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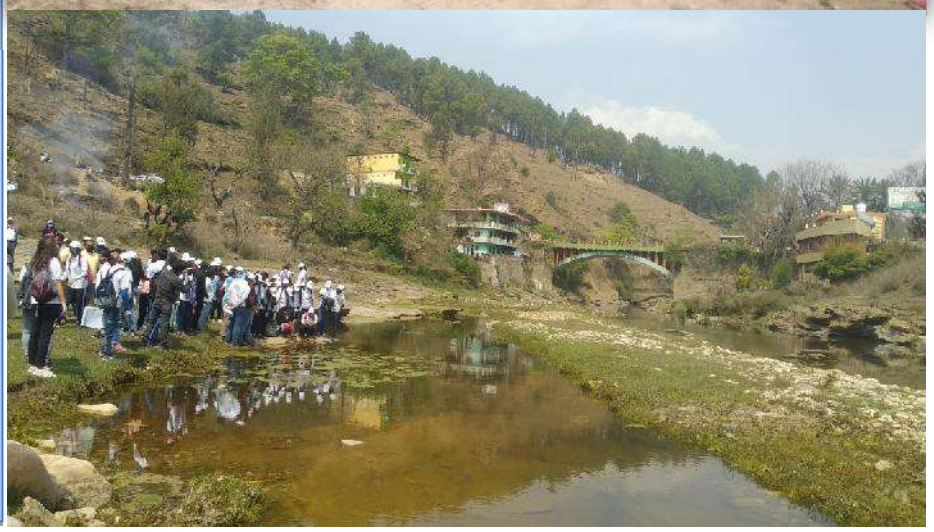
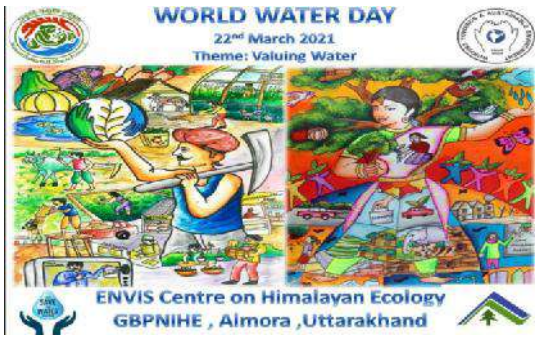
Valuing Water





Editorial Note

Dear Readers, the crucial role of mountains as the providers of large volumes of freshwater and as the natural storage site of this vital ecosystem service attracted the special attention of world leaders after the United Nations Conference on Environment and Development in 1992. Himalaya holds a significant position among the world mountains and also popularly known as "*Water Tower of Asia*". The Himalayan river basins are home to about 1.3 billion people, and supply water, food, and energy to more than 3 billion people. The Himalayan region stores more snow and ice than anywhere else in the world outside the two poles and thus popularly also known as "*the third pole*." Ten major rivers emerge from the Himalayan region, making it an important ecosystem for management of the water resources among others. However, in spite of abundance of water resources in the Himalaya its uneven distribution both in space and time comes in the way of development needs of the people. Governed by monsoon pattern of rainfall, this region which has enough water during the rainy season faces scarcity of varying magnitudes during rest of the year. The region is therefore confronted with “a too-much and too-little water syndrome”. As the concern over water demand and supply is increasing in this region, understanding of the intricate relationship between ecological, hydrological and geomorphic factors, which governs the hydrological response of spring and river catchments is important in water resource management. An interdisciplinary approach with hydrological, hydrogeological and ecological interventions thus needs to be adopted for conservation and sustainable utilization of water resources. Public awareness plays a crucial role in ensuring water sustainability.

To raise awareness among the people about conservation and sustainable use of water the World Water Day is globally celebrated each year. The people are involved in various events to promote appropriate actions to tackle the global water crisis and achieving Sustainable Development Goal 6: water and sanitation for all by 2030. The theme of World Water Day 2021 was "Valuing Water". Beyond the issues of pricing, this topic includes the environmental, social and cultural value people place on water. This Newsletter published by the ENVIS Centre on Himalayan Ecology of the GBPNIHE covers the events/activities organized by the Institute on this occasion to educate the college and University students of the region about the importance of water. This Newsletter also contains some articles on various issues of water resources in the Himalayan region. I hope readers will like this issue and send their valuable inputs / suggestions to improve this publication.

