage treatment plants so as to ensure the proper disposal of the same.

- Laying of sewer infrastructure so as to tap the waste water through interception and diversion

CLAUSES OF THE NOTIFICATION AND COMPLIANCE

Sl. No	Clauses of the notifications ESZ related to department	Compliance
1.	Clause no.-3(b) (xii) Discharge of effluents- The treated effluents shall meet the provision of the water (Prevention and Control of Pollution) act 1974.	The Individual HHs Level Latrines (IHHLs)/ Community sanitary toilets are being constructed/ proposed under Swacch Bharat Mission (Gramin) to prevent contamination of environment and water bodies by human excreta. The above toilets are soak pit/ bio technique based to prevent discharge of effluents and pollution of water bodies.
2	Clause no.-3(b) (xii) Discharge of effluents- The treated effluents shall meet the provision of the water (prevention and control of pollution) a	As per letter no. 584/XI/17/56(73)2016 (Govt. of Uttarakhand) liquid waste management works are described to prevent contaminated waste water meet with fresh streams/ water bodies. Therefore construction of treatment plant cum soak pit are being proposed at HHs level under Swacch Bharat mission / Namami Gange Program. Point No. 1 and 3 is mentioned for two different program point no. 1 for SLWM works however point no. 3 for IHHLs.
3.	Clause no.-3(b) (xiv) point no. 3,4 & 5 Solid waste (3)- The local authorities shall draw up plans for the segregation of solid waste into biodegradable and non-biodegradable components. Solid waste (4)- The bio-degradable materials may be recycled preferably through composting or vermiculture. Solid waste (5)- The inorganic material may be disposed off in an environmentally acceptable manner at an identified site.	As per letter no. 584/XI/17/56(73)2016 (Govt. of Uttarakhand) Solid waste management works are described. As per Clause no.-3(b) (xiv) point no. 3 & 5 of ESZ notification, for segregation at source level colour coated (Green &Red) biodegradable and non biodegradable garbage bins are being proposed at HHs level, and segregation shelters are being proposed at community level under Swacch Bharat mission/ Namami Gang Program. Same as per Clause no.-3(b) (xiv) point no. 4 of ESZ notification, bio-degradable waste at household level is treated by constructing vermicompost pits/ NEDEP composting pits. We are working on 3 “R” concept.

PRESENT STATUS

1. UTTARAKHAND ENVIRONMENT PROTECTION & POLLUTION CONTROL BOARD

Activities to be prohibited in Eco-Sensitive Zone :

I. River Valley Project

The Master Zonal Plan for river valley project has already been prepared by the Department of Energy.

The Uttarakhand Environment Protection & Pollution Control Board will ensure quarterly monitoring of hydro projects as per the compliance of the provision of Air (Prevention and Control of Pollution) Act, 1981 /Water (Prevention and Control of Pollution) Act, 1974, and shall take action against the defaulting hydro projects.

II. Mining of Minerals, Stone quarrying Crushing

Mining of minerals, stone quarrying and stone crushing shall be prohibited in the Eco-Sensitive Area.

III. Polluting Industries

No polluting industries can exist in the Eco-Sensitive Zone, The polluting industrial sectors covered under the 'Red' and 'Orange' category of the industries shall be strictly prohibited in the zone.

The State Pollution Control Board shall conduct the monitoring of industries for assessment of air and water quality on quarterly basis and shall also issue direction to the defaulting units under Water (Prevention and Control of Pollution) Act, 1974 and Air (Prevention and Control of Pollution) Act, 1981.

IV. Sewage Treatment in the Eco-Sensitive Zone

The untreated sewage generated from the town in the Eco-Sensitive Zone is the major source of water pollution.

According to the Water (Prevention and Control of Pollution) Act, 1974 and Air (Prevention and Control of Pollution) Act, 1981 the concerned local bodies are required to obtain consent from the State Pollution Control Board, for establishment and operation of the STPs.

The disposal of the untreated sewage generated from the towns in the Eco-sensitive Zone shall be prohibited.

The Zonal Master Plan for establishment of STPs in the Eco Sensitive Zone has been prepared by the National Mission for Clean Ganga (NMCG).

The State Pollution Control Board shall ensure to monitor the water quality of all STPs on quarterly basis for proper operation of the STPs and shall issue direction to the occupier of STPs not operating properly under Water (Prevention and Control of Pollution)Act, 1974 and Air (Prevention and Control of Pollution) Act, 1981.

V. Use of the plastic carry bags

No plastic carry bag manufacturing unit exists in the area, but huge quantities of plastic carry bags are being used in the area. According to the Plastic Waste (Management & Handling) Rules, 2016 the State Pollution Control Board shall be the authority for enforcement of provision related to registration, manufacture of plastic products and every local authorities shall be responsible for development and setting up of infrastructure for segregation, transportation storage, processing and disposal of plastic waste. The State Govt. has issued the order on dated 25-01-2017 that:-

"It is further directed that there shall be a total ban of sale, use and storage of plastic carry bags throughout the State of Uttarakhand w.e.f. 01-01-2017, No person shall be permitted to bring carry bags in the State of Uttarakhand by any means of transport, including by bus, train and air. The State Government shall launch a special campaign to make the people aware to use paper or jute bags to save the environment." The order is being executed by Govt. authorities at district level.

An annexure of the above order dated 25.01.2017 has been annexed as **(Annexure-57)**

VI, Hazardous Waste Processing Unit

No hazardous waste processing units exist in the Eco-Sensitive Zone. According to the Hazardous and Other Wastes (Management & Trans-boundary Movement) Rules, 2016 the hazardous waste processing units are required to obtain authorization/registration from the State Pollution Control Board.

The hazardous waste processing units shall be prohibited in the Eco-Sensitive Zone. The State Pollution Control Board shall not issue the consent to establish to such units in the Eco-Sensitive Zone.

VII. Water Pollution Control Measures (Industry, Agricultural Area)

The major sources of water pollution in the Eco-Sensitive Zone are disposal of the untreated sewage, indiscriminate disposal of the municipal solid waste, According to the Water (Prevention and Control of Pollution) Act, 1974 the local bodies are required to obtain the consent from the State Pollution Control Board for establishment of STP and Municipal Solid Waste Disposal site. All the local bodies in the area shall ensure to obtain Environment Clearance from the State Level Environment Impact Assessment Authority for common municipal solid waste disposal site.

Discharge of untreated sewage and indiscriminate disposal of solid waste shall be prohibited in the Eco-Sensitive Zone.

The constructions and maintenance unit (Ganga) Uttarakhand Payjal Nigam has placed station at Gangotri for water quality monitoring in the Eco Sensitive Zone and shall also conduct the monitoring of water quality of river, drains on a quarterly basis. Accordingly a facility has been established in Gangotri for monitoring of water quality and more stations will be established in downstream areas.

VIII. Solid Waste Management

There are two local bodies that exist in the notified Eco-Sensitive Zone, namely, Nagar Palika Parisad, Uttarkashi, and Nagar Panchayat, Gangotri. According to the Solid Waste Management Rules, 2016 the local authority shall facilitate construction, operations and maintenance of solid waste processing facility and associated infrastructure on their own or with private sector participatson.

Indiscriminate disposal of municipal solid waste in Eco-sensitive Zone shall be prohibited.

The Zonal Master Plan has been prepared by Department of Urban Development.

The State Pollution Control Board shall monitor the provisions of Solid Waste Management Rules 2016 in respect of standards prescribed for composting, treated leachate, and incineration and also shall monitor the ground water quality every year in the periphery of sanitary land fill site. Accordingly the solid waste disposal by nagar palikas is being monitored regularly. However a more stringent mechanism will be put in place after the finalization of Zonal Master Plan.

Activities to be regulated in the Eco-Sensitive Zone

I. Air Pollution

No major air pollution industries exist in the Eco Sensitive Zone. The major sources of air pollution in the zone are burning of wood fuel, unauthorized burning of municipal solid wastes, mining and stone crushing.

The State Pollution Control Board shall install the on-line ambient air quality monitoring stations in Eco Sensitive Zone for assessment of ambient air quality.

II. Noise Pollution

According to the Noise Pollution (Regulation and Control) Rules, 2000, the State Pollution Control Board shall ensure to collect, compile and publish the technical and statistical data relating to noise pollution and measures devised for its effective prevention control and abetment. The District Magistrate/Police Commissioners and any other officer not below the rank of Deputy Superintendent of Police have been designated for the maintenance of the ambient air quality standard in respect of noise.

The State Pollution Control Board shall periodically monitor the ambient noise pollution in the Eco-Sensitive Zone and report the status to the prescribed designated officer.

III. Bio-Medical Waste Disposal

According to the Bio-medical Waste Management Rules, 2016, it shall be the duty of the occupier to take all necessary steps to ensure that biomedical wastes be handled without adverse effect to human health and the environment in accordance with these rules.

According to the rules, the Municipal Corporations, Urban Local Bodies, and Gram Panchayat shall be responsible for providing suitable land for development of common bio-medical waste treatment facility in their respective jurisdiction.

All the hospitals are disposing their bio-medical waste through deep burial system, because no common bio-medical waste treatment storage and disposal facility exists in the area. Incase new Hospital/PHC constructed in the Eco Sensitive Zone the individual hospitals shall be obtain the authorization from the State Pollution Control Board immediate after the sanction of projects. Accordingly Health department is complying to above provisions.

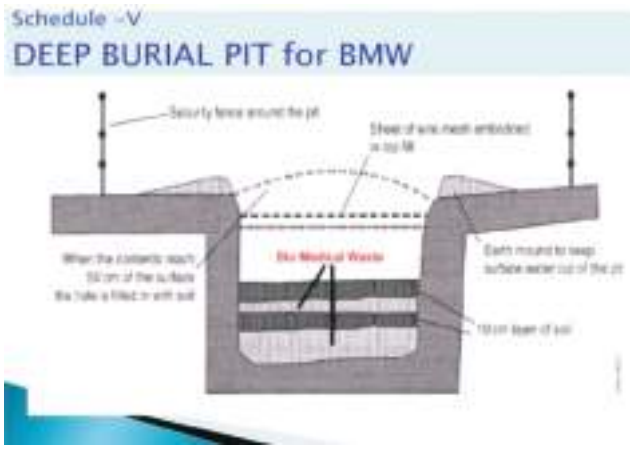
The local bodies shall provide the land for development of common bio medical waste treatment facility in their respective jurisdiction and indiscriminate disposal of bio-medical waste shall be prohibited.

The State Pollution Control Board shall ensure to maintain inventory of health care facilities in the Eco Sensitive Zone and monitor the compliance of the provision of Bio-Medical Waste (Management and Handling) Rules 2016 and also issue the direction to the defaulting health care facilities under Section 5 of the Environment (Protection) Act, 1986.

2. HEALTH AND FAMILY WELFARE

Name of Health Facility	No. of Health Facility	No. of Beds
District Hospital (DH)	01	100
District Female Hospital (DFH)	01	50
Primary Health Centre(PHC)	02	04
State Allopathic Dispensary(SAD)	06	02
Sub-Centre(SC)	16	Immunization activity conducted

A new hospital in the Nelong region does not fulfill the required population standards required to open any new health centre anywhere.



According schedule I (rule 5) and schedule II (rule 6) of Biomedical Waste Management and Handling Rule 1998.

Biomedical Waste Treatment and Disposal

Name of Health Facility	Treatment & Disposal
District Hospital (DH) District Female Hospital (DFH)	Human anatomical waste such as human tissues, organs, body parts are disposed in deep burial. Waste sharps such as needles, syringes, scalpels, blades, glass, etc. disposed after disinfection (chemical treatment /autoclaving/ shredding) into concrete pits .Discarded medicines and solid chemical wastes are disposed in secured landfills. Liquid waste and chemical liquid waste are discharged into drains after disinfection by chemical treatment. General waste and plastic waste are given to Nagar Palika for recycling or disposal.

Primary Health Centre(PHC)	Human anatomical waste such as human tissues, organs, body parts are disposed of in deep burial. Waste sharps such as needles, syringes, scalpels, blades, glass, etc. disposed after disinfection (chemical treatment /autoclaving/ shredding) into concrete pits .Discarded medicines and solid chemical wastes are disposed in secured landfills. Liquid waste and chemical liquid waste are discharged into drains after disinfection by chemical treatment. General waste and plastic waste are given to Nagar Palika for recycling or disposal.
State Allopathic Dispensary(SAD)	At present biomedical waste is brought back to PHC and disposed at PHC only.
Sub-Centre(SC)	Immunization activities are going on sub-centre level but there are no pits for disposing of biomedical waste . At present biomedical waste is brought back to PHC by ANM and disposed at PHC only.

3. SWAJAL

Mandate of PMU

- To prepare the follow-on-project of URWSSP (Sector Program);
- To provide technical assistance for community development and to do monitoring and evaluation of implementation of various GoI funded program;
- To implement Swachh Bharat Mission (SBM);
- In case of projects other than the follow-on project the functions of the PMU are limited to:
- Arranging independent certification of the quality of construction,
  - (i) Appointing Chartered Accountants for auditing, and
  - (ii) Monitoring & Evaluation of physical and financial performance. Conducting Information, education and communication activities along with carrying out training program for Human Resource Development.
- Water and Sanitation Support Organization (WSSO):
  - To develop state specific IEC strategy for reform initiatives in Water and sanitation sector and to provide capacity development of functionaries at all levels.
  - Enhance community participation and demand creation through development of strategies with effective combination of mass and personal communication for different groups.
  - Capacity building of grass root level workers, PRIs NGOs, state and district level officers, Anganwadi workers, ASHA and other motivators at village, block and district level.
  - To promote new technologies which may be taken up under rural water scheme and Nirmal Bharat Abhiyan?
  - Address the need of sustainability in water and sanitation
  - Take up advocacy on conventional and traditional water conservation and rain water harvesting.
  - Undertake action research on various aspects of sanitation including new technologies, impact of provision of sanitation facilities on health indicators, IEC strategies etc.

Information Education and Communication (IEC) Activities

Awareness campaign are organized under Swachh Bharat Mission (Gramin) to expose the method mended of sanitation at grass root level by using training & capacity building program/awareness campaign/cleanliness drives.

1. Ministry of Drinking Water & Sanitation letter no. 2/2/S(DWS)/2017 dated 08-05-2017 Gangotri is selected as **Swachh Iconic Place (SIP)** among 10 iconic places across the country to fully develop Swachhta model at the place. A meeting to finalize the sanitation plan for Gangotri was held on 21 & 22 November 2017.
2. Mass cleanliness campaigns are being organized at different places along with the bank of river Ganga using CSR support of **Oil and Natural Gas Corporation** (ONGC) with the mass participation of public/government department/member of Gangotri temple committee/students/people from ITBP force etc. In above campaign around 12 truck of garbage was collected by campaigning at Sunager/Gangnani/Malla/Bhela tipri/Bhatwari/Harsil and Gangotri.
3. To prohibit the use of poly bags in Eco Sensitive Zone, campaign named "Baskets of Proud" is started with the slogan of "There is option of poly bag but not of earth" in which cotton bags and bamboo Baskets are distributed to promote it.
4. 100% Open Defecation Free (ODF) status achieved through SBG(G) in the Eco-Sensitive Zone. Present status of water supply in rural areas of Eco Sensitive Zone is 40 LPCD and criteria of 55LPCD to be achieved under NRDWP for sustainable use IHH Toilets.
5. For village cleanliness Solid Liquid Waste Management (SLWM) plans being executed through the Gram Panchayats in the Eco-Sensitive Zone.

Awareness campaigns are organized under Swachh Bharat Mission (Gramin) to expose method of sanitation at grass root lavel by using training & capacity building program/awareness campaign/cleanliness drives.

1. Ministry of drinking water & Sanitation letter no. 2/2/S(DWS)/2017 dated 08-05-2017 Gangotri is selected as **Swachh Iconic Place (SIP)** among 10 Iconic places across the country to fully develop Swachhta model at the place. A meeting for the preparation of action plan & implementation schedule for Gangotri was held on 21 & 22 November 2017 at Delhi.
2. Mass cleanliness complains are being organized at different places along with the bank of River Ganga using CSR support of **Oil and Natural Gas Corporation** (ONGC) with the mass participation of public/government department/member of Gangotri temple committee/Students/people from ITBP force etc. in above campaign around 12 truck garbage has collected by complaining at Sunager/ Gangnani/ Malla/ Bhela tipri/ Bhatwari/ Harsil and Gangotri.
3. To develop a mechanized system for collection and disposal of solid waste including poly bags at Gangotri, new proposal of hydraulic truck transit system has been accepted from ONGC CSR fund. To improve the waste segregation practices at house hold level IEC campaigns are scheduled in the area.
4. To prohibit the use of poly bags in Eco Sensitive Zone, campaign named "Baskets of Proud" is started with the slogan of "There is option of poly bag but not of earth" in which cotton bags and bamboo Baskets are distributed.

5. In Eco Sensitive Zone **Swachh Bazar Committee** in urban areas and **Swachh Mohalla Committee** at rural areas are established to collect and segregate waste. A person from the committee named Paryaveran Mitra is being trained to contact with garbage seller, so that collected waste can be sent to the collection point.

(iv) Under IEC activities to ensure public participation social activist/ religious priests are also involved to enhance social awareness.In this respect Ganga Sapath Programme at Gangotri with the people of Gangotri Temple Committee was organized on 22 of December 2017 and with the people of Vishwanath Temple Committee on 25 of December 2017.

The connectivity of household to STP at Gangotri is to be ensured before the staring of YATRA SEASON and electricity connection will also be ensured

4. PEY JAL NIGAM

A. Drinking water

At present in the habitation of Eco Sensitive Zone drinking water is supplied as follows. At present drig water supply in 64 villages of the BESZ equals or exceeds the present norm of 55 lpcd. Drinking water supply in 24 villages is below this standard and needs to be enhanced. These 24 villages and their current supply levels are shown in the table below Drinking water supply in 24 villages is below this standard and needs to be enhanced. These 24 villages and their current supply levels are shown in the table below

Sl. No.	Name of Village/City	Existing Status of Water Supply (LPCD)
1	Bagori	20
2	Bagyalgaon	38
3	Bongari	38
4	Dobaah	30
5	Jaspur	20
6	Kankradi	38
7	Kotiyalgaon	38
8	Kuroli	30
9	Maneri	30
10	Manpur	30
11	Mastari	30
12	Nald	30
13	Nirakot	39
14	Pata	30
15	Sald	30

Sl. No.	Name of Village/City	Existing Status of Water Supply (LPCD)
16	Salu	30
17	Sangrali	30
18	Sada	20
19	Sarang	30
20	Seku	30
21	Silyan	35
22	Siror	20
23	Thalan	30
24	Uttron	30

GUIDELINES

Peyjal Nigam work under following guidelines –

- Revised guidelines of National Rural Drinking Water Program 2013

1. The goal should be to move up the water ladder of service delivery so that ultimately all rural households are provided with adequate piped safe drinking water supply within the household premises.
2. The basic minimum service level of potable drinking water supply service in rural areas that was adhered to since the inception of ARWSP was 40 LPCD. The minimum level should be 55 LPCD in Twelfth Five Year Plan period.

B. SEWAGE TREATMENT

12.24 km of sewer networks has been laid down, and an STP of 2 mld capacity has been installed at Gyansu in Uttarkashi town under GAP-I And GAP-II programme and treatment and disposal of treated effluent is as per CPCB norms as per (Regulated according to clause 3(a) viii)

Sl. No.	Clause	Permitted work	Regulated work	Prohibited work	Status
1.	Clause 3(a)-VIII). The treated sewer and industrial effluent meeting the water quality standard shall be permitted.		Gangotri Sewerage Scheme Sanctioned vide, NRCD, New Delhi Lt. No. J-11012/1/ 2010- NRCD-II dated 11.08.11 (G.O.I.) completed (Cost Rs. 1048.00 Lac).		Work Completed (2.17 Km. Sewer line laid, 1.00 mld STP). Commissioned likely March 2018 and disposal of treated effluent is as per CPCB norms as per (Regulated according to clause 3(a)-VIII).

The following guidelines have been adopted in sewerage works.

(1) The guidelines of Water (Prevention and Control Of Pollution Act 1974) has followed for sewer works. www.ielrc.org/content/e7402pdf (2) The schemes under Eco-Sensitive Zone of River Bhagirathi, discharge treated effluent as per norms of CPCB issued vide letter no. UEPPCB/HO/Gen-329(II)/2016/1048-220 Dehradun, dated 09.05.2016 are as given on previous page –

The all sewerage works follow the manual of CPHEEO under Ministry of Urban Development of the Government of India

FUTURE STRATEGY

The physical and financial outlay for a period of 15 years for Health and Family Welfare, Swajal and Payjal has been discussed in detail in financial plan of Zonal Master plan.

9

CHAPTER

TOURISM

9
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TOURISM

INTRODUCTION

The Tourism Master Plan is prepared in compliance to the MoEF notification published on 18 Dec. 2012 for the notified Eco Sensitive Zone which encompasses the notified entire watershed of about 100 km stretch of the river Bhagirathi from Gaumukh to Uttarkashi covering an area of 4179.59 square kilometres.

The tourism potential of the area is unique and significant as it contains Gaumukh, the main source of the Ganges at the foot of the Gangotri glacier and is endowed with many other important natural and manmade resources. The presence of unique natural destinations like *tals*, *bugyals*, glaciers etc. not only provide natural beauty to the area but are also potential places of tourism to be tapped sustainably in future. In addition to it, the presence of man-made destinations like Gangotri temple, Vishwanath temple and many other religious and cultural sites and activities not only attract the pilgrims and tourists from all over the world but also provide employment to the local inhabitants. The presence of bugyals like Dayara, Gidara etc. are unique ecosystems and potential sites attracting tourists and can be developed sustainably as ecotourism destinations involving local villagers for livelihood generation. Likewise,tals like Dodital, etc. can be developed as destinations for sustainable tourism.

Tourism industry in this zone has remarkable scope for growth due to its diversity as it has a range of tourist attractions, rich fauna and flora, beautiful landscapes, along with historical and cultural heritage. But predominantly it is known for "Religious or Pilgrim Tourism", which is during the summer season only when pilgrims to Gangotri converge in great numbers during the particular season. Through this master plan it is tried to offer diverse range of tourist products to

shift tourist's perception of the area and focus more on extending tourism through rural tourism, adventure tourism, cultural tourism etc. so that benefits from tourism activities are more widely distributed and to other untapped attractions/ destinations in this region that shift tourists' focus and provide more environment friendly tourist pursuits like village tourism, adventure tourism activities viz. trekking, mountain biking, paragliding, bird watching etc. based on broad ecotourism principles. This objective based futuristic tourism plan may usher in a new era of sustainable growth in tourism in the area by involving more and more local inhabitants in tourism activities and generating livelihood opportunities for them with an objective to reduce their migration from the area.

MOEF GUIDELINES FOR PREPARATION OF ZONAL MASTER PLAN

The Zonal Master Plan for tourism has been prepared keeping in view the following points mentioned under the MOEF notification:

(i) The Zonal Master Plan shall be based on carrying capacity study of the eco-sensitive zone.