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Kosi River Cleanliness Campaign

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The Kosi river originates from its north at Pinath (NW of Kausani, Distt. Almora), which flows down towards the discharge point at Kosi barrage (Rāmnagar, Nainital). Geographically, the Kosi catchment has its spatial extension between 290 22' 41.60" to 29052' 20.81" N lat. and 79002' 38.21" to 79051' 15.08" E long., which covers about 1868.64 km^2 area. The absolute relief of the catchment ranges between 349 m to 2758 m from the mean sea level. The Kosi river basin water is used for various purposes such as drinking, irrigation, fishing, cremation, etc. Over the years, the flow of water in the river has been decreasing drastically due to climate change, anthropogenic activities, infrastructural changes etc. In view of this, various initiatives and campaigns for the rejuvenation of Kosi river have been started by the district administration Almora and other organizations such as Uttarakhand Forest Department, Eco-taskforce of the Army, G.B. Pant National Institute of Himalayan Environment (GBPNIHE) etc. Under these initiatives, National Mission on Himalayan Studies-State Government Project scheme funded project entitled, "Rejuvenation of the Kosi river of Kumaun Himalaya through field interventions and people participation" has been started. On the occasion of "World Water Day' on 22nd of March 2021, the GBPNIHE, Almora in association with District administration Almora and Government Inter College, Hawalbagh, a Kosi cleanliness campaign was organized by Dr. V. Agnihotri, Scientist, GBPNIHE near Kosi barrage and Kosi bazar, Almora in association with research team of the NMHS-SGP project coordinator and other staff of GBPNIHE.

Kosi Pledge

ईश्वर कै साक्षी मान यह शपथ लिनहू की हमार क्षेत्र में आदि कालबाती अविरल प्रवाहित कोसी जो वर्तमान में सिसकन लागरेया के पूर्ण मनोयोगली सुरक्शित संरक्षित एवं संवर्धित राखूल। खूपेड़लागून खाल खनती चेकडैम आदि निर्माण करूल एक एक बूंद पनि बचूल स्वयं एवं अगली आणि पीढ़ी कै यह धरोहर सुरक्षित रखाने लिजी प्रेरित करोल। गोलज्यु यह काम में हुमर मदद करौ।

Both banks in the upstream reaches of Kosi barrage were cleaned with the active participation of students & teachers (Dr. K. Nayal, Mr. M.P. Sahoo, Ms. S. Bora and Ms. H. Tamta) from GIC, Hawalbag and Mr. P. Kandpal, Block Development Officer (BDO), Hawalbagh, Almora. During the program, an appeal was made to local residents, shopkeepers, restaurant owners and tourists, not to pollute the flood plain of Kosi River, as the river water is further pumped to Almora city for drinking and various other household purposes. During the mass awareness program, along with elaborating the theme of *"Aazadi ka Amrit Smaranotsava"* a vision of making Indian Himalayan Region (IHR) an epicenter of eco-diversity, with availability of surplus freshwater was introduced among all the

participants. Students and all participants were motivated by experts and teachers by sharing the importance of water conservation and river rejuvenation during the event at the Kosi river bank. Dr. V. Agnihotri demonstrated onsite water quality analysis to the students, using handheld pH, electrical conductivity, and TDS measuring devices, to which they responded with great enthusiasm. A pledge on protection of Kosi river was also taken by all the participants (Box 1). All collected garbage during this programme was disposed-off to the prescribed dumping site.

ENVIS Activities on the World Water Day

The ENVIS Centre of the Institute also participated in the World Water Day celebration organized by the Centre for Land and Water Resource Management, GBPNIHE), Kosi - Katarmal, Almora. On this occasion ENVIS Newsletter entitled "*Understanding the dynamics of Himalayan Glaciers*" Vol. 12(1), 2015 was distributed among the participants to raise awareness about water resources and also participated in the cleanliness drive in river Kosi. Also, on the theme of the World Water Day 2021- Valuing Water an on-line poster competition was also organized in which 54 students of class 6^{th} - 9^{th} across the country participated and the winners were given certificates.