(ii) The carrying capacity study shall be undertaken based on the existing infrastructure and shall not be based on future projections of any project that requires environment or forest clearance.

(iii) All new tourism activities, development for tourism or expansion of existing tourism activities shall be permitted only within the parameters of this Zonal Master Plan.

(iv) Tourist resorts and commercial complexes shall be located in areas with surplus water and electricity, so as not to affect the rights of existing users without their prior consultation.

(v) The construction of hotels, resorts, TRHs, etc. in the Eco-Sensitive Zone shall strictly follow the traditional concepts and architecture of the area.

(vi) The Zonal Master Plan shall encourage development of walking paths for tourism and pilgrimage.

(vii) Guidelines shall be drawn up by the state government to regulate building and other activities around the heritage structures so that special character and distinct ambience of the heritage site and area are maintained.

(viii) Solar energy for local use

(ix) Signage and hoardings

VISION

As is articulated in the state's tourism policy, Uttarakhand is committed to promoting tourism in the zone in an eco-friendly manner, with the active participation of the local host communities and developing tourism as a major source of employment and income/revenue generation and as a pivot of economic and social development in the area. It is also committed to taking all possible measures to minimize the sector's 'footprint' while building adaptive resilience.

In line with the state's tourism policy the vision for the tourism development in the region is **"Sustainable Tourism Development in the Eco-Sensitive zone to enhance the livelihood opportunities of the local community together with least impacts on the environment resources".**

OBJECTIVE

(1) To Diversify tourism products by offering diverse products/ pursuits like adventure, rural, cultural tourism, agro tourism, spiritual tourism etc

(2) To develop different destinations in the area in an ecological sustainable way

(3) To enhance livelihood opportunities of the local people through community oriented tourism development with the promotion of Rural tourism

(4) Skill development and capacity building of the local community to enhance their ability to manage the assets and increase community's hospitality to earn their livelihoods through tourist friendly businesses

(5) Identification of new trek routes around the villages and tourist spots / promotion of existing trek routes, nature trails

(6) Preservation and promotion of cultural heritage and practices

(7) Promotion of agro tourism and establishment of market linkages

(8) Carrying capacity based regulation to avoid impacts on the local environment due to peak tourist flow during the yatra season

(9) To keep religious, natural and tourist places clean and pollution free by adopting Ecotourism principles.

PRESENT STATUS

Major existing tourism destinations in the ESZ

Gaumukh

The snout of Gangotri glacier is the source of origin of river Bhagirathi at a distance of 18 kilometres from Gangotri.The Gangotri glacier is one of the largest glaciers surrounded by Shivling, Thalay Sagar, Meru, Bhagirathi-III peaks. Gomukh is 18 km from Gangotri (Nagar Panchayat) in the foot hills of Bhagirathi and is the snout of the Gangotri glacier.

The trek/trail to Gomukh begins from Gangotri. About 9 km ahead of Gangotri and towards Gomukh is Chirbasa, the abode of Chir trees. The only night halting place on this trek trail is at Bhojbasa which is located about 14 km from Gangotri Nagar Panchayat.

Gangotri

Gangotri is a nagar panchayat, located at an altitude of 3048 metres in the Himalayas of Uttarakhand State of India and is 100 km by road from Uttarkashi town, 300 km from Dehradun and 260 km from Rishikesh. The Gangotri Temple was built by a Gorkha Commander in the early years of the 18th century. One of the main religious places among the four Char Dham pilgrimage areas, Gangotri, situated in Uttarkashi district, is closely related to Goddess Ganga, the river that we know as Ganges.

The river Bhagirathi originates from Gangotri glacier below the Chaukhamba peak in an area called Gomukh at an elevation of 3892 metres and flows north-south in the Uttarkashi district of Garhwal Himalayas in Uttarakhand State before meeting the Alaknanda river at Devprayag. The name Ganga picks up later on after the river passes Devprayag and merges into the river Alaknanda. The striking presence of the snow-clad mountains in the vicinity and the pure crystal clear water of the Ganges flowing around add to the sanctity of the place. One feels close to God in the high altitude of Gangotri.

Harsil

Harsil is a beautiful village situated on the banks of Bhagirathi river, with dense deodar slopes on either side of the region. This Himalayan village is located at Bhatwari Block of Uttarkashi district in Uttarakhand State of India at a height of 7,860 ft (2382 metres) from the sea level, 70 kms towards East from district headquarter and 270 kms from the state capital Dehradun. The village is located at 500 metres from National Highway No. 108 and 40 kms from Block Headquarter Bhatwari. It is closer to Gangotri, one of the Hindu pilgrimage sites of Char Dham. The protected area Gangotri National Park is also located at the distance of 30 Kms from Harsil. Weather of Harsil stays cold and pleasant throughout the year. At present, major inflow of tourists at this place starts from April to June and from September to November.

Dayara Bugyal -Barsu – Raithal cluster

An upcoming ski and soft adventure and village tourism destination Dayara Bugyal offers best ski slopes:

- North facing slopes ensuring longer duration of snow cover
- Gently undulating slopes with almost no obstacles like rocks, boulders or other man-made structures,
- Slopes spread across an area of 28 sq km,
- And powdery snow that is the preferred snow for skiing the world over

It is considered as a prospective destination with year-round tourism potential because of pristine natural beauty and sights during summer, scenic view of the snow covered Himalayan peaks, clean, green environment during summers and huge potential for trekking.

Uttarkashi Town

The district capital and main service centre in zone 4. The Nehru Institute of Mountaineering (NIM) is located in the cedar covered hills in surrounding the town proper.

Though predominantly known for pilgrim tourism, the variety of the environment presents good potential for ecotourism and allied activities, in particular for those enthusiasts that can discern different types of mountain environments or who have a special interest in types of flora or fauna. The natural environment offers nature tourists equally diverse opportunities for active outdoor pursuits including trekking, mountaineering, rafting, mountaineering, mountain biking, cross country skiing and para-sailing.

EXISTING INFRASTRUCTURE

- **Road and transport facilities**

  Uttarkashi district has a well developed road network; most of areas are accessible through road. There are three national highways passing through the district; NH-94 (Rishikesh to Gangotri), NH-108 (Dharasu to Yamunotri) and NH-123 (Vikasnagar to Barkot). Although, the road network is well developed, the main concern is quality of road. Due to heavy monsoon and fragile geology of Himalayas, the roads here are highly prone to landslides. While interacting with tourists in the area, the quality of road was found to be the most unsatisfactory parameter in Uttarkashi . The brief outlay of national highway with respect to tourist sites is as follows:

S.No	Highway	Connecting sites
1	NH-94	Chinyalisaur, Dharasu, Uttarkashi, Bhatwari, Harsil, Gangotri
2	NH-108	Dharasu, Barkot, Hanumanchatti, Kharsali
3	NH-123	Naugaon, Barkot

The description of approach road to other remaining sites is as follow:

S.No	Site	Connecting road
1	Bhojbasa	NH-94 up to Gangotri, then 14 km trek
2	Dayara	NH-94 up to Bhatwari, then village road up to either Raithal or Barsu followed by 6-7 km trek
3	Gaumukh	NH-94 up to Gangotri, then 18 km trek
4	Mukhwa	NH-94 up to Harsil then village road up to Mukhwa

Available Accommodation

Table-1 : Accommodation: Presently available (Bjojwasa to Jaspur / Sukhi)

Name of the place	Tourism Department		Private	
	Accommodation Type	Bed capacity	Accommodation Type	Bed capacity
Bhojwasa	TRH	24	-	-
Gangotri	TRH	58	Hotel/Lodge/GH	454
-	Yatri Niwas	19	-	-
-	Ashram	-	Ashram	750
Harshil / Dharali	TRH	28	Hotel/Lodge/GH	548
Jhala	-	-	Hotel/Lodge/GH	123
Jaspur / Sukhi	-	-	Hotel/Lodge/GH	150
	Sub-Total =	**129**		**2025**
		Total upto Jaspur / Sukhi =	**2154**	

Table-2 : Accommodation: Presently available (Ganganani to Naitala & Hina)

Name of the place	Tourism Department		Private	
	Accommodation Type	Bed capacity	Accommodation Type	Bed capacity
Ganganani	-	-	Hotel/Lodge/GH	60
Barsu	TRH	24	Hotel/Lodge/GH	45
Raithal	TRH	24	Hotel/Lodge/GH	15
Bhatwari / Malla / Lata / Sainj / Naluna	-	-	Hotel/Lodge/GH	340
Maneri	TRH	30	Hotel/Lodge/GH	356
Naitala & Hina	-	-	Hotel/Lodge/GH	757
	Sub-Total =	**78**		**1573**
		Total from Ganganani to Naitala & Hina =	**1651**	

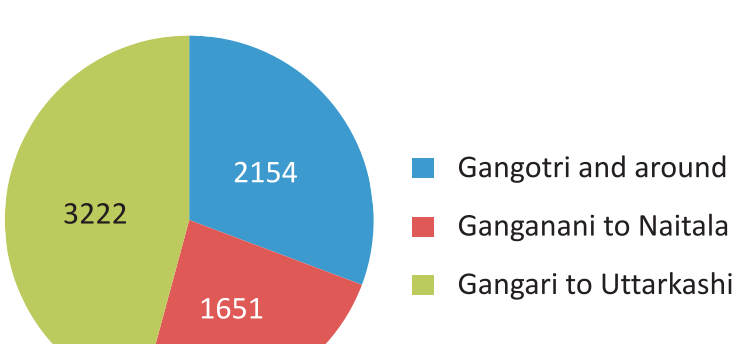
Table-3 : Accommodation: Presently available (Gangori & Ganeshpur to Uttarkashi)

Name of the place	Tourism Department		Private	
	Accommodation Type	Bed capacity	Accommodation Type	Bed capacity
Gangori & Ganeshpur	-	-	Hotel/Lodge/GH	432
Uttarkashi	TRH	110	Hotel/Lodge/GH	1880
	Ashram	-	Ashram	800
	Sub-Total =	**110**		**3112**
	Total from Gangori & Ganeshpur to Uttarkashi = 3222			

Gangotri to Gangnani

Ganganani to Naitala & Hina

Gangotri & Ganeshpur to Uttarkashi



Tourist accommodation available from Uttarkashi to Gangotri
(Figures indicate bed capacity)

Total accommodation available from Bhojwasa to Uttarkashi, the 100 km stretch designated as eco sensitive zone, in the form of TRH, Yatri Niwas, Hotels, GHs, Lodges, Ashram, etc and owned by government and private sector is for (2154 + 1651 + 3222) = 7027 tourists and pilgrims.

AVAILABLE ACCOMMODATION OF PWD AND IRRIGATION DEPARTMENT

Forest, public works and irrigation department have rest houses at various places located along the route from Uttarkashi to Gangotri. These are as follows:

Department	Gangotri	Harsil	Bhatwari	Uttarkashi	Dodital	Agoda
PWD	2x2= 4 beds	6x2= 12 beds	4x2= 8 beds	8x2= 16 beds	-	-
Irrigation	2x2= 4 beds	-	-	-	-	-

LIST OF FOREST REST HOUSE, ACCOMMODATION AND TARIFF

Name of Forest Rest House	Accommodation (Room)	Tariff		Catering
		Indian	Foreigner	
Harsil	2	1500	3000	self managed
Baironghati	2	1000	2000	self managed
Gangotri (Pre-fabricate Hut)	3	1250	2500	self managed
Gangotri (Old Cabin)	2	1000	2000	self managed
Gangotri (New Cabin)	1	1000	2000	self managed
Bhatwari	2	1000	2000	self managed
Kotbanglow	2	1000	2000	self managed
Agoda	1	1000	2000	self managed
Dodital	2	1000	2000	self managed

EXISTING INFRASTRUCTURE IN GANGOTRI

Number of Shops	63
Number of Ashrams	08
Number of Hotels	47
Number of Restaurant	35
Parking Facility	02 Slots of Parking are existing with 250-300 ECS and 02 are under construction with approx capacity of 70 ECS

OTHER ESSENTIAL FACILITIES AND CURRENT TARIFF REGULATIONS

Details of availability of other facilities for tourists in various sites are as follows:

Location	Tourist Information Centre	Petrol Pump	Police Station	Fire Station
Bhatwari	Yes	No	Yes	No
Bhojbasa	Yes	No	No	No
Dayara Bugyal	No	No	No	No
Gangotri	Yes	No	Yes	No
Gaumukh	No	No	No	No
Mukhwa	No	No	No	No
Uttarkashi	Yes	Yes	Yes	Yes

GENERAL GUIDELINES FOR DEVELOPMENT IN ECO-SENSITIVE ZONE

(1) No construction activities will be permitted within 100 m around heritage structures[1] and main temples having great religious importance along the yatra route.

(2) A construction free zone up to 100 m will be maintained from the Centre line of the rivers.

(3) The hill tops/peaks of hills will be left undisturbed. New constructions will be allowed only on leeward slopes.

(4) Effective solid waste management and sewage disposal system should be developed for all tourist destinations.

(5) Organic and green waste will be collected, treated by windrow composting and stored for use as mulch, soil improver or fertilizer. Organic waste not used for composting and all inorganic waste will be transported to a licensed landfill facility or waste treatment plant. Development proposals for waste management programme will cater to minimizing waste production and for reuse and recycling.

(6) Promulgation of Central Pollution Control Board emission standards for vehicles entering in the eco-sensitive zone and their strict enforcement as per Motor Vehicles Act, 1989.

(7) Restriction on the use of air horns in sensitive areas as per Noise Pollution Control Rules, 2000 (*an area comprising not less than 100 meters around hospitals, educational institutions and courts may be declared as silence area/zone for the purpose of these rules.*"). Provision of separators or buffer zone between sound producing area and receptors. Provision of sufficient open spaces and enough greenery around hotels, rest houses, etc. Provision for green belts with such species which can absorb pollutants is to be made along streets.

1 There are 03 heritage structures, the ownership of which is of Govt./ Private bodies other than Tourism Dept.

(8) Provisions for accommodation in tents, tree tops, caves, etc. may be developed without disturbing the natural ecosystem.

(9) Provision of solar power should be given top priority and use of diesel generating sets should be discouraged. Diesel generators in resorts and other building units should be operated under acoustically screened conditions so that the ambient noise does not go beyond the recommended CPCB standards.

(10) Diesel generators encased in sound proof structure with mufflers will only be used during emergency situations. Noise standards shall be as per prevailing standards.

(11) Hotels and resorts should not be allowed to discharge wastewater directly in to a river or water body. Establishment of waste treatment plants shall be the pre-condition for clearance to develop these facilities.

(12) Resorts shall be encouraged to go in for water harvesting for the consumption of water. Awards may be instituted for such resorts, which are environment friendly and have sewerage systems and water harvesting facilities, which are managed efficiently.

GUIDELINES FOR HOTELS/TOURIST REST HOUSES/YATRI NIWAS WITH DORMITORIES AND YOUTH HOSTELS

Priority pertaining to establishment of hotels/tourist rest houses etc. shall be given to those entities which are :

- Already in the tourism sector with a prior expertise in operations and management of similar projects.
- Local Residents/ Owners of land suitable for development of such facilities around the identified tourist destinations.
- Existing Yatri Niwas who intend to upgrade their facilities to avail incentives. In such cases the incentive will be provided for the upgradation works.
- Loan facility shall be provided to local unemployed for creating new tourism facilities under the scheme **Veer Chandra Singh Garhwali Paryatan Swarozgar Yojna**.

GUIDELINES FOR HOTELS / TRHS / YATRI NIWAS

- Ownership/lease of land and land use should be in order
- The facility shall have more than six let-able rooms and 100% of let-able rooms should have attached bathrooms. 2 rooms shall be wheelchair accessible and have attached bathrooms that can be used by disabled persons and/or senior citizens.
- The facility must be wheelchair accessible.
- Should have at least 2 dormitory rooms one for women and one for men as per the requirements specified for constructing dormitories under these guidelines
- Should have restaurant/dining hall with sitting area of minimum 30 sq. m (excluding kitchen, storage).
- The double room and single room should have minimum carpet area of 12 sq.m and 10 sq.m respectively.
- Rooms should have adequate furniture, fixtures, linen, and AC (wherever required as per climatic conditions).
- Attached toilets for each dormitory / room: Bathroom fittings should be of branded company with ISI mark. Use of low-flow/aerated-flow faucets, low-flush cisterns should be encouraged.
- The hotel shall have telephone with STD facility.

- The hotel shall have separate public toilets for men and women and first aid centre. Should have at least one common public toilet meeting barrier-free friendly built-environment compliant requirements.
- The following facilities shall be provided for:

  (a) Front desk
  (b) Visitors sitting area and lobby
  (c) Tourism 'Info' booth
  (d) Souvenir shop
  (e) For every three let table rooms, one car parking must be provided of minimum 5 sq. m.
  (f) All rooms should have telephone connectivity.

- At least one electrician, plumber, sweeper, etc. to be available for general service and maintenance on a 24 hrs basis.
- 24 hrs security and CCTV surveillance at reception and corridors. At least one female security personnel must be present at all times.
- Power back-up system is to be provided in the entire facility to provide uninterrupted power supply for all the appliances in the facility
- 24 hour uninterrupted hot and cold water supply.
- Provision of well lit, dedicated visitor parking area is to be provided in the facility for parking of tourist vehicles. These areas should be paved (use of environment-friendly permeable pavements should be encouraged, and paved area be planned & marked as per barrier-free built-environment compliant requirements) and fenced to suit the type of facility. These areas should have security to ensure safety of the vehicles.
- Staff should be in uniform, well-groomed and properly trained (should have working knowledge of English). Number of workers should be proportionate to the capacity of the unit in all services provided.
- Staffs should be trained local residents specialised in the respective fields of operation.
- Staff should be hospitable and capable to effectively respond to tourist requirements and should have a fair idea of the places of tourist interest in the State.
- There should be provision of solid waste management with incinerators and rain water harvesting. Additional incentives will be given for provision of STP/Bio-digester system with or without energy recovery, use of renewable energy, etc.

GUIDELINES FOR YOUTH HOSTELS

The entities developing Youth Hostels could be:

(a) NGOs, Educational Institutes, Sports Academy, and Associations etc. can take up the development and management.

(b) Priority will be given to those entities which are:

- Already in the tourism sector with a prior expertise in operations and management of similar projects.
- Owners of land suitable for development of such facilities around the identified tourist destinations. However, a partnership between land owners and the above mentioned entities will be given higher priority.

Other guidelines for setting up the facility include:

- Youth hostel should be built on minimum 1acres of land .
- The facility must be wheelchair accessible.
- Rooms can be single, double or on triple occupancy basis. Single, double and triple rooms should have minimum carpet area of 10 sq.m., 12 sq.m. and 16 sq.m. respectively.
- If a youth hostel has dormitories, the requirements for dormitories will also apply.
- There must be a minimum of 15 rooms (single, double, triple or dormitory would all be considered as a single room) with additional dining room, common room and recreational space, a capacity of at least 30 persons and all rooms should have attached bathrooms.
- Rooms should have adequate furniture, fixtures and linen.
- Bathroom carpet area should measure at least 4 sq.m .
- Bathroom fittings should be of branded company with ISI mark. Use of low-flow/aerated-flow faucets, low-flush cisterns should be encouraged.
- Should have a dining hall with a canteen / mess with sufficient capacity.
- Should have separate public toilets for men and women and first aid centre.
- Provision of anodised aluminium/wooden doors and windows.
- Provision of well lit, dedicated visitor parking area should be provided in the facility for parking of tourist vehicles. These areas should be paved (use of environment-friendly permeable pavements should be encouraged, and paved area be planned & marked as per barrier-free built-environment compliant requirements) and fenced to suit the type of facility. These areas should also have security to ensure safety of the vehicles.
- Staffs should be trained local residents specialised in the respective fields of operation.
- Staff should be hospitable and capable of responding effectively to Tourist requirements and should have a fair idea of the places of tourist interest in the State.
- There should be provision of solid waste management with at source segregation facility for bio degradable and non-biodegradable waste and rain water harvesting. Additional incentives would be given for provision of STP/bio-digester System with or without energy recovery, use of renewable energy etc.

GUIDELINES FOR DORMITORIES

- Dormitory should be gender specific and constructed as part of TRHs/Yatri Niwas and youth hostels. Dormitories by themselves will not be considered a tourism product.
- There should not be more than 12 beds in 1 dormitory room with adequate furniture, fixtures and linen.
- A standard of space requirement of 5 sqm per person must be maintained while building a dormitory. For example if the dormitory capacity is 12 beds the dormitory carpet area must be at least 60 sq.m. Minimum vertical clearances / height of the ceiling from the floor level shall be 10 feet.
- Each dormitory room should have attached shower rooms (3 nos.) and toilets (4 nos., including 1 toilet for differently-abled persons). If the number of beds in a dormitory is less than 12 the number of shower rooms and toilets can be

relaxed proportionality. Shower/toilet/bathroom carpet area should measure at least 3 sq. m. All bathroom fittings should be of branded company with ISI mark. Use of low-flow/aerated-flow faucets, low-flush cisterns should be encouraged.

GUIDELINES FOR DEVELOPING WAYSIDE AMENITIES

Introduction

Well-designed wayside amenities are instrumental to providing holistic experience to the visitors. Department of Tourism, GoUK (DoT), intends to promote and facilitate development of wayside amenities on all the major national highways, state highways, and major district roads or at within a short distance from such roads connecting the identified tourist destinations on the priority basis. These amenities should include gender distinct toilets including barrier-free built-environment compliant requirement met, cafeteria, mini store/pharmacy and an information/souvenir booth. These amenities should be established at intervals of about 20-30 km along the highways leading to major tourist destinations. These guidelines have been devised to assist entities interested in setting up the wayside amenities in and around the identified tourist destinations and circuits.

The land should be in effective possession of the legal entity developing/implementing the project or could be handed over as through a contract by the Government agency/department/authority implementing the road project. DoT will identify locations for development of wayside facilities. Priority would be given to the development of wayside amenities at the identified locations by the government, while providing concessions. Apart from the development of wayside amenities, DoT also aims to encourage development of midway wayside facilities to be developed into resorts with parking facilities and gender sensitive toilets.

GUIDELINES FOR HERITAGE PROPERTY CONSERVATION & REVITALIZATION

Historic Fabric

- Respect must be exercised towards the historic fabric by users, staff, visitors, owners, managers, local authorities and those involved in work at the historic places. The management must ensure constant vigilance for strict control to prevent any act of vandalism or defacement to the historic fabric, both during the course of any work as well as during general visitation. Any activity concerned with interpretation, promotion or tourism must not impact the historic fabric of the places.

Development History of the Place

- Development history of the historic place must be researched and traced as it will determine the morphological character, patterns of development & change, referential changes, and inform about abrupt/ abnormal changes, etc. These would be useful for planning and reaching decisions concerning interventions in the historic place.
- The historical, architectural and visual relationship between the historic places and their surroundings should be preserved. The landscape features that form an important part of the wider landscape of the area must be protected.

Conservation Management Plan

- Each historic place needs a 'Conservation Management Plan' to be prepared before embarking on the project, and its copies must be placed in public and government department libraries. The conservation management plan shall broadly consist of:
  - gathering information (by way of documentation, research, condition assessment, investigation, etc
  - analysis of information
  - assessment of significance

- developing policies/guidelines for conservation and revitalization
- planning a strategy for implementing policies/guidelines and
- outlining a management framework for the project and future of the historic place

Conservation Intervention

- The main aim is to conserve the historic place in accordance with the 'Conservation Management Plan'[2] to ensure that the cultural value is preserved. Historic place should be conserved by internationally accepted standards, and made safe for users, staff, visitors and those involved in work.
- Details and levels of intervention must be decided on a case-by-case basis and based on the significance, condition and potential.
- The priority and phasing of interventions must be stated in the Conservation Management Plan.
- The materials used in the interventions must be compatible with the original materials of the historic places in terms of material behaviour (chemical and physical), composition, texture, colour, strength, etc.

Reversibility

- Principle of 'reversibility' must be followed in all conservation planning and development works to any part of the historic place. All interventions must be reversible at any stage without causing any harm to the historic fabric.

Consolidation of Dilapidated Building Fabric

- The parts of existing fabric of the historic places that are in a dilapidated condition must be consolidated to prevent further damage and deterioration. This applies to those spaces that are not designated for restoration or reconstruction as per the conservation management plan. Public safety must be ensured during the process of structural consolidation.

Emergency Stabilization

- The portions in historic places that are in a serious state of near-collapse must be given urgent attention. These must be dealt with on a priority basis in consultation with qualified conservation professionals in order to prevent any further loss of historic fabric.

New Elements and Materials

- An appraisal of the aesthetic objectives of the project must be done prior to deciding the conservation approach. The principles of minimum intervention and conservative repair must be followed. The technical 'expert committee' must decide on case by case basis whether specific new works are to be distinguishable from the existing features, or are to match the original.

Additions and Alterations

- Any work in and around the historic places must be carried out under the supervision of the approved technical monitoring body/ expert committee in accordance with the Conservation Management Plan.

[2] Conservation Management Plan shall be site specific and shall be prepared by a team of experts and put up to the Expert Committee prior to the approval of Conservation/ Adaptive Reuse project

- With consultation and approval of the technical 'expert committee', previous alterations and repairs, which are established of low significance, may be removed.
- Additions should not dominate, cover or detract architecturally or visually from the historic fabric.

Adaptive Reuse

- The recommended use of a historic place must not be contradictory to its associational/ intangible value.
- In case of historic places that are designated to be reused, the objectives are to have appropriate uses which would:
  - be in the spirit of the unique history of its original owners
  - utilize the potential of the space while causing minimum changes to the significant components
  - be socially acceptable by the local community and address their requirements and expectations
  - contribute to the value of the place
  - be of social and cultural value to the present and future generations; and
  - have a healthy and safe environment for all the occupants, users, visitors and staff on the site.
  - The approved interventions in the process of reuse of the buildings must not be detrimental to their historic fabric and must not compromise with their structural stability.
- Decisions regarding compatible additions, alterations, elements and materials in the course of adaptive reuse must be taken by the technical 'expert committee' and must conform to guidelines and certain aspects must be taken into consideration while designating and designing for adaptive reuse.
- It shall not be allowed to use a historic place or a part of it merely for administrative purpose, which is not connected to its designated adaptive reuse as per the overall reuse plan.
- A technical 'expert committee' must be appointed to guide the planning, implementation and maintenance plan for the historic places. This committee must comprise qualified multi-disciplinary specialists from the field of heritage conservation and management, and all work must be carried out in conjunction with this guideline document.

Monitoring

- Monitoring entails responsibility within the project and thereby ensures better quality. Milestones and timelines must be decided upon before work commencement, and they must comply with the project objectives.

GUIDELINES FOR SIGN BOARDS

The intent of these guidelines are to:

(a) encourage the effective and equitable use of signs as a means of identifying businesses and services

(b) encourage the effective use of signs as a means of communication

(c) enhance the appearance of the municipality/nagar panchayat/destination by regulating the size, height, design and location of permitted signs

(d) apply the sign regulations in a fair and consistent manner

(e) protect the public from the dangers of inferior sign construction and from nuisance or hazards arising from improperly maintained, repaired or sited signs

(f) regulate the construction, maintenance, repair, replacement and removal of signs

Sign sitting regulations

A sign board:

(a) must not obstruct the safe and efficient movement of vehicular or pedestrian traffic, obstruct vehicular or pedestrian sightlines, or otherwise they create safety hazard to vehicles, pedestrians or other persons

(b) must not damage flowerbeds, shrubs or other landscaping located on a formal road and/or highway

(c) shall not be approved or if installed, must be removed or relocated when the authority deems the use of a highway to be adversely affected by the sitting, size or illumination of a sign;

(d) must not be attached to or obstruct or interfere with the use of any fire escape or any exit or any means of egress from a building or structure

(e) shall not, in the case of a permanent sign mounted on the ground, be closer than 1.2 m to any property line and 2.5m to any driveway.

CLEARANCE REGULATIONS

A sign board

- must maintain a clearance of at least 0.6m between the outer edge of any sign and any electric light, power, telephone or utility pole, or their supports
- if projecting more than 0.1m over a pedestrian area, must have a minimum clearance of 2.44m (8ft), excluding directional signs
- if projecting over a vehicular traffic area, must have a minimum clearance of 4.57 m; and
- must be measured for height from the natural grade. If a sign is on a man-made base, including a graded earth mound, the grade must be determined by the nearest pavement or top of any pavement curb.

Illumination

The following signs may be illuminated, except where otherwise regulated :

  - Business directory sign
  - Electronic message board sign
  - Façade signs
  - Freestanding signs
  - Restaurant sign
  - Canopy and projecting sign
  - Menu board sign
- LED, LCD, plasma, or similar display technologies are permitted in the Town Centre for all uses including restaurant sign, but not including all other uses within a residential zone.

- Lighting for illuminated signs must be downcast or shielded to minimize reflective impact on the night sky by being ground oriented.
- Lighting for illuminated signs must not shine directly onto neighbouring premises or into the direction of the oncoming traffic.
- No illuminated sign or any illuminated element of any sign may turn on or off, or change its brightness if the change of illumination produces an apparent motion of the visual image, including, but not limited to the illusion of moving objects, moving patterns or bands of light, expanding or contracting shapes, rotation or any similar effect of animation.
- Sources of light and power must be weatherproofed and approved for outdoor use and must not present heat or electrical hazards under any weather conditions.

FUTURE STRATEGY FOR TOURISM DEVELOPMENT

It is intended to offer multiple, environment friendly tourist pursuits/ opportunities in the region to promote community oriented tourism development and enhance the associated livelihood options together with minimizing the impacts on environment through :

(i) Carrying capacity based planning

Considering Gangotri region as the most vulnerable tourist destination of the BESZ, in terms of high tourist numbers during peak period and in terms of driving major tourist flow into the region. Hence the area gains major attention of Carrying capacity based planning at the first instance. Simulataneously it is being tried to divide the tourist share and revenue equitably through promotion of home stays, adventure based pursuits, eco tourism in other destinations. The areas having easy accessibility, already known tourist features, background studies conducted (by the NGO) have been phased out first for implementation of the Zonal Master Plan. The experience from this will be extended to other areas and location without any bias for holistic tourism development and revenue sharing in the entire region.

The site and use specific carrying capacity analysis has been carried out by M/s JPS Associates, subsequent to study awarded by Ministry of Tourism, Govt. of India. The draft report in this regard has been submitted and is being used as basis for deciding the carrying capacity of major destinations of the ESZ.

Table-4: Summary of Carrying Capacity Estimation of Major Destinations in the Eco Sensitive Zone[3]

Name of Destination	Carrying Capacity (CC) (Persons)	Available Capacity of Total Area) (Persons)	Recommendation for development
Bhatwari	2501	1166	Yes
Dayara Bugyal	9378	7902	Yes
Gangotri (incl. Bhojbasa and Gaumukh)	20800	10707	Yes
Harsil	8603	6050	Yes
Mukhwa	3602	2920	Yes
Uttrakashi	88648	62616	Yes

[3] Basis of calculation of Carrying Capacity is provided in Annexure-9(I)

Table-5: Basis of Carrying Capacity Estimation of Major Destinations in the ESZ

S.No	Destination	Census Population 2011	Area (in Hec)	No. of days in Peak Season	Resident Density (Persons per hec.)	No. of Domestic Tourists	DT Density (Tourists/ hac)	No. of Foreign Tourists	FT Density (Tourists per hac.)	Tourists Density	Aggregate Density in Peak Season (person per hec.)	Existing load on Total area (persons)
1	Bhatwari	1268	115	60	11.026	1612	0.584	0	0.000	0.584	11.610	1335
2	Dayara Bugyal	1475	521	60	2.831	37	0.002	0	0.000	0.002	2.833	1476
3	Gangotri incl Bhojbasa & Gaumukh	110	800	60	0.138	169883	12.387	1744	0.091	12.478	12.616	10093
4	Harsil	2355	370	60	6.365	7902	0.534	0	0.000	0.534	60899	2553
5	Mukhwa	680	294	60	2.313	41	0.006	0	0.000	0.006	2.319	682
6	Uttarkashi	17475	1202	60	14.538	204591	7.092	540	0.026	7.118	21.657	26031

Table-6: Carrying Capacity Estimation[4]

S. No.	Destination	Density for Small hill town (UDPFI person per hec.)	Adjusted Density for Small hill town (UDPFI)	Phy-Eco indicators	Socio-Demo Indicators	Poli-Eco indicators	Normalizing Index (NI)	Normalized Density (No.)=NI X10	Carrying Capacity Density (CCD) (Person per hec.)	Carrying Capacity (CC) (persons)	Existing load on Total area (persons)	Available Capacity of Total Area (persons)
1	Bhatwari	45-75	38	1.17	-1.63	0.11	-1.63	-16.25	21.75	2501	1335	1166
2	Dayara Bugyal	45-75	38	-0.50	-2.00	0.17	-2.00	-20.00	18.00	9378	1476	7902
3	Gangotri	45-75	36	-0.50	-1.00	0.000	-1.00	-10.00	26.00	20800	10093	10707
4	Harsil	45-75	40	1.17	-1.68	0.33	-1.68	-16.75	23.25	8603	2553	6050
5	Mukhwa	45-75	37	1.17	-2.48	-0.44	-2.48	-24.75	12.25	3602	682	2920
6	Uttarkashi	45-75	70	3.00	0.38	0.69	0.38	3.75	73.75	88648	26031	62616

ADDRESSING ACCOMMODATION REQUIREMENT

Based on the estimated carrying capacity, approximately 10707 pilgrims can visit the Gangotri temple per day during the peak season safely. Against the total 10707 pilgrims visiting the temple, the accommodation available at Gangotri and along the road up to 34 km towards Uttarkashi i.e., up to Jaspur / Sukhi is for only 2154 persons.

However, before making any proposal for new development for creating accommodation the tourist movement per day i.e., moving in and out from Gangotri during the peak season should be understood. A brief description about movement of tourist in Gangotri is presented below and is based upon the experience of tourism department officers organising and managing the Yatra for the last many years and data collected by them in this regard from time to time.

Out of the total tourists visiting Gangotri per day (10707 persons) during the peak season:

(a) Approximately 30% tourists prefer to return to Uttarkashi same day i.e., 3212 persons,

[4] Methodology of Carrying Capacity Evaluation provided in annexure 9(I)

(b) Approximately 30% tourists prefer to return to Naitala and Hina the same day i.e., 3212 persons again, and

(c) Only the remaining 4283 tourists stay at Gangotri and places around like Bhojwasa, Harshil / Dharali, Jhala, Jaspur / Sukhi and including Gangotri itself.

On comparing the figures pertaining to accommodation availability and requirement it can be inferred that there is a shortage of accommodation for tourists in the stretch mentioned above under construction. The option available is to create additional accommodation for the tourists on the land available with Tourist Department between Lanka and Gangotri and to regulate the visitors by setting up necessary infrastructure at Uttarkashi and Bhatwari for monitoring the tourist inflow and outflow, and thereby maintain a balance.[5] Alternate public transport vehicle can be provisioned for Tourists from halting point/ base camp to Gangotri in consultation with the Transport Dept

PROSPECTIVE PROPOSAL FOR CREATION OF ADDITIONAL TOURISM FACILITIES

(1) Tourist Rest Houses equipped with facilities like adequate parking, restaurant and sanitation are proposed at Bhaironghati and Lanka having bed capacities as 22 and 24 respectively.

(2) At Lanka, the tourism department has 1.21 Hectare of land and it is proposed to construct Light Gauge Framing System LGFS eco-friendly 160 bedded TRH with parking space for the visitors. Final approval for land is awaited from MOEF, GoI.

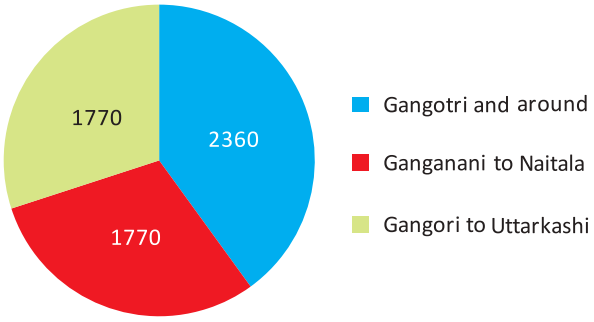
(3) At Bhatwari, the tourism Department has 0.50 acres of land and it is proposed to construct LGSF eco-friendly 50 bedded TRH with parking space for the visitors.

(4) At Uttarkashi (Manera), the Tourism Department has 0.305 hectares of land and it is proposed to construct 135 bedded Yatri Niwas with parking space for the visitors.

ANALYSIS – ACCOMMODATION AVAILABLE V/S REQUIREMENT

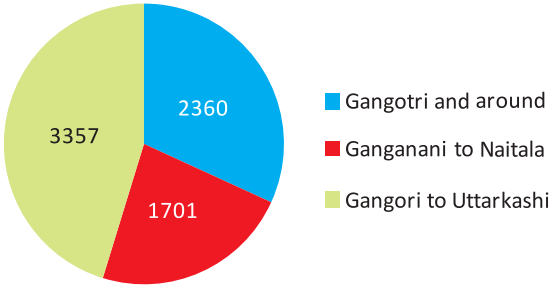
After completion of the above under construction and other proposed works, the accommodation availability scenario will be as shown below.

Tourist accommodation requirement - Uttarkashi to Gangotri
(Figures indicate bed capacity)



Accommodation requirement as per carrying capacity

Tourist accommodation available from Uttarkashi to Gangotri after the completion of under construction and proposed works
(Figures indicate bed capacity)



Accommodation available after completion of under construction and proposed works

The first graph shows requirement as per carrying capacity while the second shows the actual availability after completion of under construction and proposed works

5 A project on Tourist Safety Management System for the Char Dhams including Gangotri is in pipeline.

From the above analysis and comparison it can be observed that after completion of under construction work there is not much requirement for further infrastructure creation for tourist accommodation purposes. However, it is essential, that tourist outflow to Gangotri is regulated so that there is no overcrowding at destination as well as burdening of the sanitation facilities. Allowance may be made for establishment of tourist resorts in areas with surplus water and electricity in a regulated manner so as not to affect the rights of existing users and without any reduction in green forest cover. Prior consultation with existing users will be undertaken.

ADDRESSING NEEDS OF PARKING SPACE

It has been observed that during peak season there are frequent road jams due to heavy movement of vehicles and situation becomes more critical when these vehicle owners park their vehicles on the roadside. Due to this reason sometimes tourist planning to visit Gangotri and return back on the same day to Uttarkashi or Naitala or other destinations get stuck and have to stay during night in some hotel / lodge / ashram at Gangotri. Due to this sometimes overcrowding takes place in Gangotri and also put additional load on sanitation facilities. To overcome this problem the Tourism Department has already undertaken works pertaining to providing parking spaces near Gangotri. Two parking places are under construction:

1. About 300 metres from Gangotri temple a parking space has been constructed having parking capacity of 150 vehicles.
2. About 2 kms from Gangotri temple a parking space for 100 vehicles is under construction.

Approximately 800 to 900 vehicles travel per day during the peak season on the route between Uttarkashi and Gangotri. Out of these 80% are destined to Gangotri and therefore proper regulation of vehicular movement and monitoring is required at Uttarkashi and at Bhatwari so as to avoid frequent traffic jams. More parking space needs to be created at halting points like Natala, Maneri and Bhatwari so that practice of parking vehicles on the road can be checked and free flow of traffic is maintained.

GAP ASSESSMENT OF UTTARKASHI, HARSIL AND MUKHWA FOR ACTING AS A BASE CAMP

Analysis of Uttarkashi, Bhatwari and Mukhwa as middle reach destinations for acting as base camp for tourists to Gangotri, carried out by M/s JPS Associates (P) Ltd . has been presented below and has been utilized in developing future strategy for tourism development in the ESZ.

S. No	Destination	Environmental Analysis	Socio-cultural Analysis	Economic Analysis
1	Uttarkashi	Being a major town and district headquarter; Uttarkashi does not support any critical biodiversity.	● Tourist/recreation activity types which can be absorbed without affecting the activities of host communities - Pilgrimage, leisure tourism and adventure tourism. It is already a well-known adventure tourism and pilgrimage spot. ● Health & Hygiene - waste is generated both from resident households as well as by tourists. Inspite of Nagar Palika Parishad being in place, the waste management of Uttarkashi town is unsatisfactory, specifically the market area and bus station. There is no STP and no hazardous waste generation. [1] District Hospital is located at Uttarkashi. Local practices of public hygiene are poor.	● Migration – Similar to Barkot, Uttarkashi being headquarter, also experiences in-migration of vendors and shopkeepers. The existing establishments are owned by both locals as well as migrants from nearby places. This reflects the potential employment opportunity in Uttarkashi. However it needs more government support. ● Limited seasonal employment – There is year round employment.

[6] "hazardous waste" means any waste which by reason of characteristics such as physical, chemical, biological, reactive, toxic, flammable, explosive or corrosive, causes danger or is likely to cause danger to health or environment, whether alone or in contact with other wastes or substances have been identified) as per Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016

S. No	Destination	Environmental Analysis	Socio-cultural Analysis	Economic Analysis
			● Safety – Bothpolice station and fire brigade facility is available there. District Disaster Management Authority is at Uttarkashi	● Limited livelihood opportunities – most hotels and dhabas are owned by local people. There is need of strengthening economic linkage to include agro-producers, SMEs, communities and other allied sectors in tourism for optimum exploitation of the present opportunities.
2	Bhatwari	It falls under Bhagirathi Eco-Sensitive Zone. Upper reaches of this area support high faunal biodiversity like Himalayan Tahr, Goral and Asiatic black bear. The waste management practices are not satisfactory and need to be advanced[2].	● Tourist/recreation activity types which can be absorbed without affecting the activities of host communities –pilgrimage and leisure tourism. It is halting point enroute to Gangotri and can be developed as winter destination for leisure tourism. ● Health & Hygiene – waste management of Bhatwari is unsatisfactory. Primary health centre is available there. Local practices of public hygiene are poor. ● Safety – Both police station and fire brigade facility are available there. There is Bhatwari Tehsil Disaster Management Committee and District Disaster Management Authority at Uttarkashi	● Migration – Bhatwari is one of the most affected sites in Uttarakhand after 2013 hazards. It also experiences out-migration. The existing establishments are owned by locals. This reflects the low employment opportunity in Bhatwari. It needs a strong support from the government for further development. ● Limited seasonal employment – There is limited seasonal employment. ● Limited livelihood opportunities – Most hotels and dhabas are owned by local people. There is need of strengthening economic linkage to include agro-producers, SMEs, communities and other allied sectors in tourism for generation of opportunities.
3	Mukhwa	Mukhwa village falls under Bhagirathi Eco-sensitive zone. Mukhwa village is clean and well-maintained village. Village community makes arrangements of waste management. However, due to low tourist pressure the waste generation is limited except domestic waste. There is no STP and there is no hazardous waste generation.	● Tourist/recreation activity types which can be absorbed without affecting the activities of host communities –pilgrimage, cultural tourism and adventure tourism. It has enriched cultural values since deity Ganga is worshipped here during winter and has potential to be developed as winter destination. ● Health & Hygiene – Mukhwa village is clean and well maintained village. Village community makes arrangements for waste management. However, due to low tourist pressure the waste generation is limited except domestic waste. There is no STP and not any hazardous waste generation. Nearest PHC at Bhatwari. Local practices of public hygiene are good. ● Safety – Both police station and Fire brigade facility are available there. Mechanism of Disaster Management is not fully onsite mechanized. Quick response team at Bhatwari.	● Migration – Mukhwa experiences high out-migration. The existing establishments are owned by locals. This reflects the low employment opportunity there. It needs a strong support from government for further development. ● Limited seasonal employment – There is limited seasonal employment. ● Limited livelihood opportunities – State Tourism Department recently selected the village for home-stay scheme. Some of local traditional houses have been selected for home-stay. Government is providing low interest loan for improvement of infrastructure of these houses.

Assessment on availability of qualified/trained, skilled & semi-skilled manpower in Uttarkashi, Bhatwari and Mukhwa to ensure quality services for the tourist

S.NO	Destination	Assessment on availability of qualified/trained, skilled & semi-skilled manpower
1	Uttarkashi	Inadequacy of qualified/trained, skilled and semi-skilled manpower. Needs to be encouraged through various training programs like Hunar Se Rozgar Tak HSRT scheme of Ministry of Tourism.
2	Bhatwari	Deficiency of qualified/trained, skilled and semi-skilled manpower. Needs to be uplifted and encouraged through various training programs like HSRT scheme of Ministry of Tourism.
3	Mukhwa	Deficiency of qualified/trained, skilled and semi-skilled manpower. Needs to be uplifted and encouraged through various training programs like HSRT scheme of Ministry of Tourism.

Based on the gap assessment done by JPS Associates (P) Ltd. in the Carrying Capacity Report increasing the amenities for pilgrimage is the first priority in the ESZ. This will be achieved through

- Infrastructure development- accommodation, parking, food plaza, toilet facility, side way amenities, information
- Quality services
- Skill development and importance of service
- Regulated Yatra- Biometric centre near Uttarkashi will be developed
- Promotional activities for livelihood
- Small & medium tourism infrastructure facilities will be developed by private enterprises through the Veer Chander Singh Garhwali scheme and upcoming scheme of State Govt. in promoting local cultural building structure
- Ropeway establishment

(ii) Promotion of Winter Pilgrimage

Preparations are underway to promote "Winter Char Dham" so that year round tourist inflow is retained in the region and tourists enrich themselves with serenity and amusement of the destinations in winter season too. Moreover, if tourist inflow to Gangotri is balanced throughout the year, pressure during the particular season on the sensitive ecology and infrastructure facilities will be reduced.