Namami Gange: A Conservation Mission

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Water is Life. Most of the human activities require water for day-to-day activities. All over the world water crisis has been an evolving and daunting phenomenon, which needs high attention and efforts for sustainable water management. With regard to this the S.S.J. University, Almora in collaboration with State Management Group Namami Gange, Uttarakhand developed an action plan for Information and Education activities among the students, teachers and public in general with an objective of creating awareness regarding cleaning and maintaining water resources (Table 1). Namami Gange Programme', is an Integrated Conservation Mission, approved as 'Flagship Programme' by the Government of India in June 2014 to accomplish the twin objectives of effective abatement of pollution, conservation and rejuvenation of National River Ganga. It includes sewerage treatment infrastructure, river-surface cleaning, afforestation, industrial effluent monitoring, river-front development, bio-diversity conservation, public awareness and development of Ganga Gram. S.S.J. University, Almora stepped forward in this direction with the special efforts and keen interest of Hon'ble Vice Chancellor of the University various activities were conducted under this programme in Almora. The Programme was inaugurated on 15th March 2021 by Hon'ble Vice Chancellor and Chief Development Officer, Almora by beginning a three days' "National Workshop-cum-Painting Competition" whereby the student participants of the University made beautiful and stimulating paintings on the theme of Namami Gange.

The second activity in the sequence was "One Day Training-cum-Awareness Programme on Rejuvenation of Rivers and Water Resources", inaugurated by Chief Guest, Dr. R. S. Rawal, Director GBPNIHE, Kosi-Katarmal, Almora. Guest of Honour Prof. J. S. Rawat, National Geophysical Chair, SSJ Campus Almora, Resource Person Dr. G.C.S. Negi, Scientist G, GBPNIHE, Prof. Neeraj Tiwari, Director, SSJ Campus and Dr. Mamta Aswal, University Co-ordinator Namami Gange were present on the occasion. The participants were Research Scholars, National Service Scheme volunteers and Teachers of the University.

"Rivers are a source of cultural and spiritual value in India from cradle till death. Many civilizations had established near the banks of water bodies and rivers. It's the duty of every citizen to make efforts for conservation of water bodies. Our University has been trying to connect with all the students and general public in this mission by conducting awareness activities."

–Prof. N.S. Bhandari, Vice Chancellor, Soban Singh Jeena University, Almora

The resource persons presented their talks on mountain springs, which are natural sources of groundwater and perched aquifers are the primary sources of water in Himalayan regions such as *Naula, Dhara and Gadhera (Bhatt, 2017*). Various problems of water crisis in the hills due to developmental activities, deforestation and climate change were discussed in details. Such as people are forced to reduce water consumption, consume unhygienic water, prone to water borne diseases and face conflicts over water issues (*Negi, 2017)*. Major recharge zones in the Kosi river basin area were discussed and *modus operandi* to recharge the dying river Kosi, which serves as the main sources of water in the city, were suggested. How to conserved rain water through chal-khals, check dams, infiltration holes and tree plantation and indigenous knowledge about was provided to the participants in detail. Dr. Rawat emphasized that drying rivers can be rejuvenated by recharging the origin of these rivers leading to increase in underground water storage which will revive the small springs (Gadhera) and consequently the big rivers will survive (Rawat, 2011). On the World Water Day (22 March 2021) a cleaning drive on the banks of Kosi river was conducted along with a visit to the Rural Technology Complex and arboretum of GBPNIHE, Kosi-Almora where the participants came to know a variety of sustainable practices being carried out at using Chir Pine needles (Pirul), which is otherwise a big menace for forest fire in this region. Participants gained a lot of information and knowledge about conservation of water resources. They pledged to remain active in dealing with the concerns of water scarcity and also performed a "Nukkar Natak" to generate awareness among the street people during this programme.