(iii) Promotion of Rural Tourism

Rural tourism is recognized as the fast growing sector and has emerged as an instrument for employment generation, poverty alleviation and sustainable human development. Rural tourism has numerous capabilities to create large scale employment – from most specialized to unskilled rural people. In addition to being an important source of income, rural tourism provides number of other economic benefits, which vary in significance from one region to another.

ACTION PLAN

- Identification of rural sites at tourism villages
- Identification of promotional activities
- Capacity building and skill development
- Implementation through the Uttrakhand Gramin Paryatan Uthan Yojana and convergence with other programs including BADP (Border Area Development Program)
- Promotion of local products, cuisine &souvenir making

IDENTIFIED VILLAGES

On initial basis one cluster has been identified which includes 9 villages for piloting of the concept. Main concept behind this idea is to promote rural tourism by initiating local activities and staggering the tourists to other villages so that benefits of tourism shall be equally shared. In the identified cluster villages are Harsil, Mukhaba, Dharali, Bagori, Jaspur, Purali, Jhala& Sukhi. Individual identified villages which have traditional, cultural potential and scope for adventure tourism are Bhangeli, Hurri, Bhukki, Kujjan, Tihar , Salang, Barsu, Raithal, Nateen, Sari, Saunra, Syaba, Silla, Pilang , Jorai, Gorsali, Pahi Agoda, Naugaon, Bankoli Gajoli Seku, Utaron, Nald, Naitala, Ganeshpur, Lata, Kumalti, Malla, Bhellatipiri, Manpur, Kankarari, Kishanpur, Sangrali, Gyanja & Sald.

It was felt that comprehensive Village Tourism Master Plan will be required that would be a broad framework for guiding the rural tourism development in the region.With Master Plan it tries to determine and create experiences for tourists who enjoy locations that are sparsely populated, predominantly in natural environment, meshes with seasonality and local events and is based on preservation of culture, heritage and traditions. Department of Tourism running the scheme named **Gramin Paryatan Uthan Yojna** for the development of village tourism and home stay development.

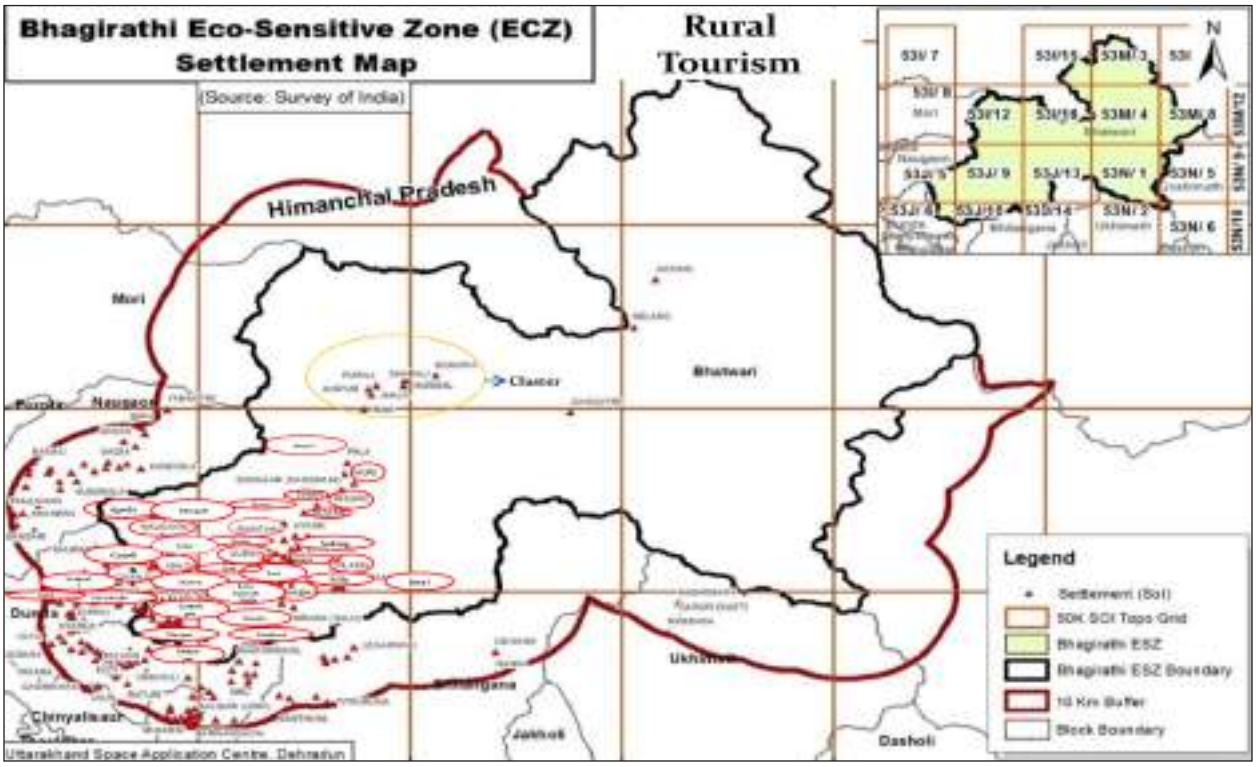
Presently,master plan for 04 villages Harsil-Mukhwa and Raithal-Barsu have been prepared and based on the lessons learnt from the piloting of these concepts, rural tourism shall be promoted in other identified villages in the ESZ.

Sample developed for village Harsil is presented below:

INTENDED OUTCOME FOR HARSIL

Based on potential tourism resources, following activities with specific USP for Harsil have been proposed for tourist as well rural community to fulfil following out comes:

- Increased number of tourist foot fall
- Additional scope for tourists to experience the region
- Diversified activities for tourists
- Increased source of employment & income generation for local community during on and off season



Map of ESZ showing rural tourism villages

Identified activities for village tourism are :

- Development/promotion of home stays with all necessary facilities viz neat rooms with toilets, drinking water and food
- Identification of heritage houses
- Camping facility near homestays
- Development of nature trails and eco parks
- Agro/farm tourism activity
- Trekking around villages and nearby places for which local male and female youth will be trained as guides.
- Sightseeing
- Development of yoga and meditation centers
- Wild life viewing and bird watching
- Interpretation centers operated by trained local youthscentres

DEVELOPMENT OF HOME STAYS IN VILLAGE HARSIL

Home stay is relatively a new concept for the people of this village. At present, the accommodation capacity is not decent both in terms of capacity and quality. Except in few hotels and guest houses, standard of quality accommodation is not available. There were few homes found in the village with showing traditional and architectural touch of the ancient times. Some local people of the village have established private cottage facilities in the region but the numbers are very few. But, those cottages

don't exhibit the sense of rural and traditional ethos of the village. Also, the nearby Bagori village which is inhabited by Bhutiya/ Jadhs tribal groups was also visited for its ethnicity, ancient homes and extravagant surroundings but the non-availability of basic amenities has promptly come up as a hindrance to promote it.

SAMPLE RURAL TOURISM MICRO PLAN FOR HARSIL

Activity	Spot /USP
Trekking	**Sattal** ● Trek of approx. 7 Kms. from Harsil. ● 4 km uphill trek from Dharali village. ● Cluster of 7 lakes (Mridang, Jhankiya, Dabriya, Rikh, Bamaniya, Loap, Bakriya). ● Passes through apple orchards and kidney bean fields ● Can be easily trekked within a day. **Lamatipri** ● Trek of approx. 1.5 Kms from Harsil ● Buddhist temple adds serenity to the place ● A high steep trek adds spirit to adventure enthusiasts ● Can be trekked and explore within half day **Harsil to Morasor trek** ● Trek of approx.12 kms from Harsil and runs parallel to Jhalandri Gad. ● Magnificent meadows can be explored on this trek ● Natural water fall of 200 metres height culminates exuberance of nature seekers and adventure enthusiasts ● Can be completed within two days ● Camping can be done on the meadows **Harsil to Kachoragad - Nagri trek** ● Trek of approx.10 kms from Harsil ● Can experience the passion of rising sun through the midst of Meru and Semuru mountain peaks - during early hours ● Can be completed within two days. ● Camping/ night stay can be done on the trek
Bird watching	● Paradise for bird lovers with varied species like Himalayan Monal, Grey Francolin, Himalayan Golden back Kingfisher along the treks ● Exclusives sites for bird watching Jhinda meadow (approx. 7 kms.) and Saat tal
Nature walk	● Bagori village (3kms.) depicts rich traditional heritage through vernacular homes ● Cholmi village (2.5 kms) can be explored for rich flora & fauna (Cedar, Oak, Cyprus etc.)
Rock climbing	● Area near Wilson farm – 500 mtrs. from Harsil suitable for rock climbing
Angling	● Jalandhari Gad and Kachora Gad are ideal sites for angling ● Brown trout and Rohu (Labeo rohita) are the major species found here
Kayaking	● Jhala to Jhangla– 9 kms. stretch is an ideal location ● Initial Summer season is the best time
Zip lining	● Spot locate at distance of 3 kms. from Harsil ● Markande tok (Mukhwa) to NH 108 over Bhagirathi river (200 mtrs) is an Ideal site for Zip lining
Camping	● Jalandhri Gad, Mandakni Fall, Telgada sites situated within 2 kms. radius ● Area along treks at Jhinda meadows and meadows near Morasor are best location

Activity	Spot /USP
ATB vehicles riding	● ATB vehicle riding at Telgada (approx. 2 kms.) during snowfall
Orchard tourism	● Beautiful apple orchard at Harsil, Bagori, Dharal & Mukhwa villages, located within radius of 3 kms. ● Farm fresh harvesting and camping at orchard during September-October
Hiking	● Jalandhri gad and Kachora gad, Madakini water fall are major hiking sites located at 2 to 3 kms from Harsil.
Cultural	● Hardudhu and Selku fair is a famous and vibrant festival and celebrated during September with illumination of deodar torch. ● Losar Festival is celebrated by tribes of Harsil and Bagori village during the month of February or March.
Meditation and yoga	● Rejuvenating experience of meditation and yoga through locally available trained professionals.
IGP (Income Generating Programmes) with village community	
Food processing (Value addition Apple, Wild apricot, Sea buckthorn, Pear and Kidney bean)	● Establish common food processing centre ● Skill building of producers on value add products e.g dry apple slices, squash, jam and chutney ● Branding value added product and kidney beans through retail pack and marketing at tourist route
Mandir prasad	● Mahile Mangal Dals in Harsil, Mukhwa, Bagori and Dharali village manage supply chain and quality control ● Commodity is categorized into identified cluster of villages. e.g. apple for Harsil
Handloom	● Promotion of handicrafts/souvenir items like caps, mufflers, sweaters and shawls ● Marketing local handloom products through GMVN

GUIDELINES FOR DEVELOPMENT OF HOME STAYS IN UTTARAKHAND

Presently, Agoda, Mukhwa, Dharali, Harsil and Bagori have been selected under Home Stay Program with the objective of decongesting popular locations, generation of rural livelihood and developing alternate tourist places of interest.

The Department of Tourism (DoT), Government of Uttarakhand (GoUK) had introduced a scheme Home-stays to supplement the demand of accommodations at various tourist destinations in the State of Uttarakhand. These home stays provide standard facilities with minimal investment and encourage the locals to earn an extra income. All home stays shall be registered and established as per Uttarakhand Home Stay Rules, Amendment 2016.

Existing home stays registered with ILSP under Rural Development Department should be integrated with the registration requirements of Uttarakhand Home Stay Rules, 2015 and the information on such Home Stays should be duly linked with communication mechanism of the UTDB website.

(iv) Promotion of Adventure Tourism

Adventure Tourism is one of the emerging segments of travel in the state. The Ministry of Tourism extends Central Financial Assistance to state governments/union territory administrations for the development of tourism projects including adventure tourism, on the basis of proposals received from them subject to adherence of relevant scheme guidelines and availability of funds utilization of funds release earlier. Adventure tourism in this zone will comprise of the below mentioned activities:

- Mountaineering
- River running/ rafting
- Trekking
- Water sports

- Paragliding
- Bungee jumping
- Mountain terrain biking
- Ropeway development
- Water sailing
- Rock climbing
- Skiing

ADVENTURE TOURISM (AREAS)

(1) Mountaineering areas : Gaumukh and beyond Gaumukh rea , Kedar Tal, Rudragair, Neelang valley, Jhonly valley, Bandar poonch area, Kheeragad (Srikanth area), KhedaTal, Dropattika danda etc. are major sites for high attitude mountaineering and peak climbing areas.

(2) Trekking : All mountaineering sites, tourist sites and in and around the tourist village, numerous trekking routes are available.

(3) Water sports : Joshiyara lake (Jheel) and Maneri lake (Jheel) are the major sites for water sport activities while in the river Bhagirathi (Ganga) from Harsil to Uttarkashi rafting activities could be done.

(4) MTB : Gangotri to Neelang valley, Gangotri to Uttarkashi, Raithal, Natin, Barsu, Varunawat area, Mahidanda and around Uttarkashi area.

(5) Skiing and winter sports : Major sites are- Dayara Bugyal, Gidara Bugyal, Kushkalyan and Jorai bugyal, Awana Bugyal and Haronta Bugyal.

MOUNTAINEERING

A total of 36 out of 37 mountain peaks including Bhagirathi-I, II, III, Chaukhamba I, II, III, IV, Gangotri I, II, III, Jogin I, II, III, , Kedardom, Basuki Parwat, Sudarsan Parwat, Rudragaira etc. are open for mountaineering in Gangotri National Park as per the guidelines issued via Uttarakhand Govt. Order no. 997/CS/MT/2004 dated 03-07-2004.(Annexure). The above guidelines also cover "Regulation of local tour operators providing services to Mountaineering Expeditions" and "Fees and Tarrif for Mountaineering expeditions in Uttaranchal".

Mountain peaks falling within Gangotri National Park

Name of Mountain Peaks		Altitudes (in mt.)
Above 7000 mt.		
1.	Chaukhamba -I	7138
2.	Satopanth	7083
3.	Chaukhamba-II	7070
Between 6500 to 7000 mt.		
4.	Chaukhamba-III	6995
5.	Thaley Sagar	6984
6.	Kedarnath	6940
7.	Bhagirathi – I	6856
8.	Chaukhamba- IV	6854
9.	Kedardom	6830

Name of Mountain Peaks		Altitudes (in mt.)
10.	Devban	6820
11.	Vasuki Parwat	6792
12.	Bhragu Panth	6772
13.	Swachand	6721
14.	Gangotri-I	6672
15.	Meru South	6660
16.	Jaunli	6632
17.	Karchha Kund	6632
18.	Gangotri –II	6590
19.	Bhartekhunta	6578
20.	Gangotri – III	6577
21.	Manda	6568
22.	Sivling	6543
23.	Bhagirathi –II	6512
24.	Sudarshan Parwat	6507
Below 6500 mt.		
25.	Jogin	6465
26.	Bhagirathi – III	6454
27.	Meru North	6450
28.	Meru west	6361
29.	Bandarpunch	6316
30.	Keerti Stambh	6285
31.	Saifi	6167
32.	Shri Kantha	6133
33.	Jogin	6116
34.	Thelu	6000
35.	Rudragaira	5819
36.	Lamkhaga	5764
37.	Jogin – II	4363

TREKKING

It is planned to promote walking pilgrimage to Gangotri through restoration of old paths and exploring new trek routes to decrease the carbon footprints from transportation and also showcase the nature and village life enroute. This is intended to increase the tourist retention time in the zone and decrease the pressure on road and associated infrastructure facilities enroute Gangotri. The existing walking pathway starts from Shukhi first bend to Jhala, Jhala to Harsil, Mukhwa to Jangla.

MAIN NATURAL TREK TRAILS FALLING IN THE ECO-SENSITIVE ZONE

List of trekking routes, walking paths falling within the Uttarkashi Forest Division:

S.No.	Walking path	Length (km)	Name of Range
1	Harsil to Saat Tal	3	Gangotri Range
2	Harsil to Kyarkoti	40	-"-
3	Jaspur to Brahmtal	12	-"-
4	Sukki to Kandara	5	-"-
5	Songad to Bandarpunch	20	-"-
6	Jhala to Awana	10	-"-
7	Gangnani to Gidara	14	-"-
8	Malla to Sahastratal via Kush Kalyan and Kyarki Bugyal	48	-"-
9	Bhukki to Khedatal	20	-"-
10	Nateen to Goi	7	Taknor Range
11	Jodaw to Sahastratal via Kyarki Bugyal	25	-"-
12	Hurri to Khedatal	20	-"-
13	Jodaw to kush Kalyan via Pilang	12	-"-
14	Gorshali to Bakariya Top	10	-"-

S.No.	Walking path	Length (km)	Name of Range
15	Bhukki market to Tihar	6	-"-
16	Jhala to Awana Bugyal	10	-"-
17	Salang to khedatal via Devkund	18	-"-
18	Pilang to Masuri Tok Bugyal via Khaneri Tok	25	-"-
19	Bhatwari to Dayara via Raithal	14	-"-
20	Bhatwari to Dayara via Barsu	14	-"-
21	Barsu to Syari	15	-"-
22	Thirang to Bhu-top Bugyal via Salang	15	-"-
23	Sangamchatti to Dodital	22	-"-
24	Dodittal to Darwa top	6	-"-
25	Satkadi Majhi to Devkundh	10	-"-
26	Seku to Morsana Satkadi	15	-"-
27	Agoda to Bakariya top	15	-"-
28	Naugaon to Aucha	8	-"-
29	Dodittal to Bakariya Tal	20	-"-
30	Agoda to Gonsala Bugyal	10	-"-
31	Manjhi to Darwa top	5	-"-
33	Chapa to Chauladoni	4	-"-
38	Joshiyada to Sankurnadhar	8	Mukhem
39	Aleth to Harota Bugyal	8	-"-
40	Saura to Belak	10	-"-
41	Belak to Sahastra tal	10	-"-
43	Joshiyada to Panyula	10	-"-
45	Thandi to Belak	10	-"-
46	Siror to Jamak	6	-"-
47		35	-"-
48	Jamak to Kamar	10	-"-

LIST OF WALKING PATHS FALLING WITHIN GANGOTRI NATIONAL PARK

Sl. No.	Name of the Trek	Total Distance
1	Gangotri- Bhojbasa- Gomukh- Tapovan- Nandanvan	40 km.
2	Gangotri- Bhojkharak- Kedarkharak- Kedar Tal	20 km.
3	Gangotri- Rudrgaira- Gangotri peak base camp- Oden Col	30 km.
4	Gangotri to Vasuki tal – Kalindi – Badrinath	112 km
5	Gangotri to Kedartal, Gangotri peak- 1, 2 and Thaley Sagar	20 km
06	Neelapani to Managad and Badrinath	115 km
07	Bhujgadi to Matrapeak	10 km

The location plan showing these trek routes is placed below. Improvement in the condition of these trek trails is needed.

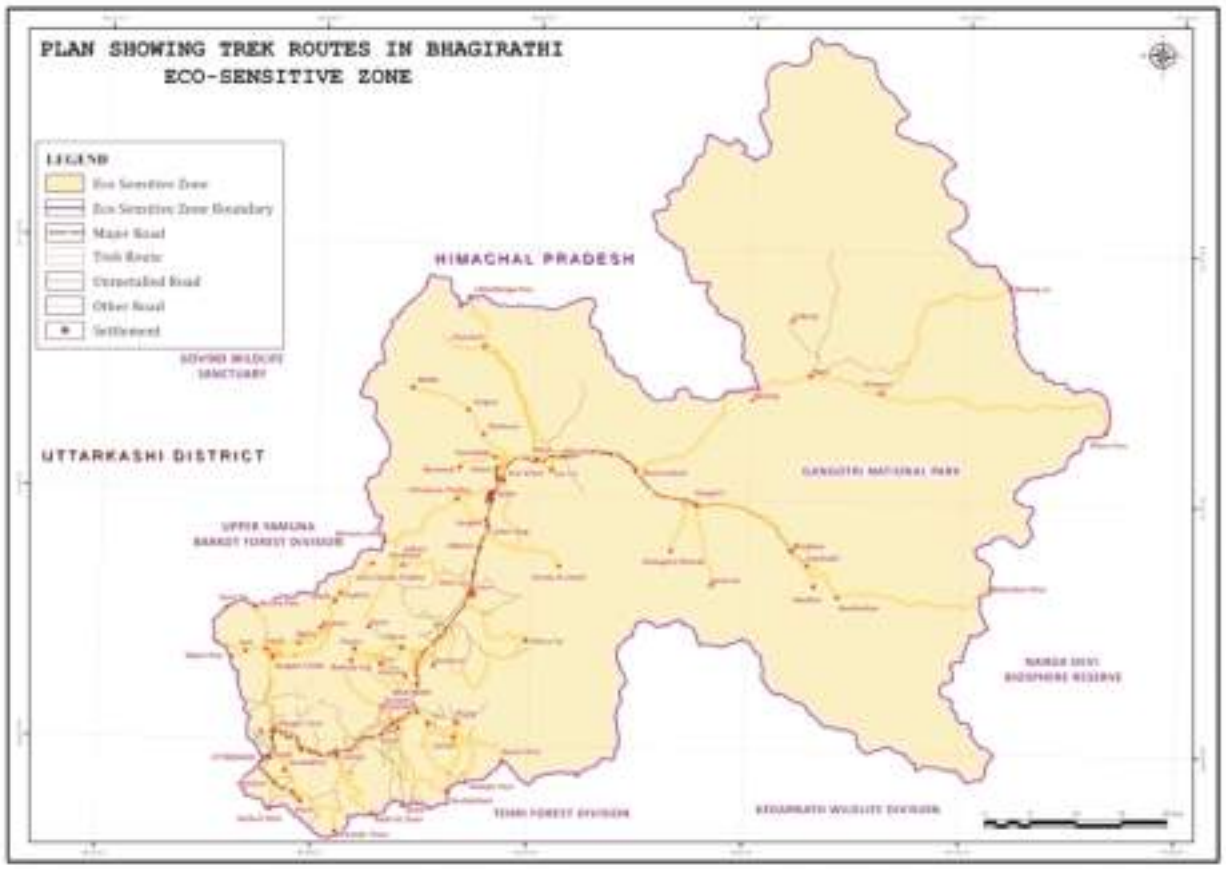


Table-7: Trekking Statistics in Bhagirathi Eco-Sensitive Zone

S. No	Year	Name of route and no. of trekkers arrived					
		Dodital Trek Route			Raithal, Dayara, Kedartal		
		Indian	Foreigner	Total	Indian	Foreigner	Total
1	2003-04	572	29	601	23	0	23
2	2004-05	2497	147	244	0	0	0
3	2005-06	1144	238	1382	394	0	394
4	2006-07	2481	341	2822	144	56	200
5	2007-08	1659	265	1924	310	141	451
6	2008-09	1883	200	2083	1204	89	1293
7	2009-10	2054	164	2218	709	31	740
8	2010-11	2423	159	2582	635	77	712
9	2011-12	2098	112	2210	876	126	1002
10	2012-13	2097	69	2166	1226	103	1329
11	2013-14	1098	48	1146	707	88	795
12	2014-15	1952	172	2124	1066	24	1090
Total -		**21958**	**1944**	**23302**	**7294**	**735**	**8029**

S.No.	Year	Name of Route and No. of Trekkers arrived								
		Kalindi			Kedar Tal			Neelapani- Jadung		
		Indian	Foreigner	Total	Indian	Foreigner	Total	Indian	Foreigner	Total
1	2009-10	211	9	220	172	18	190	0	0	0
2	2010-11	149	19	168	321	17	338	0	0	0
3	2011-12	42	0	42	140	0	140	0	0	0
4	2012-13	194	23	217	409	9	418	0	0	0
5	2013-14	90	2	92	83	4	87	25	0	25
6	2014-15	150	15	165	219	19	238	26	0	26

The trekking in Gangotri National Park is regulated as per Goverenment of Uttarakhand order no. 564/ XVIII-(2)/08-13(1)/2008 dated 21.04.2008. (Annexure), in which the maximum no. Of visitors are restricted to 150 per day in side the park.