Table 1: A brief programme schedule of the activities conducted under the Swachhta Pakhwada

Dates	**Events**
15 March	Inaugural of Ganga SwachhtaPakhwada
15 - 17 March	Painting Competition
19 March	One day Training cum awareness Programme on Rejuvenation of Rivers and water resources
21 March	NukkadNatak
22 March	Cleaning Drive on Kosi river banks/ Pledge/ Visit to GBPNIHESD
22 March	Exhibition of paintings
26 March	Cleaning Rally
	Signature campagain

Fig: Glimpses of Namami Gange programme

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Geoinformatics in Spring Studies

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A watershed is an area of land that drains all the streams and rainfall to a common outlet, whereas spring shed is simply an area of land that contributes groundwater to a spring. It is easier to delineate and manage a watershed rather a spring shed. Changes in springs discharge, location, quality of water etc. occur due to landuse / land cover changes, earthquakes, landslides, human interventions, climate change etc. In recent years such major changes have been observed in drying up of springs in the IHR particularly in Garhwal Himalaya. Springs are the major source of potable water in the IHR Therefore, there is an urgent need to preserve these springs for the sustaining life. It is important to note that though delineation techniques for watershed and spring shed are different but their management techniques are quite similar. Therefore, better management of watersheds should bring positive results towards spring management. In recent years, some efforts have been made towards management of watersheds in the Himalaya, which have brought positive impacts. Since springs bring groundwater on surface due to topographic setup, and hence in order to improve springs, well established groundwater recharge techniques of hard rock terrain may be adopted. Rainfall data analysis of past about 120 years has revealed that total annual precipitation over India has not changed significantly. Further, it is also well known that more about 98% of our rainfall water ends up in the form of surface runoff. Further, it is important to note that in last 120 years our requirements of water has increased many folds due to rapid increase in the population and industrialization, however, at the same time our efforts towards groundwater recharge have not increased proportionally. Recent studies have shown that groundwater recharge measures can brings significant improvements in groundwater conditions in hard rock terrains than within 2-3 years' time. Techniques of groundwater recharge are well known and have been in practice since ages and therefore instead of making efforts towards spring shed delineation etc., emphasis should be towards better management of overall watershed and extensive groundwater recharge. Geoinformatics techniques which includes remote sensing, GIS and global navigation satellite systems (GNSS) may be employed to investigate better locations of groundwater recharge sites and overall management of watersheds. Remote sensing techniques can be employed to assess current landuse / landcover as well as changes occurred in last few decades, whereas GIS along with GNSS will provide a digital platform to manage, analyse and model spatial data related with overall watershed management and groundwater recharge in the Himalayan mountains.It is reported that half of the perennial springs have already dried up or have become seasonal resulting into acute water shortage for drinking and other domestic purposes across hundreds of Himalayan villages. Continued crisis will consequently affect lives of millions of people in the mountains. The dependency of majority of the population on spring water implies that with changing climatic conditions and rainfall pattern, a large number of villages, hamlets and settlements will face potential drinking water shortage. Of late, efforts to preserve and save springs from drying up and recharging them are gaining momentum across various Institutions, Government and NGOs which include; hydrogeological mapping of spring sheds, catchment area restoration/protection for augmentation of recharge; monitoring and management of springs, dissemination, outreach and sharing of knowledge.

Participatory Springshed Management is the Key for Water Security and Resilience of Mountain Villages of Uttarakhand

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Mountain springs are the primary source of water for over 60% rural households in the Himalayan region for fulfilling their domestic and livelihood needs such as drinking water, sanitation and irrigation. Despite the key role they play, springs have not received their due attention and facing the threat of drying up. There is increasing evidence that springs are drying up or their discharge is reducing throughout the Himalayas. Spring discharge is reported to be declining due to increased water demand, changing land use patterns, and ecological degradation. The Himalayan ecosystem is quite fragile and susceptible to several changes caused due to both natural dynamism and anthropogenic interventions. The erratic rainfall pattern with marked decline in winter rain, seismic activity and ecological degradation associated with land use change for infrastructural development is posing huge pressures on mountain aquifer systems. The problem of dying springs is being increasingly felt across the IHR.