ACTIVITIES PROHIBITED/REGULATED FOR THE VISITORS

1. Not more than 150 people per day enter inside the Gaumukh area (Gangotri National Park).
2. Night movement inside the P. A.
3. Carrying firearms
4. Catching/ feeding wild animals
5. Lighting fire or damaging flora & fauna.
6. Playing music through tape recorders, transistors or other gadgets
7. Spreading garbage/ non-biodegradable substances in the P.A.

GUIDELINES FOR DEVELOPING OTHER ADVENTURE TOURISM & RELATED ACTIVITIES

River Running/Rafting

- Any company operating river running trips or commercial white water rafting trips must be registered with Indian Association of Professional Rafting Outfitters/Adventure Tour Operators Association of India and Ministry of Tourism, Govt. of India.
- All trips on white water for tourists will be conducted with at least one qualified guide on each craft. A senior guide or trip leader must be present and supervise the activity at all times.
- The guide accompanying the trips should:
  (a) be at least 18 years of age
  (b) be able to swim
  (c) hold a valid first aid and cardiopulmonary resuscitation (CPR) certificate or equivalent
- Training: Guide trainees should complete a course (or equivalent training) that equips them with the necessary skills and knowledge to safely and competently guide a raft. A guide training course should include the following topics:
  (a) *Skills* - rafting techniques, crew training and management, emergency and rescue techniques.
  (b) *Knowledge* - equipment, safety and emergency procedures, rapid theory, leadership, signals, environment protection.

- For River rafting/kayaking adventure tourism activity, "Uttarakhand River Rafting/Kayaking Regulations, 2014" implemented by Department of Tourism must be strictly followed.

PARAGLIDING

- In case of solo flights the pilot should have undergone two full days ground training consisting theoretical and practical training and instructor should satisfy himself of the first launch both in hill and winch launched paragliding. For first 15 launches height should be restricted to max. 500 feet and student should be radio guided. After demonstrated capability for 180 degree stable turns, five spot (20 mtrs) landings and after the theory paper is cleared, the student may be allowed to carry out free fly. The student pilot must have a valid registration with a club recognised by the Aero Club of India.
- Tandem pilots must have a tandem pilots license issued by the competent authority, which will be issued after the following :
  (a) 150 logged flights
  (b) 35 hrs + logged
  (c) Pass theory paper
- All instructors must be current pilots having sufficient knowledge and experience in the sport.
- Operator must have access to safe and open take off points in case of hill launches. The take-off point should be free from obstructions in the take-off path and should not have rock or crops which could injure the participant. Cliff take-off points must strictly not to be used.
- The operator must have free and clear access to a designated landing ground free of obstructions such as tall trees, buildings, electric wires etc.
- Wind conditions should be strictly monitored and the activity must be done within the weather conditions stipulated by the equipment manufacturer.
- Paragliding wings must have APCUL, DHV or CEN certification. Such certification should be stitched on the wing and visible for inspection. Harness should be with back protection and harness must be fitted with round type certified rescue parachute.
- Helmets and ankle shoes must be compulsory.
- Proper log books must be maintained for all equipment.
- Annual inspection and certification of equipment for air worthiness must be carried out.

BUNGEE JUMPING

- All parts of the jump line must be duplicated. This extends from the connection of the bungee to the jumper and the connection to the structure at the other end of the line. Normally the jumper should have an attachment to ankle straps, and another to a body or sit harness.
- Equipment (harnesses, karabiners) should be of sound construction and suitable for this use. Mountaineering equipment from reputable suppliers is appropriate. Karabiners should be of the screw gate type.

- Braided ropes: At least 2 braided ropes should be used and matched to the weight of the jumper; they should be to BS 3F 70 1991 specification for heavy duty braided rubber cord, or to a demonstrably similar standard.
- Unbraided ropes: Normally one unbraided rope is adequate because of the in-built redundancy from its structure of approximately one thousand individual strands bound together. Each rope should have an examiners certificate from an independent source and be selected according to the weight of the jumper.
- Rope log books should be kept, describing maximum load, and numbers of jumps and drop tests undertaken, and in the case of unbraided ropes, any other conditions required by the examiner (e.g. length of time in sunlight). Ropes have a finite life and operators should be able to demonstrate that this has not been exceeded.
- There should be a written operating procedure. If not written, elements will be more likely to be forgotten or short circuited. Both operators and enforcement officers should be able to check that safe procedures have been established and are being followed.
- The operating procedure should cover at least:
  (a) medical enquiry
  (b) age verification - if under 18, parental consent should be required; and if under 14, they should not be allowed to jump
  (c) weighing and rope selection: There should be a method of checking that the weight of the jumper has been correctly measured and recorded so as to ensure that the correct rope is selected for each jumper
  (d) attachment of each part of harness and ropes, and the checking of each action by a second trained person
  (e) briefing of jumper
  (f) entry into and riding in cage
  (g) re-instruction and jump and
  (h) Retrieval of jumper
- Use of mobile cranes: Use of mobile cranes is not recommended allowed as this is too dangerous.
- Other important elements: Training of personnel is of paramount importance. Each job undertaken requires a different level of training and experience. Those in charge should be able to demonstrate that everyone who is carrying out a task has enough experience to do so, unless under direct supervision by another experienced person. There should be a proper training schedule showing how a person progresses from one level of competence to the next. The schedule of work should clearly state, who carries out every safety critical action and who checks it. Each person should know the tasks, which they are permitted to carry out and those which they are not authorised to do. To date, all known fatal accidents worldwide have resulted from human error.
- The person in overall charge should keep close control of the site. Arrangements should be made to exclude spectators from the jump zone for their own safety and to avoid distraction of the operators.
- Anyone in a cage should be securely attached to it. Spectator riding, especially by children, should be discouraged.
- There should be a dead-weight drop test of the whole line at the beginning of the day to ensure its integrity.
- Spares for all the components in the jump line should be kept on site so as to be available for immediate replacement of suspect components.

- An air bag should be used for jumps over land with unbraided ropes. The purpose of the bag is to prevent a jumper striking the ground if an incorrect rope selection is made. It is not to safeguard jumpers who fall due to a failure to properly connect them to the supporting structure. Braided ropes to BS 3F 70 have an outer covering which tightens when stretched. Unbraided ropes do not, so there is more risk of a jumper descending too far if a wrong rope selection is made. If a jump is made over water with an unbraided rope, relying on the water to perform the function of the airbag, steps should be taken to ensure that there are no obstructions under the water surface. In addition, suitable arrangements should be made for rescue from the water.

(v) Promotion of Cultural Tourism

There are many locations of cultural and mythological significance in and around the ESZ. Effective showcasing of these through light and sound shows, cultural tours, fairs and marketing will open new avenues of tourism in the area and thereby decrease the pressure on Gangotri.

CULTURAL & HERITAGE TOURIST PLACES

(1) Dodital – is said to be birth place of Lord Ganesha and is situated at 3150 meters above mean sea level. It is surrounded by dense forest comprising of Oak, Pine, Deodar trees. Every year villagers of Agoda, Nuagaon, Bharkot and other villages visit this place on the occasion of Lord Ganesha's birthday i.e., Ganesh Chaturthi. The celebration is done by beating of large and different size drums. The fair / occasion needs to be organized and may be marketed as a cultural tourism.

(2) Vishwanath Mandir and Shakti Mandir – Situated at the bank of river Bhagirathi and known as Uttarkashi and is devoted to Lord Shiva and Shakti Mandir is devoted to Durga which has a huge trident. The temple was built by the Pandavas in Katuri architecture.

(3) Raithal village – There is a four-storied house in this village and is said to be more than a century old and has been constructed in a unique style and architecture. The house is lying vacant and needs to be renovated and preserve as a cultural heritage point.

(4) Selku Mela – is being celebrated every year by the villagers of Mukhaba, Dharali, Harsil, Jhala, Purali, Jaspur, Sukhi, Hurri, Raithala, Barsu, etc after the end of harvesting. It is also called festival of flowers.

(5) Different mela timings in the region are depicted below:

Table-8: Fairs in the ESZ

S.No	Name of Fair/ Mela	Month of Celebration
1	Magh Mela	January
2	Assi – Varuni Yatra	March
3	Kuteti Mela	April
4	Hari Maharaj Mela	April
5	Phoolet Mela	June
6	Anduri Mela/ Butter Festival	August
7	Selku Mela	September/ October

(vi) Developing New Alternative Tourism Destinations

There are several sites having great tourism value. It is proposed to develop these areas by increasing tourist facilities, approach roads and more promotions. Following sites have been identified as potential tourist destinations

DAYARA BUGYAL

Dayara Bugyal is situated at an elevation of about 3048 m and this vast meadow is second to none in natural beauty. During winter, Dayara provides excellent ski slopes over an area of 28 sq. kms. The panoramic view of the Himalayas from here is breathtaking. There is a small lake in the area, and to camp by its side is a memorable event. From this spot one can trek down through the dense forest to Dodital, which is about 32 kms.

Dayara Bugyal offers best ski slopes due to :

(1) North facing slopes ensuring longer duration of snow cover

(2) Gently undulating slopes with almost no obstacles like rocks, boulders or other man-made structures

(3) Slopes spread across an area of 28 sq km

(4) Powdery snow that is the preferred snow for skiing the world over

- Pristine natural beauty and sights during summer
- Scenic view of the snow covered Himalayan peaks
- Clean, green environment during summers
- Huge potential for trekking

ROUND THE YEAR DESTINATION

Snow season lasts a maximum of four months, during which tourists can visit Dayara Bugyal for winter sports like skiing. Another major tourist inflow takes place during the Gangotri-Yamunotri yatra season. The winters would attract adventure tourists to the site for trekking and skiing. Products and services that such tourists demand are: good snow cover for skiing, good quality skiing equipment and training facilities, hassle free equipment rental and ticketing processes, rental outlets for warm and effective snow gear (overcoats, shoes, etc.), good quality accommodation, high quality services, clear pathways for easy and hazard-free walking, good food, bar and barbeque arrangement, campfires for social interaction in evenings, cultural functions organised by local troupes. Summers attractions for tourists would include, a serene, green, fresh and pollution-free environment, facilities for light entertainment, like music and dance, special events like fairs and festivals, campfires for social interaction in evenings, adventure tourism like treks, etc., man-made attractions like ropeway, chair lift, glass-houses, watch towers, etc, nature trail walks with local guides to interpret local flora and fauna, view points for viewing the beauty of nature like sunrise and sunset, nature interpretation centre with films, quizzes and models, visit to local villages, special tourism attractions like herbal studies, meditation centre, etc., putting green for amateur golfers/non golfers

DODITAL

Dodital is a one of the most beautiful freshwater lake in Uttarakhand, situated at a height of 3,310 metres. The circumference of the lake is 1.5 km and is surrounded by dense Deodar, Pine and Oak forest. Lake is source of Assiganga river, which joins Bhagirathi river at Uttarkashi. On one corner of the lake a beautiful small temple is dedicated to Lord Ganesha. Dodital is an ideal beginners trek in the Garhwal Himalayas, the total length of trek is 22 km.

The route of Dodital begins with a short drive from Uttarkashi to Sangamchatti, a distance of 15 km. Trek starts with crossing a bridge over the Assiganga at Sangamchatti. The first stop of trek could be Agoda, 7 km from Sangamchatti, where a well preserved Forest Rest House is available and also few snacks point are present. After Agoda the next halting point is Dodital, 16 km from Agoda. There is a forest rest house at Dodital, one can also camp at the site for night stay, with due permission from the Forest Department.

The entire route is lined with wide profusion of wild flowers. The surrounding forests are rich in wildlife, and one can see a variety of birds. The Asiatic Black Bear is also very common in this area. Lake and Assiganga river is filled with introduced exotic fish Brown trout, but angling is prohibited.

Dodital is already a well-known destination among adventurists and every year many enthusiastic persons including foreigners visit the area. The statistics of domestic tourists and foreigners tourist visiting the area in last 9 years is as follow:

S.No	Year	Domestic Tourist	Foreigner Tourist	Total
1	2007-08	1659	265	1924
2	2008-09	1883	200	2083
3	2009-10	2054	164	2218
4	2010-11	2423	159	2582
5	2011-12	2098	92	2190
6	2012-13	2097	40	2137
7	2013-14	1108	48	1156
8	2014-15	1441	95	1536
9	2015-16*	807	53	860

Data for year 2015-16 is up to July 2015 only.Source – Department of Forest, Govt. of Uttarakhand

Tourist facilities may increase in this area by starting Home Stay Scheme at Agoda. Small signage board should be placed after Agoda, since there are several diversions. Promotion of site by department of tourism would increase the tourist interest in this area.

NELONG VALLEY

Hidden away on the remote border district of Uttarkashi, this beautiful valley at the historically famous Indo-China border stands at a height of over 11,000 feet above the sea level. It gives rise to one of the largest tributaries of the Bhagirathi river, the Jadh Ganga. The valley lies to the north-east of the rushing waters of the Jadh Ganga. Located about 5 km from Dhumku, Nelong is one of the two deserted villages in the valley. Nelong (or Nilang) traditionally means the 'place of blue stones'. It housed the Jadh people that gave the valley its name. They were known for their trade in cotton goods, metals, and sugar and oil seeds with Tibet up until 1962. The Sino-Indian border conflict of 1962 resulted in civilians having no access to this paradise.

The 1962 conflict made sure that no more exploration of the area is possible. But recently, state government has decided to open the Nelong Valley in Uttarakhand to Indian tourists after a gap of more than half a century. Regional Tourism Department, Uttarkashi is also trying to promote the area.

Nelong is located on the route to Gangotri and a separate road of 25 km from Bhairoghati reaches Nelong Valley. Permission from Forest Department is must to visit valley. Very limited tourist facilities are available in the valley. Due to immense natural beauty and potential there are ample opportunities to develop Nelong Valley as the adventure tourism place in the Uttarkashi district.

(vii) Training

Understanding that tourism Sector is a major generator of employment in the region as tourism and tourism supported activities create a high proportion of employment and career opportunities for low skilled and semi-skilled workers, particularly for poor, female and young workers andwith the vision that tourism sector shall continue to be an important source of employment and consequently poverty reducer in the ESZ, focussed training programs shall be an essential component of the Master plan for the ESZ.

Trainings in hospitality, home stay management for better management of rural tourism, English language, adventure related pursuits like water sports, mountaineering, trekking, guides, porters, etc will be provided to the community. Under Hunar Se Rozgar Tak scheme of the Ministry of Tourism, trainings are already being provided in hospitality, food and beverages production, housekeeping etc. To further its efforts, an NGO has been selected by the Dept. for facilitating Community to get training in the pursuits based on the basic skills and interest they possess, which shall be further integrated with providing them market linkages. Dept. has also empanelled training institutes through which focussed training programs can be delivered to the community by Expert agencies like NIM, Uttarkashi, Hanifl Centre for Outdoor Education and Environmental Study, National Institute of Water Sports, etc. Trainings are also imparted by the Forest Dept. in Eco Tourism pursuits.

ACRONYMS

MoEF	Ministry of Environment and Forests
TRH	Tourist Rest House
NIM	Nehru Institute of Mountaineering
GH	Guest House
VCS	Veer Chandra Singh Garhwali Scheme
LGFS	Light Gauge Steel Framing
PHC	Primary Health Centre
HSRT	Hunar Se Rozgar Tak
ATB	All Terrain Biking
MTB	Mountain Terrain Biking
IGP	Income Generating Program
GMVN	Garhwal Mandal Vikas Nigam
ILSP	Integrated Livelihood Support Project
UTDB	Uttarakhand Tourism Development Board
FD	Forest Department
PA	Protected Area
APCUL	Certification For Paragliding Wings
DHV	
CEN	
UDPFI	Urban Development Plans Formulation and Implementation Guidelines
IMF	Indian Mountaineering Foundation

10

CHAPTER

ROAD INFRASTRUCTURE DEVELOPMENT

10
CHAPTER

ROAD INFRASTRUCTURE & COMMUNICATION DEVELOPMENT

INTRODUCTION

Bhagirathi Eco Sensitive Zone total area of 4179.95 Sq km from Gaumukh to Uttarkashi is a region in the upper Himalayas which shares its border with China. There are a total of 89 villages situated in the rough terrain of the Higher Himalayas. A total of 16 villages with a population of more than 7000 still lack road connectivity forcing the population to migrate to the urban settlement in search of better services. In addition, the Gangotri Dham is located in the BESZ, is one of the most important place of pilgrimage attracting the pilgrims from all over the world. The poor road infrastructure on this side of the Indo-China border, demand for upgradation of the same in view of the national security concerns. The area of BESZ is severely prone to natural disasters like floods, cloud bursts, avalanches, landslides etc. Every year roads, bridges, buildings etc are damaged or washed away by different disasters and therefore need establishment in a very time bound manner. The floods of the year 2012-13 had a very severe impact on the road infrastructure and the area is yet to rehabilitate to its original shape. This plan has been prepared keeping in view the basic infrastructure services to the villagers of the area, upgradation of border infrastructure in view of national security and basic infrastructure to the Char Dham pilgrims.

There are five agencies of State Government as well as Central Government, who are presently stabilizing, upgrading and maintaining the road infrastructure in the area and they are as follows:

1. P.W.D. Division Bhatwari – Construction and maintenance of state highways, village roads, different types of bridges (motor bridges and bridle bridges), government buildings etc.

2. Border Roads Organization- Establishment, upgradation and maintenance of NH-34 from Uttarkashi to Gangotri, Bhaironghati to Jadong , Naga and other border roads etc.
3. P.M.G.S.Y Division - Construction and maintenance of 13 village roads, motor bridges.
4. P.W.D. (World Bank Division)- Restoration works by construction of different types of bridges (motor and bridle bridge).
5. P.W.D. (ADB Division)- Restoration of roads and upgradation of state highways.

OBJECTIVE

Road connectivity is the first step for the development of any civilization. As described above sixteen villages having a population of 9000 are still unconnected with motor road. People of these villages are travelling on an average of 8 to 10 Km long distance on foot. Pilang and Jodav are 22 km far away from a road head. Modern heavy defense equipments have to transport up to border, the object and vision of the departments associated with road infrastructure development are as under:

- To establish and upgrade national highways in view of providing better services for Char Dham yatra pilgrims
- To establish and upgrade the road infrastructure in the border area for national security concern
- To establish and provide road connectivity to the villagers, with an objective to stop their migration
- To upgrade the road infrastructure so as to facilitate the pilgrims with smooth and safe transport
- To restore the infrastructure damages due to nature calamities
- To maintain the existing road infrastructure including their annual repair

As per the Guideline of Eco-Sensitive Zone Gazette Notification following provisions in new roads, re-construction of road and other repair/maintenance works are included in proposed Zonal Master Plan.

Clause No. 2 - Zonal Master Plan for Eco Sensitive Zone

Conditions of Gazette notification	Provisions incorporated in ZMP
(2.12) - No change of land use from green uses such as horticulture area, agriculture area, tea garden, parks and other likes places to non green use shall be permitted in the Zonal Master Plan, except the strictly limited conversion of such lands may be permitted to meet the local needs including civic amenities and other infrastructure development in large public interest and complying with their mitigation option and subject to finalization of zonal master plan.	(2.12) - The alignment of roads and bridges shall be chosen in such a manner to avoid and minimize the damage to agricultural area, tea garden, parks and other and like places and environment .In construction and development activities forest conservation act 1980 shall be followed accordingly. The compliance provisions have been incorporated in the guidelines for construction of roads.
(2.14) - There shall be no consequential reduction in Green area such as forest area, agricultural area etc subject to the provisions commented in Clause (12) and the Forest Conservation Act 1980 (69 of 1980) as applicable.	(2.14) – The alignment of roads and bridges shall be chosen in such a manner to avoid Green area such as dense forest and agricultural area. In construction and developmental activities Forest Conservation Act 1980 shall be followed. The measures regarding conservation of green area shall be followed accordingly.
2.16- Development and Protection –	
(i) Zonal master plan shall indicate the area on hill slopes where development shall not be permitted.	The alignment of road shall be chosen in such a manner to avoid steep & unstable slope. Necessary guide lines have been incorporated in the Zonal Master Plan .

Conditions of Gazette notification	Provisions incorporated in ZMP
(ii) No development shall be undertaken in area having a steep slope or area which falls in fault or hazard zones or areas falling on the spring lines and first order streams or slopes with a high degree of erosion as identified by the State Government on the basis of available scientific evidence and in exceptional cases infrastructural works for the benefit of community may be undertaken with proper study of Environmental impacts and taking appropriate mitigation measures arising out of such development in consultation with line Ministries of the Central Government including public consultation.	The developmental activities shall be undertaken after geological investigation and environmental study. Proper care shall be taken with the help of geologist in fixing the alignment to avoid areas which appear susceptible to erosion or areas which have unstable slopes. In case of steep slope, the provisions of IS 14496 (Part 2) 1998 shall be followed. The mitigation measures as per forest conservation act 1980, IRC specifications, Beuro of Indian Standards Code No 14494 part 2 (1998), **(Annexure-58)** and environmental impact assessment as stated "Guide lines for construction of road "in this this chapter shall be followed.
(iii) No development on existing steep hill slopes or slopes with a high degree of erosion shall be permitted.	The alignments shall be chosen in such manners which impose minimum impact on environment. Those areas shall be avoided which have a tendency of erosion. But in unavoidable circumstances modern techniques of slope stabilization like breast wall gabion walls, reinforced soil and soil nailing shall be applied to mitigate all adverse effect of construction. The developmental activities shall be undertaken on the hill slopes as specified by IS Code No 14496 (Part II) 1998 Indian Standard for Preparation of Land Slide Hazard Zonation Maps in Mountainous Terrains Guidelines at the time of executing the project.
(v) The places in the Eco Sensitive Zone where cutting of hills causes ecological damages and slope instability in adjacent areas, such cuttings shall be undertaken with proper study of the Environmental Impact and taking appropriate mitigation measures in consultation with the Ministries of the Central Government including Public Consultation.	All possible measures shall be taken to avoid ecological damages or slope instability using modern techniques of slope stabilization like breast wall gabion walls, reinforced soil and soil nailing. In addition suggestion of planting of local grasses or other species to avoid growth of exotic species in such area would be undertaken at the time of executing the project. The developmental activities shall be undertaken on the hill slopes as specified by IS Code NO 14496 (Part II) 1998 Indian Standard for Preparation of Land Slide Hazard Zonation Maps in Mountainous Terrains Guidelines at the time of executing the project. Such types of guide lines have been incorporate in Zonal Maters Plan.
2.19 – Hill Roads	
(i) For construction of any road including untarred road in the Eco-sensitive Zone (including the extension or widening of existing roads) subject to inclusion in the Zonal Master Plan.	A list of 16 unconnected villages has been enclosed with this Zonal Master Plan. Which shows the length required to connect these villages .
(ii) Provision shall be made for treatment of hill slope and cost of such protection measures should be included in the cost estimate of the proposed road.	Generally, alignments of new roads shall be selected in such a way to avoid areas having steep slope or having tendency of land slide. As per new circular of EinC PWD Uttarakhand the hill road shall be constructed in part cutting and part filling and the alignment should be chosen in such a way to minimize or avoid the H.P bends. In unavoidable circumstances R/wall and breast wall shall be constructed using geo grids or plum concrete.