It is reported that half of the perennial springs have already dried up or have become seasonal resulting into acute water shortage for drinking and other domestic purposes across hundreds of Himalayan villages. Continued crisis will consequently affect lives of millions of people in the mountains. The dependency of majority of the population on spring water implies that with changing climatic conditions and rainfall pattern, a large number of villages, hamlets and settlements will face potential drinking water shortage. Of late, efforts to preserve and save springs from drying up and recharging them are gaining momentum across various Institutions, Government and NGOs which include; hydro geological mapping of spring sheds, catchment area restoration/protection for augmentation of recharge; monitoring and management of springs, dissemination, outreach and sharing of knowledge.

However, in addition to these efforts, there is also a need to address demand side challenges to ensure the current water requirement in times of limited resource availability, by augmenting the efficiency of water use. Hence, social, economic and ecological sciences must compliment hydrology and hydrogeology in the management of the precious spring water resource in the mountains. This entire process would gain further value and utility when institutions like village water and sanitation committees (VWSCs) that have specific water and sanitation focus, or more formal systems like the Gram Sabah's of Gram Panchayats or Village Councils participates in it activity. Therefore, multiple actions need to be taken right from use of technology for spring recharge to social and policy level participation for sustaining the water discharge of the drying springs of Himalayan mountains.

Water Resource Sustainability in Middle Himalaya

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The hydrogeology as well as topography largely controls the availability of groundwater flowing as springs or seeps for the rural and urban population in the IHR . The most vulnerable rural water supply network has it source in groundwater springs spread all across the mountain-scapes. However, over a period of last 4–5 decades reports of diminishing supply of water from the springs and streams are emerging from the middle mountains of Himalayan region. The complex underlying reasons for such a wide spread observation is a result of both changes in the biophysical as well as socio-economic factors. Rural-to-urban migration of people from the hill district of Uttarakhand has led to series of changes in terms of rapid landuse change marked by agriculture land abandonment and regeneration of trees such as pine which has significantly higher water demand. Recurrent forest fire in pine-dominated forests has further led to hardening of soil causing more run-on than infiltration. One of the most important drivers threatening the water resource sustainability in recent times is the alteration in the characteristics of rainfall, series of drought years and delay in monsoon. Anthropogenic drivers such as road expansion and apathy of people towards government funded initiatives are major issues which need science-based understanding and result-based financial funding for forest and water improvement schemes. All the state implementing agencies related to water and forest sector are engaged in soil and water conservation with cluster of villages as an administrative unit, but without effectively demonstrating the efficacy of the treatment for spring recharge at a catchment scale. The success of any intervention will largely depend on the understanding of the "black box", which in this case is the catchment subsurface characteristics governing storage, flow pathways and residence time. Environmental stable isotope, due to the its conservative nature and natural abundance in water is used as a tracer to estimate the contribution of direct runoff and base flow to the total hydrograph, estimation of average elevation of recharge for springs and low-order streams and finding out the mean residence time. $\delta^{18}O$ and $\delta^{2}H$ environmental stable isotope by its measurement in water (rain, surface runoff, soil and groundwater) is extensively used for understanding the rainfall-runoff relationship for small catchments, thus giving insight into the hydrological processes. Two micro watershesds located in Ir-gad watershed which is part of Paschimi Nayar River basin was investigated using stable isotopes over the past decade. The local meteoric water line was developed for the region which indicates that rainfall, especially the monsoon recharge is the primary source of recharge for springs and streams and the approximate elevation of groundwater recharge lies within the immediate watershed divide. Some of the key knowledge gap is effectively managing the rising evapo-transpiration demand due increasing expansion of fast growing pine and understanding of its impact on water availability. Future water sustainability for mountainous basins need focused interdisciplinary water research divulging the link between terrain characteristics; geology, landuse, climate change and soil and water conservation activities with supporting pre-and post implementation data for better management of freshwater. Stakeholder of Himalayan headwaters should be made aware of the complex water related issues and training and exposure of the future water aspirants should take precedence.

Participatory Springshed Management in the Mountains

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Uttarakhand is vital for the ecological security and integrity of the country as it provides perennial water sources, fertile soil and forest cover. The ecosystem of the region is highly vulnerable and susceptible to anthropogenic and natural impacts. An economic and technological intervention in the name of development is responsible for overexploitation and overuse of nature. The forest logging for construction of roads and buildings and hydropower projects has depleted forests in this fragile and sensitive area. Further, unplanned tourism activities have also add to the vulnerability of the water resources. Forests play important role in harvesting rain by regulating the water yield and flow. An area with thick forest cover and slopes percolates down the high-quality water in the whole watershed area which provides regular water supply to the local community. The watershed area not only regenerates water but also replenishes water streams, ponds, rivulets and the downstream rivers. Thus it has become imperative to declare the life supporting natural resources as sacred so that these can be protected and conserved. Various legends and myths are associated with most of our area to protect environment. The wisdom of our ancestors was good enough to create fear and guilt amongst community by declaring many areas as sacred landscapes and sacred groves where no human intervention is allowed. Our wetlands especially in high altitude area are considered to be sacred and are associated with certain beliefs, so as the rivers. Traditionally Dhara, Naula, Gadhera are used for daily water needs. However, most of the aquifers in the area are on the verge of depletion. The maintenance of these natural water resources is being also ignored because of door-to-door water supply. Need of the hour is to map all the water resources and to identify the related issues such as their present status, recharge, biodiversity, livelihood of communities, etc. The regeneration of the springs can be done by preserving the catchment of the spring and by declaring Water Protected Area (WPA). All anthropogenic activity should be banned. Seeds of indigenous herbs, shrubs, climbers and trees can be sprayed in the recharge zone during monsoon so as to assist the natural regeneration. Minor check dams can be erected on landslips. These should be done by bioengineering and conserving forests. The water policy should be focused on keeping in mind the protection/conservation of water aquifers; emphasis on gravity tapping of water and legal teeth to all catchment of the natural water resources. It must be ensured that large catchment areas around water bodies are developed so that natural water recharge takes place. Just like the Seog water catchment area in Shimla, Himachal Pradesh which is a wild life sanctuary since 1999 and where no construction is allowed. This can be cited as a success story for regeneration of water sources. This water catchment area in Shimla is the watershed management work initiated by the Britishers by making a reservoir at Seog, Shimla in 1901 and declared as water catchment area. The catchment has an area of 1020.32 ha and receives average 1600 mm rainfall. The water supply based on gravity and is the source of supply of water to Shimla town. At the same time, it is an important wildlife sanctuary having a great conservation value. A long history of conservation has been associated with catchment area; it has been conserved for more than past 100 years. The area is being managed by the Himachal Pradesh Forest Department. The catchment area is rich in biodiversity, home to many species of plants, animals, birds and insects and has 9 perennial streams. Shimla city which had the water supply from Seog has supplemented the same through lift irrigation schemes from major water sources — Gumma, Giri and Churat.

Water Security Through Participatory Springshed Management in Uttarakhand

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Himalayan region is facing challenges pertaining to water insecurity due to changing climatic and anthropogenic factors. On the basis of people's perceptions and data collected from the region it is noticed that spring discharges are declining on regular basis and leading to water scarcity in the area. Many villages are facing acute water shortage especially in the summer season. Drying up of the water sources have adversely affected the rural water security of people; especially women have to travel greater distances for water collection. Rural communities of Uttarakhand are using traditional water sources such as Naula, Dhara etc. for daily water requirement. These water resources are mostly owned, used and maintained by the local communities and treated as common pool resources. Climate change and change in land use pattern is a serious threat for the water resources (springs) in this region (Uttarakhand) and affecting adversely on spring discharges. The rural water supply systems in Uttarakhand are spring-fed and most of the water sources (springs) originate partially and fully from reserve forest area or in some cases the springs catchment protection area falls under reserve forest. Besides springs catchment, small artificial ponds, pits, trenches and plantation, constructed on the slopes of mountains, these structures were not only the traditional methods of rainwater harvesting which helped in maintaining the groundwater level but also provided water to domestic and wild animals in forests. Such traditional water resource management systems are now dying due to lack of forest and tree cover, irregular and unpredicted rainfall pattern, loss of traditional knowledge, modernization and uncontrolled development. Among the important reasons behind the negligence of these important water resources is modernization, which has caused a loss of traditional knowledge systems among rural communities along with a lack of maintenance due to out-migration of villagers to nearby towns and cities for better job opportunities. United Nations' Sustainable Development Goals (SDGs) that have been targeted towards the year 2030 and mountains play a key part in achieving the SDGs for water (SDG 6). Springs are the main source of drinking water for the local communities and called as lifeline of mountain people. Springs are an essential resource and plays key role in context of mountain region to provide water for drinking, domestic and livelihoods to rural communities. Spring water flowing through gravity is appropriate in such terrains which often emanate from localized unconfined aquifers also known as perched aquifers. Therefore, a local geological system beneath the ground, holding and disseminating water is important and understanding of geology will be useful for planning and implementation.