Conditions of Gazette notification	Provisions incorporated in ZMP
(iii) The debris shall not be dumped down the khud or slopes but shall be subsumed in the construction of roads and the provision shall also be made for disposal of unused debris in appropriate manner at suitable and identified location so as not to affect the ecology of the area adversely and the debris shall be treated and landscaped using bio-engineering and other appropriate techniques and the cost of such measures shall be included in the cost estimate of the proposed road.	Approx. 30 to 40 percent of debris generated from hill cutting is being consumed in road construction work, such as retaining walls, gabion walls, stone ballast etc. Nowadays PWD is using soil stabilizer where the local waste material is being used with certain admixture which are called soil stabilizer as per mix design for the sub base and base coat of road pavement. Debris from hill cutting are being dumped in safe dumping zone. Dumping zone are provided in such a place which are stable for muck disposal additional fund required, which is being included in the cost of work. The dumping zones are located on forest land transfer cases with their coordinates. **(Annexure 59 & 60)** Such type of document had been provided to ESZ monitoring committee at the time of their visit in the area.
(iv) All roads shall be provided with adequate number of road side drains and these drains shall be kept free from blockage for run off disposals and this run off from road side drainage shall be connected with the natural drainage system of the area.	Road side drains and cross drainage shall be provided as per geology of the site. As per new circular of EinC PWD Uttarakhand, the drain shall be lined with local stones received from local cutting of hills. So there is no seepage and erosion. These drainage shall be kept open for disposals of run off.
(v) Alignment shall be selected so as to minimize loss of vegetal cover.	Alignments of roads shall be selected in such a way to minimize the loss of vegetal cover.
(vi) Appropriate design standards shall be followed while designing the roads including mass balancing of cut and fill and avoidance of unnecessary cutting.	The road construction shall be done as per IRC specifications, and for steep slope consideration IS 14496 part 2 (1998) shall be followed. As per new circular of EinC PWD Uttarakhand, **(Annexure-61).** the hill road shall be constructed in part cutting and part filling. Such types of guide lines have been incorporated in Zonal Master Plan. Approx. 30 to 40 percent of debris generated from hill cutting shall be consumed in road construction work such as retaining walls, gabion walls, stone ballast etc.
(vii) Notice shall be given about all fault Zones and land slide Zone along the roads indicating the beginning and end of such area.	The alignments of roads shall be finalized after detailed geological investigation. The suggestions of geologist shall be incorporated in the alignment.

PRESENT STATUS

(A) Existing infrastructure

S.No	Name of Road	Class of Road	Length (km)
P.W.D.			
1	Uttarkashi Ghansali Motor Road	State Highway	18.00
2	N.I.M Motor Road	Village Road	2.00
3	Mustiksaur Motor Road	-do-	7.00

S.No	Name of Road	Class of Road	Length (km)
4	Tekhala Mahidanda Motor Road	-do-	12.760
5	Pata link Motor Road	-do-	1.00
6	Sangrali Motor Road	-do-	1.00
7	Uttron Motor Road	-do-	6.00
8	Seku Motor Road	-do-	0.700
9	Ganeshpur Motor Road	-do-	0.40
10	Bonga Bhailura Motor Road		3.828
11	Bhatwari,Pahi, Dwari, Gorshali, Jakhol Motor Road	-do-	17.00
12	Maneri Jamak Motor Road	-do-	1.25
13	Sainj Motor Road	-do-	0.75
14	Charethi Raithal Nateen Motor Road	-do-	13.00
15	Bhatwari Barsu Motor Road	-do-	11.25
16	Raithal mini Stadium Motor Road	-do-	2.50
17	Dawri Raithal Motor Road	-do-	3.00
18	Bandrani Motor Road	-do-	0.90
19	Dawari Holticulture Motor Road	-do-	1.00
20	Bhelatippri Saura Motor Road	-do-	5.25
21	Malla Silla Motor Road	-do-	4.71
22	Harshil Mukhwa Jangla Motor Road	-do-	5.85
23	Pyara Jhalla Motor Road	-do-	1.00
24	P.W.D Store and Office Motor Road	-do-	0.600
25	Saura Sari Motor Road	-do-	2.00
Border Roads Organization			
1	Bhaironghati Nelong	Border Road	23.60
2	Naga- Nilapani	-do-	9.80
3	Nelong-Naga	-do-	8.10
4	Naga- Sonam	-do-	11.20
5	Naga- Jadung	-do-	5.33
6	Harsil-Kiarkoti-Lamkhaga Pass-Gainder thatch-Nithal-Thatch	-do-	42.00
7	Mehdi-Tsangchockla	-do-	10.00
8	Sumla-Thangla	-do-	12.00
9	Uttarkashi to Gangotri (N H 34)	National Highway	100.00

(B) List of unconnected villages in BESZ

(i) Villages for which road has been sanctioned but not yet constructed

Sl. No	Name of Village	Sanctioned length (km)	Code	Population	Sanctioned cost (Rs. in Lakhs)	Extra cost required for cartage of material (Rs in Lakhs)
1	Bagori	2.00 km	040712	567	208.00	304.24
2	Hinna	3.00 km	040769	735	149.75	219.04
3	Kankradi	1.50 km	040798	468	18.90	27.65
4	Nirakot	8.00 km	040792	83	100.80	147.80
5	Silyan	8.00 km	040791	186	100.80	147.80
6	Maneri	18 km+80m	040740	1271	191.96	280.78
7	Kamar	9.95 km	040744	463	666.96	975.56
8	Syawa	6.00 km	040745	475	369.41	540.34
9	Salang	4.75 km	040750	432	303.56	444.02
10	Silla	9.60 km	040753	492	618.33	904.43
	Total :	**70.8 km + 80m**		**5172**	**2728.47**	**3991.30**

(ii) Villages for which road has not been sanctioned yet.

Sl. No	Name of village	Proposed length from nearest motor road	Approximate cost in lakhs	Code	Population	Proposed road for connectivity
1	Dansra	6.00 km	312.00	040759	187	Extension of Sangamchatti Gajoli road.
2	Pilang	22.00 km	1144.00	040754	349	Extension of Malla Silla Motor Road.
3	Jodaw	22.00	1144.00	040755	132	Extension of Malla Silla Motor Road.
4	Kaneth	5.00 km	260	040739	06	Construction of motor road from Maneri.
5	Bhangeli	2.30 km	154.00	040718	541	Construction of motor road from Gangnani.
6	Salu	4.00 km	208.00	040746	263	Construction of motor road from Syawa.
	Total :	**61.30 km**	**3222.00**		**1478**	

FUTURE SCENARIO

Following are the works proposed for establishment of road infrastructure development.

PWD Bhatwari

1. Construction of link road from Heena to village Heena.
2. Construction of Malla Suparga Motor Road.

3. Construction of approach motor road from Mathali Tok in village Raithal to Choriya in Bhatwari Block of district Uttarkashi.
4. Construction of Jaspur Silyan Nirakot Motor Road from Bhaldiyana Lambgaun Uttarkashi Motor Road.
5. Extention of Mukhwa Jangla Motor Road from Harshil.
6. Construction of Kishan pur Motor Road via Kankradi from Mustik Saur Kuroli Motor Road.
7. Construction of Bhatwari to Kyark bridle road.
8. Construction of bridle bridge over Siya gad between village Harshil and Jhala.
9. Construction of Motor Road from Bonga to Kiyan Gaon
10. Construction of Motor Road from Bonga to Gandhiyal Dhar

PMGSY Uttarkashi

1. Gyansu-Sald-Uprikot Motor Road km.-14 to Nismor Motor Road
2. Mahidanda Motor Road to Bagiyalgaon Motor Road
3. Malla-Sari Motor Road to Silla Motor Road
4. Jamak-Bayana Motor Road to Syaba Motor Road
5. Jamak to Kamar Motor Road
6. Thirang to Salang Motor Road
7. Bhankoli to Agora Motor Road
8. Gyansu-Gyanza Motor Road (Stage-2)
9. Silla Motor Road to Pilang Motor Road
10. Gangnani to Bhangeli Motor Road (Stage-1)
11. Jamak to Bayana Motor Road at X-Sec-2/22-23 (Bridge)
12. Jamak-Bayana Motor Road to Syaba Motor Road at X-Sec-2/13-14 (Bridge)
13. Gajoli to Naugoan Bhankoli Motor Road at X-Sec-3/18-19 (Bridge)
14. Thirang to Salang Motor Road at X-Sec-0/14-16(Bridge)
15. Malla Sari Silla to Pilang Motor Road at X-Sec-1/14-1/6 (Bridges)

P.W.D (W.B) Uttarksahi

1. Sada Bridge
2. Harsil Bridge
3. Pilang Jodaw 01 36 m Span
4. Pilang Jodaw 02 120 m Span
5. Korigaad Bridge
6. Tambakhani Bridge

Border Road Organization

1. Bhaironghati-Nelong

2. Naga-Nilapani
3. Nelong-Naga
4. Naga-Sonam
5. Naga-Jadhang
6. Harsil-Kiarkoti-Lamkhaga Pass-Gainder Thatch-Nithal-Thatch
7. Mehdi-Tsangchockla
8. Nilapnai-Mulinha
9. Sumla-Thangla
10. Double lane of NH-34 from Uttarkashi to Gangotri
11. Construction of bye pass road of NH 34 from Jhala to Jangla (connecting village Bagori , Harshil and Mukhwa).

P.W.D (ADB) Uttarkashi

1. SH No 15 Uttarkashi Ghansali Tilwara Motor Road km.Ch. 0-000 to 50.775.

The projected financial outlay of the above proposed works is provided as detail in budgetary provision section of this chapter.

GUIDELINES FOR CONSTRUCTION OF ROADS

- The alignment shall be finalized in such a way so as to avoid steep slope, sliding zone, landslides etc as far as possible. Geologist report describing the geology and fragility and slope stability of the area under project, possible impact on small streams due to project and the remedial measures shall be used in finalizing the alignment.
- The projects affecting the wildlife habitat and its distribution in the area shall include the plan for wildlife conservation and habitat management as a part of the project. The budgetary provisions shall be included in the overall cost of the project.
- Locally useful water spring shall not be disturbed during road construction, proper care shall be taken in such a area where alignment of road passes through spring lines, first order streams. In unavoidable circumstances their utility shall be ensured.
- The projects affecting the small streams /tributaries of river Bhagirathi affected by road construction shall be a part of geologist report. Small Micro watershed treatment plans of affected streams shall be included in the project and necessary budgetary provisions be made accordingly.
- The Road construction shall be carried out as per IRC specifications and steep slopes shall be considered as per the guidelines of Bureau of Indian Standards vide IS code No.14496 (Part-2) 1998.
- Modern techniques of slope stabilization like breast wall, gabion walls, reinforced soil and soil nailing shall be applied to mitigate the effect of construction.
- As per new circular of EinC PWD Uttarakhand, the hill road will be constructed in part cutting and part filling and the alignment should be chosen in such a way to minimize or avoid the H.P bends.
- Detailed Muck dumping scheme shall be prepared at the beginning of each project as per the requirement of Forest Conservation Act 1980. The muck dumping scheme shall include details about the total muck likely to be released in the

project, percentage of it to be utilized in filling and construction purposes, and the information about the safe identified sites for the disposal of the remaining muck.

- The videography/photography of cutting of marked tree as far as possible shall be kept for future records.
- The selection of the muck dumping sites shall be done on the basis of the total muck likely to be disposed at the site. In case of line projects, muck dumping sites shall be selected at multiple points so as to reduce cost due to transport and illicit muck dumping. The muck sites shall be constructed before the cutting of the road. The muck dumping plans alongwith digital map and KML. File shall be presented to monitoring committies for approval.
- As required in Forest Conservation Act 1980, the construction work shall be started only when the fund for NPV and Compensatory Afforestation is submitted and the required permission is obtained from the appropriate authority.
- As per new circular of EinC PWD Uttarakhand, the drain will be constructed with local stones released from local cutting of hill so as to avoid seepage and erosion. Check walls shall be constructed to control water discharge through scuppers
- Proper study of environment impact and appropriate mitigation measures shall be taken in road infrastructure development activities.
- As per clause : 16(ii) and 16(iv) of the Amended Notifications dated 16 April, 2018 proper study of the environmental impact and appropriate mitigation measures shall be taken in developmental works in consultations with line ministry of Central Government including public consultation in this regard, road projects shall comply to the above clause of Amended Notification.

COST ANALYSIS

- In Gazette Notification of Eco-Sensitive Zone, no commercial mining is allowed. All the construction activities come under commercial activities. Due to restriction on commercial mining such as stone, grit, sand etc. the cost of work will be increased. For this purpose cost analysis is being enclosed as follows.
- The material will be carted beyond the Eco-Sensitive Zone. Hence extra cartage will be paid for carting such type of construction materials like sand grit, stone etc.
- Cost of extra cartage.

1	20 mm Stone Ballast	Cost of Cartage	Unit
	Basic Rate	1200.00	
	10% C.P.	120.00	
	18% GST	216.00	
	add 2% wastage on basic cost	24.00	
	Total A	1560.00	
	Cartage- 45 km by truck at Quarry Dunda		
	(1x72+2x11+2x10+5x9+7x7)	208.00	
	(1x10)x16	160.00	
	Total	368.00	

	10% C.P. on cartage	36.80	
	Total B	404.80	
	Total A+B	1964.80	
	Say	1965.00	Per Cubic Metre
2.	Coarse Sand		
	Basic Rate	800.00	
	10% C.P.	80.00	
	18% GST	144.00	
	add 2% wastage on basic cost	16.00	
	Total A	1040.00	
	Cartage- 45 km by truck at Quarry Dunda		
	(1x72+2x11+2x10+5x9+7x7)	208.00	
	(1x10)x16	160.00	
	Total	368.00	
	10% C.P. on cartage	36.80	
	Total B	404.80	
	Total A+B	1444.80	
	Say	1445.00	Per Cubic Metre
3.	40 mm gauge stone ballast		
	Basic Rate	1600.00	
	10% C.P.	160.00	
	18% GST	288.00	
	add 1% wastage on basic cost	16.00	
	Total A	2064.00	
	Cartage- 45 km by truck at Quarry Dunda		
	(1x10)x16	160.00	
	10% C.P. on cartage	16.00	
	Total B	176.00	
	Total A+B	2240.00	
	Say	2240.00	Per Cubic Metre
4.	Stone		
	Basic rate	300.00	
	10% C.P.	30.00	
	18% GST	54.00	
	add 2% wastage on basic cost	6.00	
	Total A	390.00	

	Cartage- 45 km by truck at Quarry Dunda		
	(1x72+2x11+2x10+5x9+7x7)	208.00	
	(1x10+2x4.50)x16	304.00	
	Total	512.00	
	10% C.P. on cartage	51.20	
	Total B	563.20	
	Total A+B	953.20	
	Say	953.00	Per Cubic Metre
5.	20 mm gauge stone grit		
	Basic rate	3750.00	
	10% C.P.	375.00	
	Total	4125.00	
	Cartage- 45 km by truck at Quarry Dunda		
	(1x72+2x11+2x10+5x9+10x7+10x6.5+20x6+163x5.5)	1310.50	
	10% C.P. on cartage	131.05	
	Total	1441.55	
	Cartage per quintal	144.16	
	Hence rate at site	4269.16	
	Say	4269.20	per quintal

Rate of Items (average)

S.No.	Item	Unit	Rate as per SOR	Rate after extra cartage of material	Percent of increase of rate
1	R.R. dry	Cubic Metre	2228.00	3181.00	42.77%
2	R.R 1:6	Cubic Metre	4028.00	6426.00	59.53%
3	WBM G1	Cubic Metre	3656.00	6054.00	65.59%
4	WBM G2	Cubic Metre	3743.00	6141.00	64.06%
5	WBM G3	Cubic Metre	3704.00	6102.00	64.74%
6	Premix Carpet	Sqm	237.00	278.00	17.29%
				Average of %	52.33%

- Total cost of running works = Rs. 1353.10 Lakhs
- Add extra cost of cartage is 52.33%
- Total cost after adding extra cartage of material is = Rs. 2061.17 Lakhs

COMMUNICATION

INTRODUCTION

There are 88 villages comes under Bhagirathi Eco Sensitive Zone of Uttarkashi district, all villages are not fully covered by communication network. Few villages are partially covered with voice network and even less villages are covered with 2G/3G network connectivity. BSNL is the largest service provider in the area under BESZ. They provide telecom service from Uttarkashi to Gangotri but not all villages are covered with BSNL network service. Geographic of this area is the biggest challenge for network service providers; entire zone is covered with high mountains, deep valley and forest which obstruct the signals.

Present status of network communication

BSNL COMMUNICATION NETWORK UNDER ECO SENSITIVE ZONE UTTARKASHI

Existing Network

Sl. No.	Site Name	Landline	Mobie BTS	Broadband	TX Medium	Backhaul Bandwidth
1	Gangotri	NA	2G BTS	NA	IDR	2 mbps
2	Harsil	NA	2G BTS	NA	IDR	2 mbps
3	Kachhora Top	NA	2G BTS	NA	VSAT	2 mbps
4	Sucki Top	NA	2G BTS	NA	IDR	2 mbps
5	Bhatwari (Pala)	NA	2G BTS	NA	VSAT	2 mbps
6	Bhatwari Exchange	YES	NA	YES	OFC	155 mbps
7	Maneri Exchange	YES	2G+3G BTS	YES	OFC	155 mbps
8	Gangori	NA	2G+3G BTS	NA	OFC	155 mbps
9	Gajoli	NA	2G BTS	NA	VSAT	2 mbps
10	Mahidanda Exchange	YES	2G+3G BTS	YES	OFC	155 mbps

Satellite telephones status

Following agencies/departments under ESZ have satellite telephones for the purpose of any emergency cases.

SL.NO.	Location	Responsible officer
1	Disaster Management Office at Control Room	Disaster Management Officer
2	Teshil Bhatwari	SDM Bhatwari
3	NIM-Uttarkashi	Registrar-NIM

Digital Satellite Public Telephone (DSPT)

Following agencies/departments under ESZ have Digital Satellite Public Telephone DSPT for the purpose of any emergency cases.

Sl. NO.	Location	Responsible officer
1	Army/ITBP	In different Border posts
2	Border Road Organization	Camp office Bhairavghati near Gangotri
3	Forest Check Post- Gangotri	Forest Range Officer Gangotri National Park, Gangotri

4	TRH – Harshil	Manager TRH-Harshil
5	Forest Check Post -Agora	Forest Range Officer, Sangamchatti Area, Forest Division Uttarkashi

FUTURE STRATEGY

BSNL communication network have following plan for villages/towns fall under ECO Sensitive Zone - Uttarkashi.

SL.NO.	SITE NAME	PROPOSED NETWORK
1	GANGOTRI	UPGRADATION OF 2G MOBILE BTS INTO 2G+3G MOBILE BTS
2	HARSIL	UPGRADATION OF 2G MOBILE BTS INTO 2G+3G MOBILE BTS
3	NELONG	NEW 2G MOBILE BTS
4	OTHER 6 BOPs	NEW 2G MOBILE BTS
5	Disaster Management Office at Control Room	Global Satellite Phone Services (GSPS)
6	DFO –Uttarkashi	Global Satellite Phone Services (GSPS)
7	Dy. Director Gangotri National Part	Global Satellite Phone Services (GSPS)
8	SDM – Bhatwari	Global Satellite Phone Services (GSPS)

Other Telecom Network Status

Reliance JIO : Reliance JIO already proposed connectivity plan from Uttarkashi-Bhatwari-Sukkhi-Gangotri under ESZ. All villages on this route will be connected with 4 to 5 mbs bandwidth. Reliance JIO will provide 4G voice and 4G data services and lease line connection to end user.

Challenges : There are some challenges regarding permission to establishment of tower, other land issues which are main cause of delaying the project 4G services at location.

Airtel : Airtel also providing voice and 2G/3G services in the area under ESZ but their connectivity are limited to some villages.

Idea : Idea is the second most reachable network in remote areas under ESZ. Idea is also working to improve its connectivity in the villages under ESZ.

Apart from above telecom service providers, there are other ways of communication during disasters situations.

1. **Radio Sets :** Police and Forest have their own radio communication sets which work on different frequencies and are very effective during emergency situations.
2. **HF Set :** HF set mainly used by Army and ITBP but during disaster situations Army and ITBP provide their support to provide relief through their communication channels
3. **Walki-Talkie :** walkie-talkies mainly used for less distance communication. All SDM/ Teshildaars / Thanas and forest post

are equipped with walkie-talkies handsets in the areas under ESZ

Although BESZ is somehow covered through any medium of communication but still some less/weak network villages are still there.

List of less/weak network villages under Eco Sensitive Zone

S. No	Name of Village	Status of network
01	Bhangeli	Not available/Weak strength
02	Tihar	Not available/Weak strength
03	Kujjan	Not available/Weak strength
04	Hurri	Not available/Weak strength
05	Pilang	Not available/Weak strength
06	Silla	Not available/Weak strength
07	Gorsali	Not available/Weak strength
08	Gajoli	Not available/Weak strength
09	Seku	Not available/Weak strength
10	Naugaon	Not available/Weak strength
11	Bhankoli	Not available/Weak strength
12	Dasra	Not available/Weak strength
13	Agora	Not available/Weak strength

11 CHAPTER

DISASTER MANAGEMENT

11 CHAPTER

DISASTER MANAGEMENT

INTRODUCTION

Disaster is a sudden accident or a natural catastrophe that causes great damage or loss of life, and define Disaster Management can be defined as the organization and management of resources and responsibilities for dealing with all humanitarian aspects of emergencies, in particular preparedness, response and recovery in order to lessen the impact of disasters

The terrain and climate of Uttarkashi district provide uncongenial physical environment for human settlement. Uttarkashi is a border district of the state of Uttarakhand. Situated at 78^{o} 26' E and 30^{o} 44' N at a distance of 155 Km from Rishikesh and 141 km from Dehradun at an elevation of 1140 Mts. Above sea level on the bank of Bhagirathi river. Covering an area of about 12.02 Sq. Km. the Township of Uttarkashi has a total population of about 18220 approx (2011 census). The district is located in the most sensitive zone (Zone IV & V) of the Himalaya. The main central thrust (MCT) is passing through the district. The area which falls under the Bhagirathi Eco Sensitive Zone has faced many disasters in the past. Village Jamak and Agora was main focal point of the earthquake disaster in 1991 (6.4 in Richter scale). The district also faced the heavy floods in 1978, 2012 & 2013 and mass land slide in Varunawat hill in 2003. Thus the possibility of earthquake, flood and landslides is always there. In Garhwal Himalayan Mountains landslides and earthquakes have been occurring frequently that inflicts damages to life and property almost every year.