The varied geological set-up coupled with complex structures, controls the hydro geological scenario of the mountain region and in addition, the morphology plays an important role on the occurrence and movement of ground water over the area. As per NITI Ayog report (2018), it is reported those more than three million perennial springs in IHR. States have already dried up or become seasonal, resulting in acute water shortages across thousands of Himalayan villages. Reflections of climate change are also challenging in Himalayan region. Science, Governance and community participation are the main pillars of water conservation programmer.

Since the beginning of the 21st century, Uttarakhand is facing an increasingly acute water crisis. Less than 50% of the people receive adequate quantities of safe drinking water. The availability of potable water during the dry season in rural areas can drop to 25-30 liters per capita per day (LPCD). In 2019, it was estimated that over 50% of springs located in the state of Uttarakhand have dried up or become seasonal. It is widely accepted that climate change, land use change, unplanned development activities, and lack of resource management due to outmigration from rural to urban areas and mountains to lowlands are responsible for diminishing spring flows. Though entire region faces the problem of water scarcity specifically during long dry spells, but it is more pronounced in mid and upper hilly regions due to limited number of springs characterized with smaller recharge zones, thus having finite discharge.

जल स्रोतों का वर्तमान समय में प्रबंधन एवं जरूरतें

आ ाराममंमगाई
नॉडल अधिकारी, डालियों का दग्ड़िया, श्रीनगर गढ़वाल

उत्तराखण्ड के भौगोलिक परिपेक्ष्य को देखाजाय तोपिछले 50 वर्ष पूर्व 80 प्रतिशत आबादी मध्य हिमालय के पहाड़ी ग्रामीण क्षेत्रों के गांवों की बसावटथी, उसके पीछे मुख्य कारण पानी एवं कृषि, तथा चारे को लेकर हर गांव बसता था। गांव उसी को माना जाता था जहा ंपर मनुष्यों का रहना एवं खेती करना तथा मनुष्यों एवं पशुओं तथा खेती की सिंचाई के लिए पानी उपलब्ध हो क्योंकि जलस्रोतों के अलावा जीवनयापन का और कोइ विकल्प नही था। गॉव के 2 किलोमीटर के दायरे में जितने भी जलस्रोत एवं कुऐं व गाड़–गधेरें होते थे उस पर सम्पूर्ण स्वामित्व ग्रामीणों का होता था जिससे उनका सम्पूर्ण प्रबंधन की जिम्मेदारी वहा स्वयं की समझते थे जिसे वह अपने लिए पीने के पानी, पशुओं के लिए पेयजल, कृषि के लिए सिंचाई की व्यवस्था अपने तरीकें से करते थे। जलस्रोतों के एक किलोमीटर के क्षेत्र में पशु चुगान पर प्रतिबंध और वन अग्नि से बचाव, शौच जानें पर प्रतिबन्ध, पेड़ों के कटान पर रोक, प्रसूता महिला एक माह तक जल स्रोत पर जाना, प्रतिबन्ध आदि कई पारम्परिक तरीकों से प्रबन्धन करते थे ताकि आगे आने वाली पीढ़ीयों को जल संकट से न गुजरना पड़ें और गॉव का अस्तित्व भी बचा रहें। लेकिन आधुनिक विकास की दौड़ में जल स्रोतों का पानी को पाइप लाइनों द्वारा टेप करके रोड़ साइड के कस्बों को दिया गया। कच्ची गूलों की जगह पक्की गूलें बनवाई गई, जिससे उससे ग्रामीणों ने समझा कि इन जलस्रोतों से हमारा अधिकार छीन लिया गया है, फिर वह पूर्ण रूप से लाप्रवाह हो गये और धीरे–धीरे जल स्रोतों पर संकट मंडराने लगा। पिछले दशक से जलवायु परिवर्तन और बारिश के समय का अनियत्रित होने का प्रभाव सीधा जल स्रोतों पर पड़ा। आज से 25–30 वर्ष पूर्व शीतकाल में 1 से 2 सप्ताह की लगातार हल्की बारीश होती थी जिससे जल स्रोतो पर ग्रीष्मकाल में मई–जून में फर्क नही पड़ता था लेकिन आज वर्तमान में शीतकाल की बारिश बिल्कुल विलुप्त हो चुकी है जिससे जल स्रोतो पर गहरा संकट छा गया है। इसके कारण बारीश का पानी जमीन के अन्दर जाने के बजाय सीधा बह जाता है जिससे भूमि में नमी का संरक्षण नही हो पाता है।पहले खेती में हल लगने से पानी जमीन में खेतों के मध्य में रूक कर समा जाता था और वही कहीं न कहीं हमारे जल स्रोतों को जीवन प्रदान करता था लेकिन अब ऐसा नही है। ग्रामीणों द्वारा प्रत्येक वर्ष सामूहिक तरीके से जल स्रोतों को पूजने की परम्परा थी और सभी गॉव वाले मिल करके स्रोत को सफाई एवं अगल–बगल की झाड़ियां साफ करते थे। स्रोत के एक किलोमीटर क्षेत्र को वन अग्नि से बचाया जाता था।नई बहू द्वारा धारा

पूजन का कार्य किया जाता था। गांव में किसी की मृत्यु होने पर सभी संस्कार पितृ कार्य जल स्रोतों के नजदीक किया जाता था। जल स्रोतों को कुल देवता के अनुसार पूजा जाता था लेकिन यह सभी प्रथाऐं धीरे–धीरे समाप्त हो गई है। अतः जल स्रोतों के संरक्षण के उपायों में सरकारों द्वारा ग्रामीणों को जलस्रोतों के हक–हकूक को वापस दिलवाना, खेती के प्रति सोच बदलना, फ्लायन की रोक, बड़ी जल विद्युत परियोजनाओं पर रोक, पानी के स्रोतों के कम से कम पॉच किलो मीटर के दायरे में कोई निर्माण कार्य पर रोक, जल स्रोतों के महत्व के प्रति ग्रामीणों को जागरूक करना, ग्राम पंचायतों में जल स्रोतों के रखरखाव के प्रतिप्रस्तावबनाकर भाासन–प्र ाासनकोअवगतकरवाना, चौड़ीपत्ती के पौधों का रोपण करवाना और चीड़ को समाप्त करने के लिए सरकारों एवं विभागों पर दबाव बनाना, खाल–खन्तियों व रिचार्ज पिटों, आदि का निर्माण पंचायत द्वारा मनरेगा के अन्तर्गत सरकारी एवं गैर–सरकारी संगठनों द्वारा किया जा सकता है।

राष्ट्रीय जल मिशन

जल शपथ

मैं पानी बचाने और उसके विवेकपूर्ण उपयोग की शपथ लेता हूँ/लेती हूँ।

मैं यह भी शपथ लेता हूँ/लेती हूँ कि मैं जल का समुचित उपयोग करूँगा/करूँगी।

तथा पानी की हर एक बूंद का संचयन करूँगा/करूँगी और ' कैच द रेन ' अभियान को बढ़ावा देने में पूरा सहयोग दूंगा / दूंगी।

मैं पानी को एक अनमोल संपदा मानूँगा/मानूँगी
और ऐसा मानते हुए ही इसका उपयोग करूँगा/करूँगी ।

मैं शपथ लेता हूँ/लेती हूँ कि
मैं अपने परिवारजनों, मित्रों और पड़ोसियों को भी इसके विवेकपूर्ण उपयोगऔर उसे व्यर्थ नहीं करने के लिए प्रेरित करूँगा/करूँगी।

यह ग्रह हमारा है और हम ही इसे बचा सकते हैं
और अपना भविष्य सुरक्षित कर सकते हैं।

जल हैं तो कल हैं