The river Bhagirathi originates from Gangotri glacier below Chaukhamba peak in an area called Gaumukh at an elevation of 3892 metres and flows almost north-south in the Uttarkashi district of the Garhwal Himalayas. The Bhagirathi valley

is rich in flora & fauna. The Gangotri region of the Uttarakhand Himalayas has one of the largest glacier systems in the world. Due to increased anthropogenic activities and concerns over global warming, these glaciers have become the focus of much international attention.

OBJECTIVE

- To equip the Organization to handle all aspects of disasters in the district
- To create awareness on disasters through intensive public education
- To ensure disaster prevention, risk and vulnerability reduction, as a means of reducing the impact of disasters on society;
- To be in a position to provide the first line response in times of disaster;
- To assist in post-emergency rehabilitation and reconstruction effort;
- To assist and motivate community-based organizations to serve as the credible voluntary organizations to assist in the prevention and management of disasters at the local level;
- To set up monitoring and early warning systems to aid the identification of disasters in their formative stages, to disseminate timely information and warning, and hazard/disaster awareness creation
- To enforce laws to prevent and mitigate disasters
- To provide good conditions and scheme of service to raise morale, performance; and productivity;
- To improve human capacity and development of community.

PRESENT SCENARIO & FUTURE STRATEGY

District Disaster management authority (DDMA)

District Disaster management authority (DDMA) came in to institutional mechanism for drawing up and monitoring the implementation of disaster management plans, ensuring measures for prevention and mitigation of disasters and for undertaking a holistic, coordinated and prompt response to any disaster situation.

The District Disaster Management Authority (DDMA), has been constituted as per sub-section (1) of section 14, of the Disaster Management Act-2005. The constitution of DDMA is as given in the table below. Relevant sections of the act has been annexed as **(Annexure-62)**

Sl	Designation	Designation Under DDMA
01	District Magistrate (DM)	Chairperson
02	Zila Panchayat President	CEO-Chairperson
03	Superintendent of Police	Member
04	Chief Development Officer (CDO)	Member
05	Additional District Magistrate (ADM)	Member -Chief Executive Officer
07	Chief Medical Officer (CMO)	Member
08	Executive Engineer (EE)-PD-PWD	Member (Nominated)

District Emergency Operation Centre (DEOC)

District Emergency Operations Centre (DEOC) is a central control facility responsible for carrying out the principles of emergency preparedness and emergency management, or disaster management functions at a strategic level during an emergency, and ensure the coordination of all departments for effective response

Apart from the team of identified personnel (as detailed in the table below) the network at DEOC- Uttarkashi consists of police and forest wireless radio set, computer with internet facility, fax machine, landline telephones, mobile phone, helpline desk and televisions are available to receive and deliver the information and bulk SMS service. A satellite phone for any emergency situation and sirens are installed at different places in the district.

Sl. No	Designation	No. of Vacancies	Status	Remarks
01	Executive Officer	01	Ex. Official (ADM)	DDMA
02	Disaster Management Officer	01	Full	DDMA
03	Clerk	01	Full	DDMA
04	Driver	01	Full	DDMA
05	Peon	02	Full	DDMA
06	Clerk	03	Full	DEOC
07	Data Entry Operator	03	Full	DEOC
08	Peon	03	Full	DEOC

DISASTER SPECIFIC PRONENESS

(a) Floods and Landslides : A large area of the district is prone to landslides and flash floods, particularly during the rainy season due to heavy rain or sudden cloud burst. Such incidents have occurred in the past at places like Gangnani (1978), Indravati (1997-98), Varunavat (2003) Sangamchatti (2012), Uttarkashi (2013).

(i) The upper part of Himalaya in district Uttarkashi is affected by slope instability problems every year causing damage to property and life. Geological Survey of India (GSI) has framed a national level programme i.e. National Landslide Susceptibility Mapping (NLSM) for categorization of hill slopes in terms of landslide susceptibility and to suggest general remedial measures. In this programme some areas flling under BESZ were covered in the field season 2014-15 of GSI.

(ii) One of the main output of NLSM study is the Landslide Susceptibility Map, prepared on 1:50000 scale, which depicts the landslides measuring more than 50 m X 50 m in dimension. The location of these landslides along with their coordinates is given in the 41-point Geo-parametric Data Sheet which also contains the genarl remedial measures for every slide zone. The BESZ of Bhagirathi valley of district Uttarkashi was also studied in the Standard Operating Procedure (SOP) of GSI for landslide hazard zonation on scale 1:50,000.

(iii) The sector from Gangnani - Bhatwari -Uttarkashi along Bhagirathi valley is highly affected by the toe/river bank erosion under torrential stream condition, which had done severe damages to the village roads/ NH-34 and villages of Kiyark, Chadethi, Bhatwari, Malla, Netala, Shiror, Gangori, Tiloth, Joshiyara in BESZ of district Uttarkashi. Some other villages located on gentle to flattish grounds comprising loose overburden debris, the phenomenon of differential

settlement occurred due to percolation of surface water and piping phenomenon. This phenomenon is very difficult to map Hence such areas need to be studied separately for planning like villages like Barsu, Kujjan, Silyan, Mastari, Pata, Sangrali and Pilang etc.

Site specific remedial measures like removal of debris, re-profiling of slopes to gentle angle with intermediate benches, stabilization of slopes by rock bolts, shotcrete suitably designed retaining walls on either side of road, construction of flood protection walls, training of stream with culvert and proper drainage arrangements were suggested.

1978 Landslide in the kandoliya gad valley:

On August 6, 1978 there was a massive landslide occurred in the Kandoliya Gad after heavy showers during the preceding fortnight. Thousands of tons of debris covered about 4kms long and 1km wide area. Because of the Debris flow there was the blockade of water from Bhagirathi River and Kandoliya Gad. This blockade had led to the formation of two temporary lakes. Later when these temporary formed lakes burst as a result of which flood occurred and severely damaged many settlements. It swept away many villages and damaged the Maneri-Bhali Hydro electric Project. The villages that were affected are Bhatwari, Gangnani, Gawana, Hina, Josiyara, Bharkot, Maneri, Nantal, and Seinj.

(b) Road Accidents : The area being hilly is prone to road accidents mainly due to mechanical failure, over speeding or overtaking.

(c) Forest Fires : Almost 98% of the total area of the BESZ is covered by reserve forest. The area under chir forest is highly prone to forest fires in summer (Fire season) which at times may result in damage to life and property in addition to environmental loss. A detailed section covering forest fire management aspects has been included in Chapter-1 Forest and Wildlife.

(d) Earthquake : As mentioned that the district is located in the most sensitive seismic zone of the Himalayas and the main centre thrust (MCT) is passing through the district. The 'North Almora Thrust'(NAT) crosses near Nalupani in Bhagirathi river which is present in near Rajgarhi in Yamuna valley, separate two different group of rocks of lesser Himalaya. This tectonic unit is quite away from BESZ. In present scenario, anthropogenic activities may enhance landslide threat in some areas therefore precautionary measures and site specific geological studies shall be carried out before starting any kind of work . The major seismic event 'Uttarkashi earthquake', on October 20, 1991, at 2.53 a.m. local time, an earthquake occurred in the Garhwal Himalayas in northern India. Magnitude recorded was 6.8 and duration was approx. 45 seconds. The earthquake caused strong ground shaking in the district of Uttarkashi, Tehri, and Chamoli. Information indicates that population of about 307,000 in 1,294 villages were effected; 768 persons died while 5,066 were injured. In addition the earthquake claimed 3,096 head of livestock. As many as 42,400 houses were damaged. The roads between Uttarkashi and Gangotri were disrupted.

(e) GLOF (Glacial Lake Outburst Flood) & climate change:

The flash flood due to sudden burst of a glacial lake produce the violent flow of water and associated debris and is known as Glacial Lake Outburst Flood (GLOF). Wadia Institute of Himalayan Geology and Uttarkhand Space Application Centre are working in Uttarkashi region for the study of Glaciers and natural disasters. The climate change play an important role in the glacial melt in the Himalayas leading to increased flooding that will ultimately affect the water resource availability within

the next few years. At high elevations in Himalayas the warming of the climate is resulting in the recession of glaciers and formation of glacial lakes that have increasing conflict with glacial hazards including moraine dam failures and glacial lake outbursts floods with potentially disastrous effects. The increase in global temperature will cause increased occurrence of GLOFs and will affect the size of the glacial lakes. The breakage of such lakes can be extremely devastating to human habitations. The kadar Nath tragedy in the year of 2013 was a example of Glacial Lake Outburst Flood set by nature.

DISTRICT DISASTER MANAGEMENT ACTION PLAN (DDMAP)

District Disaster Management Action Plan (DDMAP) has been prepared which includes identification of vulnerable areas in the district inter-alia eco-sensitive zone. The plan includes Hazard, Risk and Vulnerability Analysis (HRVA) of the district towards disasters like earthquakes, landslides, floods, flash floods and avalanches. DDMP includes institutional measures, mitigation measures and preparedness measures. Every line department has its own departmental Disaster Management Plan which involves local community and resources also. Incident Response System (IRS) is already in place in the district to cater any type of disaster.

DDMAP UPDATING, IRS MEETING/TRAINING & MOCK DRILLS

DDMA regularly update District Disaster Management Action Plan (DDMAP). Following four main priorities of Sandai Framework has been incorporated in the Disaster Management Action Plan

Priority 1 : Understanding disaster risk

Priority 2 : Strengthening disaster risk governance to manage disaster risk

Priority 3 : Investing in disaster risk reduction for resilience

1. Disaster mitigation training at village and school level
2. Capacity building programme for departmental officials eg- Police, SDRF, FIRE, Revenue and other line Departments
3. Earthquake safe housing techniques adopted in new construction

Priority 4 : Enhancing disaster preparedness for effective response and to “Build Back Better” in recovery, rehabilitation and reconstruction

Community based disaster management programmes, earthquake resilient building construction techniques, search & rescue and first aid training programmes awareness programmes are organized in the district time to time.

MAJOR EVENTS WORKSHOP/SEMINAR AND OTHER OUTREACH ACTIVITIES (2016-17)

There are many disaster related activities organized in the district.

Following state level and district level activities are run under the supervision of state government as well as NDMA (national Disaster Management Authority). Mostly line departments and officers participate in these programmes hence NGO, PRIs and other social organizations are vital part of such events/exercise. In disaster situations such type of exercises are helpful for community based disaster management and disaster response mechanism.

Sl	Name of activity	Date	Place	Remark
01	Review Meeting on Pre-Disaster Preparedness	14-12-2016	Collectorate	Departmental Disaster Management Plan discussed
02	3 Days IRS- Workshop Programme	28-12-16 to 30-12-2016	Collectorate	NGO, PRI and other social organizations also participated
03	IRS Training/ Mock Exercise Programme	13-06-2017	Barkot	Suggestion from NGOs received and a process of data collection of NGO started under the streightning of SDMA & DDMA programme
04	IRS Training/ Mock Exercise Programme	16-06-2017	Uttarkashi	
05	IRS Training/ Mock Exercise Programme	19-06-2017	Bhatwari	
07	Workshop for farmers on Himalaya Diwas	09-09-2017	Uttarkashi	Information regarding disaster management and farming given by all NGOs
08	Mock Exercise	09-10-2017	Uttarkashi District	
09	Review Meeting on Pre-Disaster Preparedness	07-10-2017	Collectorate	
10	Mock Exercise Earthquake	13-10-2017	State Level	

INCIDENT RESPONSE SYSTEM (IRS)

According to Disaster Management Act 2005, The Incident Response system has been constituted as follows;

S.N.	Position of IRS		Nomination officer in IRS
1	**Responsible Officer**	**(RO)**	**District Magistrate/ Chairperson DDMA, Uttarkashi**
	Command Staff (CS)		
1.2	Incident Commander	(IC)	District Magistrate or Nominated by DM
1.3	Information & Media officer	(IO)	DIO (District Information Officer)/ADIO
1.4	Liaison Officer	(LO)	DMO (Disaster management officer) /uki DIO (District Informatics Officer)
1.5	Safety Officer	(SO)	SDO (Forest)/ SO (Police) Supported by AE, PD PWD Uki/ Medical Officer/Fire Officer, uki & Veterinary Officer (as per Situation)
	Operation Section (OS)		
2	**Operation Section Chief**	**(OSC)**	**SP Uttarkashi.**
2.1	Staging Area Manager	(SAM)	OC Collectorate/CO police/AE, PWD/ RI police line/ Supply Inspectors & Dy.CMO,uki.
2.2	Response Branch Director	(RBD)	SDM (Sadar),field unit of either ARMY/ITBP/SDRF/NIM
2.3	Site Chief	(SC)	Nominated by Operation Section Chief
2.4	Transportation Branch Director	(TBD)	ARTO, uki & Staff
2.5	Group In charge Road Operation		EE, PWD, PD Uttarkashi/EE, PMGSY Uttarkashi.
2.6	Nodal Officer (Air Operation)		ADM/ OC Collectorate Uttarkashi.
	Planning Section (PS)		
3	**Planning Section Chief (PSC)**	**(PSC)**	**CDO (Chief Development Officer) / DFO,Uttarkashi/**
3.1	Resource Unit Leader	(RUL)	DPO (ICDS), Uttarkashi
3.2	Situation Unit Leader	(SUL)	DPRO Uttarkashi
3.3	Documentation Unit Leader	(DUL)	DSTO ,Uttarkashi

S.N.	Position of IRS		Nomination officer in IRS
3.4	Demobilization Unit Leader	(Demob.UL	DDO,Uttarkashi
	Logistics & Finance Section		
4	**Logistics & Finance Section Chief**	**(L&FSC)**	**ADM, Uttarkashi/ SE, PWD Uttarkashi/STO,uki.**
4.1	**Services Branch Director)**	**(SBD**	**PD, DRDA Uttarkashi.**
4.1.1	Communication Unit Leader	(Con.UL)	SDO, BSNL/Police Radio Officer Uttarkashi.
4.1.2	Medical Unit Leader	(MUL)	CMO Supported by CVO, DHMO, District Ayurvedic Officer,uki.
4.1.3	Food Unit Leader	(FUL)	DSO Uttarkashi & Food safety Officer
4.1.4	Restoration Leader	(RL)	SE, Irrigation, Uttarkashi.
4.2	**Support Branch Director**	**(Sub.BD)**	**CEO (Chief Education Officer),uki.**
4.2.1	Resource Provisioning Unit Leader	(RPUL)	DO, PRD Uttarkashi.
4.2.2	Facilities Unit Leader	(Fac.UL)	DEO (Basic)/DEO (Madhiyamic**),**uki
4.2.3	Ground Support Unit Leader	(GSUL)	DTDO, Uttarkashi
4.3	**Finance Branch Director**	**(FBD)**	**CTO (Chief Treasury Officer)**
4.3.1	Time Unit Leader	(TUL)	OC Bills (Collectorate) ,uki.
4.3.2	Compensations/Claims Unit Leader	(Com.CUL)	OC, Disaster Management/Concern SDM/Teshildar
4.3.3	Procurement Unit Leader	(PUL)	Dy Treasury Officer,uki
4.3.4	Cost Unit Leader	(CUL)	Sub Treasury Officer, Bhatwari

HRVA PROFILE OF DISTRICT UTTARKASHI UNDER ESZ

This Hazard Risk and Vulnerability assessment is proposed by DDMA-Uttarkashi based on the technical data made available by different departments like PWD, NH, BRO, with other Governmental and Non-Governmental, Central and State Government organizations. The GIS cell has been established and a workshop on GIS has been done. After the workshop the GIS cell will collect and digitize the data which will be used as a disaster management tool.

The prime objectives of developing the GIS database are to help disaster managers at State, District and Block level for:

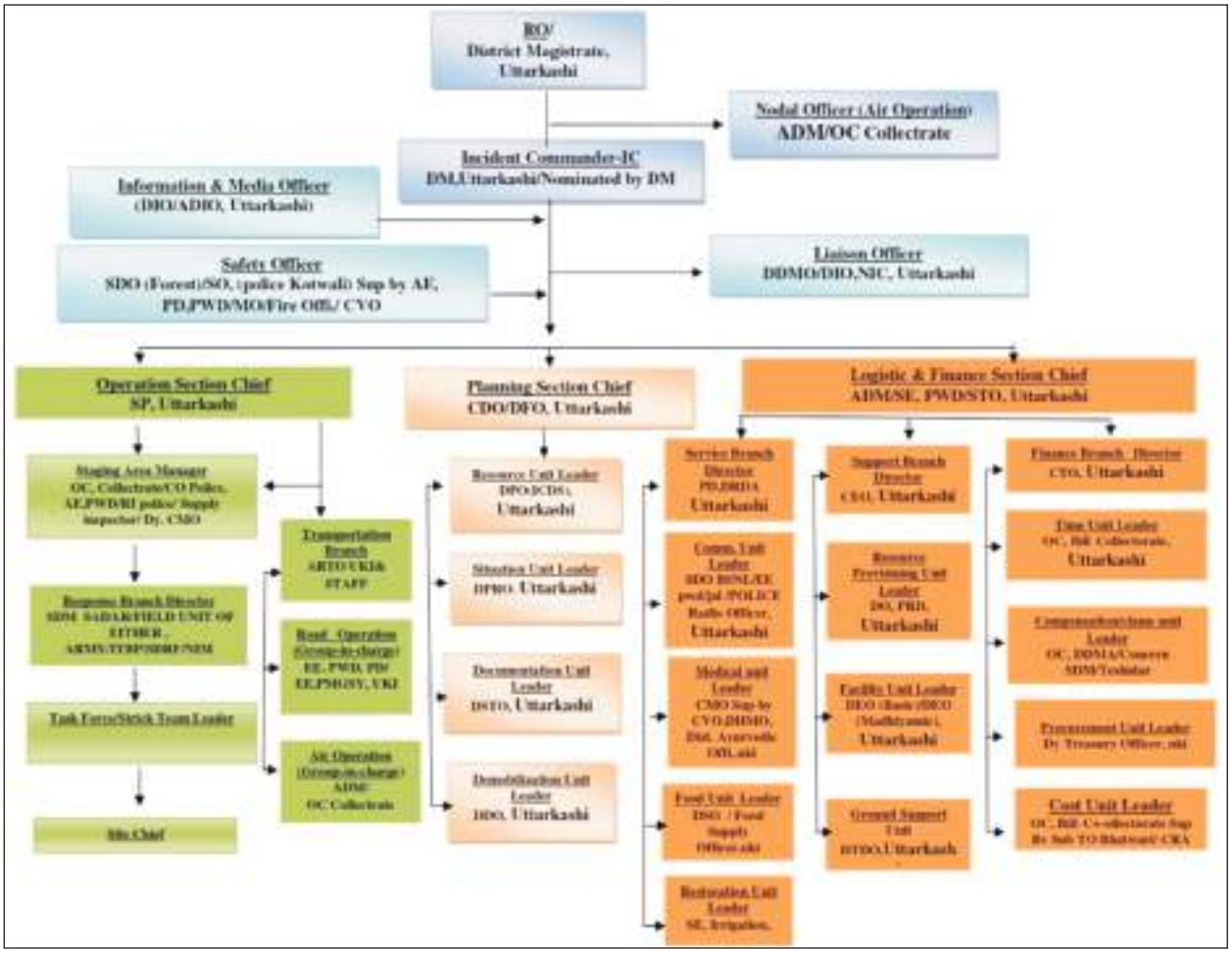
- Pre-disaster planning and preparedness
- Prediction and Early Warning
- Damage assessment and relief management

GIS combines layers of information on various themes to enable the managers to take the most appropriate decisions under the given circumstances. For disaster management, a GIS database could be a useful managerial tool for various reasons, some of which are as under :

Disaster Managers could generate maps both at micro and macro level indicating vulnerability to different extents under different threat perceptions.

- Locations likely to remain unaffected or remain comparatively safe could be identified.

Incident Response System (IRS) of District Uttarkashi



- Alternate routes to shelters, camps, and important locations in the event of disruption of normal surface communication could be worked out.
- Smooth rescue and evacuation operations could be properly planned.
- Rehabilitation and post-disaster reconstruction works could be properly organized.
- Locations suitable for construction of shelters, go-downs, housing colonies, etc. can be scientifically identified.
- Areas where no construction should be taken up or existing habitations require relocation could be identified.

IDENTIFICATION OF LANDSLIDE PRONE SITES ON NH UNDER ESZ

Appendix No.	Name of the land slide/ new or reactivated land slide	Latitude/ Longitude	Elevation	TS Nos.	Type of land slide
Landslide incidences along NH-108 (Dharasu to Gangotri)					
1	Tekhla slide (New slide)	N 30°45 07.2"/ E78°27 11.7"	±1155m	53J/5	Debris slide
2	Gangori slide (New slide)	N 30°45 31.6"/ E78°27 26.5"	±1172m	53J/5	Debris slide

3	Ganwan slide (New slide)	N 30°45□ 30.5"/ E78°27□43.7"	±1195m	53J/5	Debris slide
4	Ganeshpur slide (New slide)	N30°45□16.46"/ E78°28□42.71"	±1210m	53J/5	Debris slide
5	Naitala slide (New slide)	N 30°44□ 33.1"/ E78°29□33.6"	±1249m	53J/6	Rock cum debris slide
6	Heena slide (New slide)	N 30°44□ 18.8"/ E78°30□03.9"	±1272m	53J10	Debris slide
7	Maneri dam slide (New slide)	N 30°44□ 31.2"/ E78°31□40.1"	±1300m	53J10	Debris slide
8	Maneri Reservoir slide (new slide)	N 30°44□ 21.8"/ E78°32□01.5"	±1311m	53J10	Debris slide
9	Silkura slide (New slide)	N 30°44□ 31"/ E78°32□39.1"	±1335m	53J10	Debris slide
10	Aungi slide (Reactivated slide)	N 30°44□ 48.7"/ E78°32□59.3"	±1340m	53J/10	Rock cum debris slide
11	Laldang slide (New slide)	N 30°45□ 17.3"/ E78°33□35.9"	±1355m	53J/9	Rock cum debris slide
12	Bishanpur slide (New slide)	N 30°45□ 20.5"/ E78°34□15.5"	±1392m	53J/9	Rock cum debris slide
13	Lata slide (New slide)	N 30°46□ 35.5"/ E78°36□21.5"	±1498m	53J/9	Debris slide
14	Malla slide-1 (Reactivated slide)	N 30°46□ 43.4"/ E78°36□29.4"	±1515m	53J/9	Debris slide
15	Malla slide-2 (Reactivated slide)	N 30°46□ 59.2"/ E78°36□48.8"	±1534m	53J/9	Rock cum debris slide
16	Malla slide-3 (New slide)	N 30°47□ 16.9"/ E78°36□56.6"	±1564m	53J/9	Debris slide
17	Bhatwari slide (Reactivated slide)	N 30°48□ 44.3"/ E78°37□12.7"	±1610m	53J/9	Rock cum debris slide
18	Chadethi slide (Reactivated slide)	N 30°48□ 49.0"/ E78°37□13.7"	±1610m	53J/9	Rock cum debris slide
19	Pala slide (Reactivated slide)	N 30°49□ 46.2"/ E78°37□13.9"	±1600m	53J/9	Debris slide
20	Singhrali slide (New slide)	N 30°51□ 29.8"/ E78°38□47.2"	±1780m	53J/9	Debris slide
21	Helgu slide (New slide)	N 30°52□ 05.8"/ E78°39□15.2"	±1800m	53J/9	Debris slide
22	Sunagar slide-1 (New slide)	N 30°53□ 06.3"/ E78°40□10.3"	±1850m	53J/9	Debris slide
23	Sunagar slide-2 (New slide)	N 30°53□ 37.8"/ E78°40□27.6"	±1880m	53J/9	Debris slide
24	Gangnani slide (New slide)	N 30°54□ 03.7"/ E78°40□43.7"	±1850m	53J/9	Rock cum debris slide
25	Jyoti slide (New slide)	N 30°55□ 52.9"/ E78°41□03.2"	±2135m	53J/9	Rock cum debris slide
26	Sukhi Top (Reactivated slide)	N 30°59□ 49.4"/ E78°41□49.1"	±2510m	53J/9 & I/12	Debris slide
27	Sartia slide (Reactivated slide)	N 31°02□ 22.5"/ E78°47□41.5"	±2530m	53I/16	Debris slide
28	Jangla slide-1 (Reactivated slide)	N 31°02□ 29.0"/ E78°48□05.1"	±2550m	53I/16	Debris slide
29	Jangla slide-2 (Reactivated slide)	N 31°02□ 39.8"/ E78°48□50.8"	±2597m	53I/16	Debris slide
30	Bhairon Jhanp slide (Reactivated slide)	N 30°59□ 40.1"/ E78°56□30.5"	±3049m	53J/13	Rock cum debris slide

(Source – GSI)

Geological Survey of India (GSI) has undertaken detailed geological investigation in village Barsu within BESZ. GSI has already covered, in detail, Banderkot near Matli in Bhagirathi Valley and Waria villages in Yamunotri valley and provided key geological inputs which will be important while devising the mitigating measures for vulnerable areas. GSI has covered landslides of BESZ area on 1:50,000 scale in its National Landslide Susceptibility Mapping (NLSM) project. The concerned departments and agencies of GoU need to put up the proposal to GSI through State Geological Programming Board (SGPB) for detailed site specific investigation of landslides and for suggesting remedial measures.

FACILITY MAPS

Maps depicting facilities like police station, FCI godowns, hospitals and helipads have been prepared for disaster response.

CONTROL ROOM

District Emergency Operation Centre (DEOC) is operational 24X7 for exchange of disaster related information. Apart from DEOC, control room at tehsil Bhatwari is also established for disaster response.

District Emergency Operation Centre Uttarkashi (DEOC)

Phone : + 91 - 1374 - 222722, 222126 & 1077 (Toll free)
Mobile : + 917500337269, 7252887587, 7310913129,
(Off) Fax : + 91 - 1374 - 222722 (Off)
Satellite no : +91-8991112033
Mail Id : ddmauttarkashi@gmail.com

Tehsil Bhatwari Control Room

01374-244322

COMMUNICATION

For emergency communication at the time of breakdown of traditional communication system DSPT phones have been installed in the Eco-Sensitive Zone. Location of DSPT terminals as listed below:

Location	Number
Tourist Rest House, Harshil	0899-1323143
Forest Department, Aghora	0899-1323144
Forest Department, Gangotri	0899-1323145

These DSPT phone primly installed in such places where there is less communication network c or tourist flow is high. On other area SDM and forest departments have satellite phone for any emergency situation.

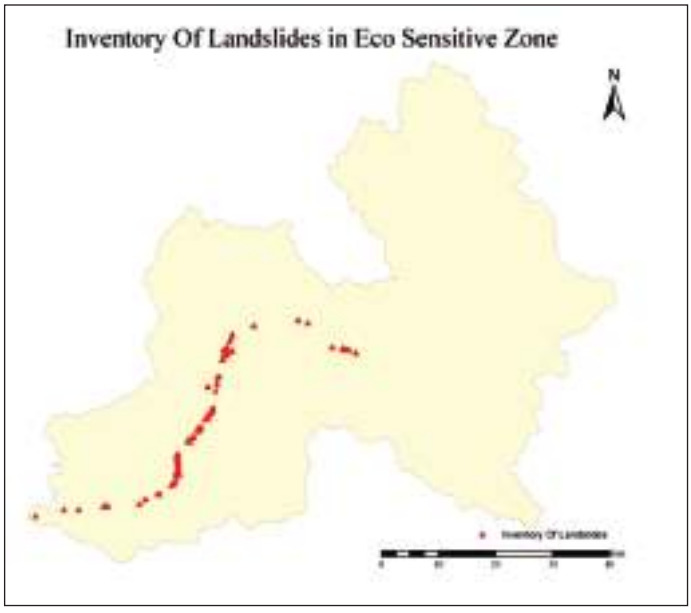
The Eco-Sensitive Zone comes under Zone IV and V of earthquake zonation map of India.

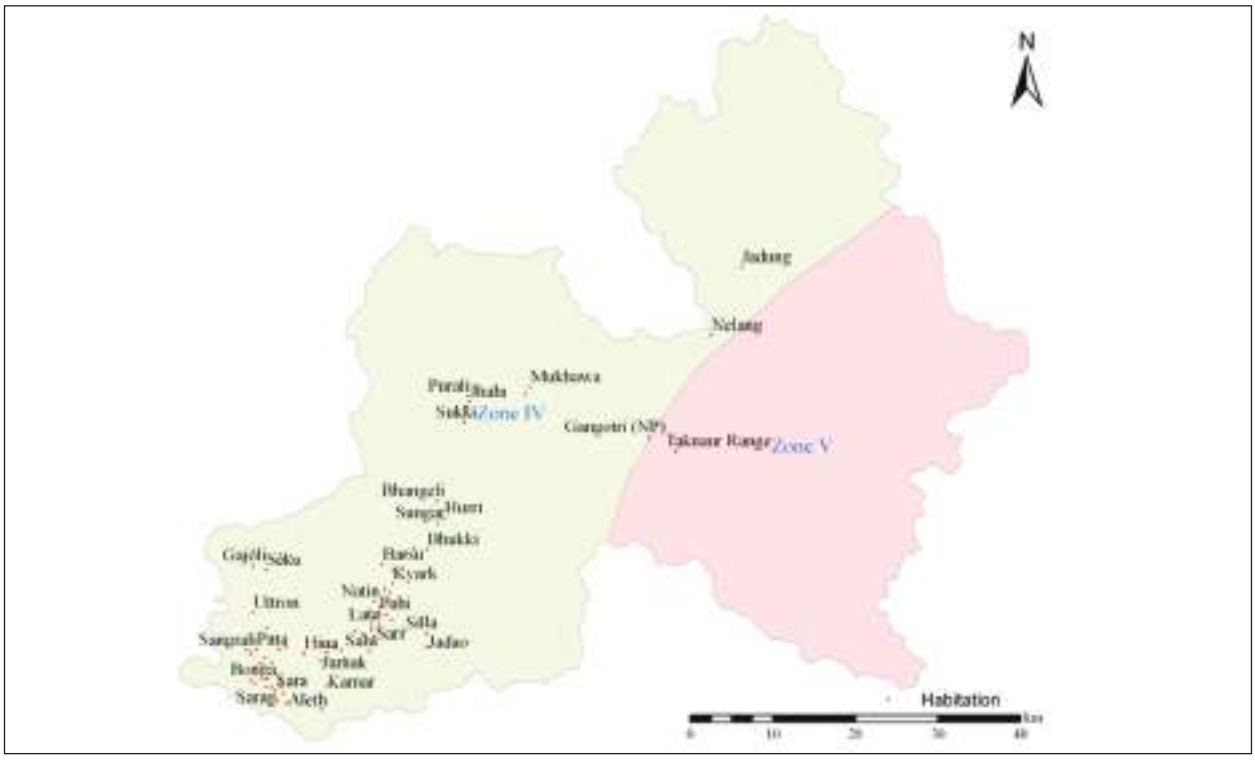
Uttarakhand building by-laws and regulations have been adopted for construction of houses in the state. Eco-Sensitive Zone is also covered by Uttarakhand building by-laws and regulations.

Mason Training Module prepared and being distributed alongwith training to the masons on earthquake safe construction techniques.

Apart from earthquakes landslides are a major hazard in the Eco Sensitive Zone given below is the map of landslides along the Gangotri route in the Eco Sensitive Zone.

Emergency shelters are identified along with the NH in different locations as schools and other community





buildings. These shelters used previously as emergency shelters, principal of the school is responsible for providing shelter and district education officer is nodal officer for this work.

RESTRICTIONS ON ANTHROPOGENIC ACTIVITIES

To restrict the anthropogenic activities in the Gangotri glacier Government of Uttarakhand has restricted the inflow of pilgrims and tourists to Gaumukh to 150 persons per vide GO no. 564/XVIII-(2)/08-13(1)/208

COMMUNITY AWARENESS AND CAPACITY BUILDING IN THE DISTRICT

Community awareness and capacity building programs are being organised throughout the state. For building the capacity of community a 10 day search and rescue and first aid program is being organised at Nyaya Panchyat level and all the Nyaya Panchayats in the Eco Sensitive Zone have been covered under this program.

Nyaya Panchyat	Number of Participants
Harshil	25
Bandrani	25
Saura	25
Sald	25
Gangori	25
Joshiyara	25
Mustiksaur	25

The second phase of community awareness program intends to cover all the *Nyaya* Panchayats and villages in the Eco Sensitive Zone and apart from this training of masons on earthquake safe construction techniques to be conducted in the Eco Sensitive Zone.

A study on real time landslide monitoring is proposed under State Strategies for Climate Action. The objective of the study is to monitor the landslides in the Eco Sensitive Zone for generating early warning of landslides in the region to minimize the losses due to landslides.

12

CHAPTER

SKILL DEVELOPMENT

12 CHAPTER

SKILL DEVELOPMENT

INTRODUCTION

In order to address the challenges of unemployment and ensuring gainful and sustainable employment to the youth of the state, the Hon'ble Chief Minister has created the Uttarakhand Skill Development Mission UKSDM in February 2013. Uttarakhand Skill Development Mission (UKSDM) has been providing free skill development training to youth over all 13 districts urban and rural sectors of state. The state plans to train 6.5 lac youth and provide employment.

The objectives of skill development mission are :

- To develop skills of the un-skilled youth and upgrade the skills of skilled workers.
- To promote skill development activities, to help and monitor skilling programs implemented by different Government agencies.
- To formulate appropriate and innovative strategies to facilitate large scale employment for vulnerable people of the state.
- To improve the livelihoods by enhancing earning capacities through skills development.

The Mission provides operational training to youth in association with 120 partner agencies and contributes to a total of 39 sectors.

In order to streamline the skill development activities in the State, the Uttarakhand Skill Development Mission was established in 2013. The Mission is headed by the Board of Governors (BoGs) under the Chairmanship of the Chief Secretary. BoGs has representation from all major departments. The decisions of the BoG' is executed by the Executive Committee headed by the Principal Secretary/ Secretary, Technical Education.

The training programmes are being designed in a way that at least 70% of the total youth trained in a batch get employed. Out of total number of youth trained, 50%

can be linked to wage employment and 50% to entrepreneurship or self-employment. Common norms are being followed and training providers will be empanelled by the Mission and affiliated training partners of Sector specific skill councils are being used. Recognition of prior learning will be taken up with the help of sector skill councils and PMKVY is being implemented as per PMKVY guidelines.

Looking at the catchment area, orientation programmes will be conducted to promote youth for taking up skill training. According to the 2011 census Uttarkashi district has a population of 329,686. The district has a population density of 41 inhabitants per square kilometre (110/sq mi). Its population growth rate over the decade 2001-2011 was 11.75%. Uttarkashi has a sex ratio of 959 females for every 1000 males, and a literacy rate of 75.98%.Considering 5% of the population as the target, the total number of youth to be trained will be around 16000 but taking a target of roughly 10000 youth or 9500 will be a number good enough to plan the training activities .

The school/college students could be the potential target group for skilling so that along with the formal education, they are equipped with skills to add to the overall framework of Skill India and Make in India.

Training in the following 31 sectors would be useful :

Agriculture	Electrical Sector	ICT	Telecom
Apiculture	Electronics	Leather	Textile
Apparel	Fabrication (welding)	Medical & Nursing	Tourism &Hospitality
Automotive	Fashion Designing	Plumbing	Travel
Banking & accounting	FMCG	REF (Refrigeration)	
Beauty & Wellness	Food Processing	Renewal Energy	
Business & Commerce	Garment	Retail	
Capital Goods	Green Job	Security	
Construction	Health Care	Soft skill	

SELECTION OF TRAINING SECTORS AND TRADES

The Industries Association of Uttarakhand provided requirement of more than 10000 trained youth as per their requirements. The Mission based on the requirements reached out to the Sector Skill Councils and planned training programmes to cater to the requirement of the industry.Based on Skill Gap studies done by E&Y, NSDC and UKSDM and keeping the key feature of the State economy, it has found out that major sectors with potential are Agriculture/Horticulture and allied activations, Tourism, Hospitability, IT/ ITES, Retail and Manufacturing.

Focusing on the **Eco-sensitive Zone** the requirements will be different as migration needs are to be checked and livelihood programmes need to be promoted so local orientation, aspiration check-study is required and skill-gap study is needed to find the skill-gaps in which training can be provided and localized economic activities can be promoted.

Highlights of the UKSDM Entrepreneurship and Placement Linked Training Programme :

i. Courses under Modular Employable Scheme (MES) of Skill Development Initiative Scheme (SDIS) and Sector Skill Councils (SSC)

ii. Minimum training duration will be 200 hrs. and minimum 4 hrs. daily.

iii. Soft Skills, I.T. and Entrepreneurship Training with every sector/module 20 hrs. each.

iv. Third party assessment and National Council of Vocational Training / Sector Skill Councils.

v. Non-resident trainees of the Development Block/Nagar Palika/ Nagar Nigam /Cantonment Board where training is being conducted will be offered a residential allowance of Rs. 2500/- at the end of each training.

vi. 70% placement in private sector to the successfully certified trainees within three months of completion of training. At least 50% of the trainees passing out being placed in wage employment. Self-employment will be linked to bank loan.

vii. Real time Biometric attendance facility supervised with inspection by Monitoring Officers (District Employment Officers), Training information available on Android app.

ZONAL MASTER PLAN OF UTTARAKHAND SKILL DEVELOPMENT MISSION

Sl.No.	Work Name	Regulated	Permitted	Non-Permitted	Comments
1.	Skill Development Training to the residents of Eco Sensitive Zone		Permitted		All types of skill development training should be permitted. Skilled manpower can cater to all local requirements. Training in tourism and hospitality, health, power green jobs and renewable energy, construction, wood work furniture and several other sectors will help in stopping migration.
2.	Recognition of prior learning		Permitted		Identification of local skills and certification is important to promote local skills and standardize the practices so that more people can be trained and local resources can be utilized in a better way to support the economy and stop migration.
3.	Training support to all departments, help in designing training courses as per requirements		Permitted		The mission can support training activities of all the departments by involving empanelled training partners and Sector Skill Councils.

Acronyms

ANM	Auxiliary Nurse Midwife
ANC/PNC	Ante-Natal Check Up/ Post-Natal Check Up
ASHA	Accredited Social Health Activist
ATMA	Agriculture Technology Management Authority
ATB	All Terrain Biking
APCUL	Certificate for Paragliding Wings
ADB	Asian Development Bank
ANF	Assisted Natural Regeneration
BADP	Border Area Development Program
BCM	Billion Cubic Meter
BESZ	Bhagirathi Eco-Sensitive Zone
BMC	Biodiversity Management Committee
BHS	Biodiversity Hostage Sites
CCA	Culturable Command Area
CSS	Centrally Sponsored Schemes
CITES	Convention on International Trade in endangered species of flora and fauna
CWLW	Chief wild life warden
CAMPA	Compensatory Afforested Fund Management & Planning Authority
CWC	Central Water Commission
CCS	Credit Cum Subsidy
CSP	City Sanitation Plan
CT	Community Toilet
CBO	Community Based Organization
CP	Contractor Profit
DPAP	Drought Prone Areas Program
DH	District Hospital
DFH	District Female Hospital
DDAY	Deen Dayal Awas Yojna
DPR	Detailed Project Report
DAY	Deen Dayal Antyoday Yojna
DDMAP	District Disaster Management Action Plan
DEOC	District Emergency Operation Centre
DSPT	Digital Satellite Phone Terminals
DFO	Divisional Forest Officer
EPA	Environmental Protection Act
ESZ	Eco-Sensitive Zone
EinC	Engineer in Chief
FPO	Farmer Producer Organization
FMD-CP	Foot and Mouth Disease Control Program
FD	Forest Department
FCI	Food Corporation of India

GR	Ganga Rejuvenation
GOU	Government of Uttarakhand
GNP	Gangotri National Park
GPS	Global Positioning System
GH	Guest House
GMVN	Garhwal Mandal Vikas Nigam
GLOF	Glacial Lake Outburst Flood
GSI	Geological Survey of India
HHs	House Holds
HM	Horticulture Mission
HMNEH	Horticulture Mission for North East Himalaya
HSRT	Hunar Se Rozgar Tak
HRVA	Hazard Risk Vulnerability Assessment
HP.Bends	Hair Pin Bends
IHHL's	Individual House Hold Latrins
IEC	Information Education and Communication
IMR	Infant Mortality Rate
IFAD	International Fund for Agriculture Development
ILSP	Integrated Livelihood Support Project
INM	Integrated Nutrition Management
IPM	Integrated Pest Management
IHHL	Individual House Hold Latrine
IEC	Information Education Communication
IGP	Income Generating Program
IMF	Indian Mountaineering Foundation
IRS	Incident Response System
IRC	Indian Road Congress
IS	Indian Standard
IWPA	Indian Wildlife Protection Act
ITBP	Indo Tibet Border Police
IWWP	Integrated Watershed Management
JICA	Japan International Co-operation Agency
KVK	Krishi Vigyan Kendra
LPCD	Liter Per Capita Par Day
LGFS	Light Gauge Steel Framing
LPG	Liquid Petroleum Gas
MCM	Million Cubic Meter
MOWR	Ministry of Water Resources
MI	Minor Irrigation
MTDP	Mid Term Development Plan
MMR	Maternal Mortality Rate
MOEF & CC	Ministry of Environment, Forest and Climate Change
MLALADS	Member of Legislative Local Area Development Scheme

MNREGS	Mahatma Gandhi National Rural Employment Guarantee Schemes
MPLADS	Member of Parliament Local Area Development Scheme
MSW	Municipal Solid Waste
MT	Metric Tone
MTB	Mountain Terrain Biking
MCT	Main Central Thrust
MD	Managing Director
NDMA	National Disaster Management Authority
NMCG	National Mission for Clean Ganga
NIH	National Institute of Hydrology
NRDWP	National Rural Drinking Water Program
NTFB	Non-Timber Forest Produce
NRLM	National Rural Livelihood Mission
NAMET	National Agricultural Management Extension and Technology
NULM	National Urban Livelihood Mission
NPP	Nagar Palika Parishad
NIM	Nehru Institute of Mountaineering
NAT	North Almora Thrust
NGO	Non-Governmental Organization
NLSM	National Landslide Susceptibility Mapping
NH	National Highway
NBA	National Biodiversity Authority
ODF	Open Defecation Free
O&M	Operation and Maintenance
PPA	Proposed Potential Area
PMKSY	Pradhan Mantri Krishi Sinchayee Yojna
PHC	Primary Health Centre
PRI's	Panchayati Raj Institutions
PMU	Project Management Unit
PMAY	Pradhan Mantri Awas Yojna
PCC	Plain Cement Concrete
PT	Private Toilet
PHC	Primary Health Centre
PA	Protected Area
PRI	Panchayati Raj Institution
PMGSY	Pradhan Mantri Gram Sadak Yojna
PWD	Public Works Department
PBR	People Biodiversity Register
PA	Protected Area
PIA	Project Implementation Agency
RBM	River Bed Material
RRR	Repair Renovation Restoration
RD	River Development

RKVY	Rashtriya Krishi Vikas Yojna
RCC	Reinforced Cement Concrete
RMSA	Rashtriya Madhyamic Siksha Abhiyan
RR	Random Rubble
RET	Rare, Endangered and Threatened
SPA	Special Plan Assistance
SPMG	State Program Management Group
SAD	State Allopathic Dispensary
STP	Sewage Treatment Plan
SC	Sub-Centre
SLWM	Solid and Liquid Management Program
SHG	Self Help Groups
SCP	Special Component Program
STP	Scheduled Tribe Plan
SSA	Sarva Siksha Abhiyan
SBM	Swatch Bharat Mission
SWM	Solid Waste Management
SDRF	State Disaster Response Force
SGPB	State Geological Programming Board
SOP	Standard Operating Procedure
SH	State Highway
SPCB	State Pollution Control Board
SMC	Soil and Moisture Conservation
SBB	State Biodiversity Board
SC/ST	Schedule Caste/Schedule Tribe
SPP	Species
SLNA	State Level Nodal Agency
S.WP	Special Watershed Project
TRH	Tourist Rest House
UWSSC	User Water Sanitation Sub Committee
URWSSP	Uttarakhand Rural Water Supply and Sanitation Program
ULBs	Urban Local Bodies
UREDA	Urban Renewable Energy Development Agency
UTDB	Uttarakhand Tourism Development Board
UDPFI	Urban Development Plans Formulation and Implementation Guidelines
UP	Uttar Pradesh
VWSSC	Village Water and Sanitation Sub Committee.
VCS	Veer Chandra Singh Garhwali Scheme
WMD	Watershed Management Directorate
W.C	Working Circles
WATSAN	Water and Sanitation Sector
WSSO	Water and Sanitation Support Organization
WBM	Water Bound Macadam
ZMP	Zonal Master Plan