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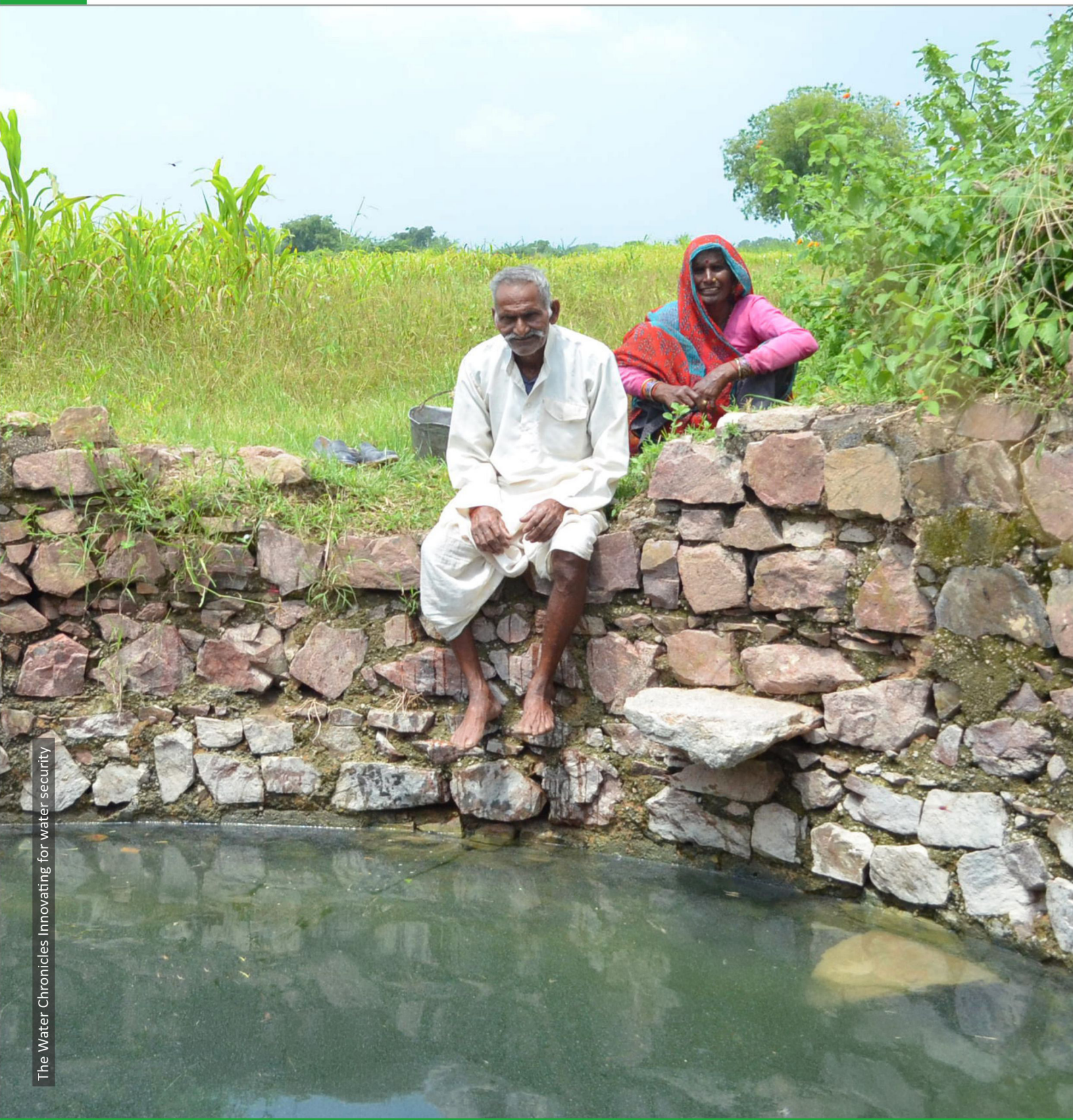
DEVELOPMENT ALTERNATIVES

Monthly newsletter on issues of sustainable development



The Water Chronicles Innovating for water security

Water Solutions for a Water Stressed World

Contents

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Water: The Most Critical but Most Used Resource of the World

Receding snowline and glaciers in the Himalayas will affect the availability of freshwater

Water is the most important and widely used resource on Earth, essential for sustaining life. It plays a crucial role in maintaining a healthy lifestyle, supporting agriculture, and driving industrial production. Almost everything in our life is connected to water. About 60% of our body is composed of water and we need approximately 3-4 litres daily to stay hydrated and healthy. Globally, we consume around 10 billion tonnes of water every day, with agriculture accounting for 70%, industry 20%, and the remaining 10% used for human consumption.

There is significant inequality in water usage among different countries. Industrialised nations tend to use far more water than developing nations. For instance, Africa has a per capita water usage of 47 litres of water per person per day, Asia uses 95 litres of water per person per day, the UK consumes 334 litres of water per person per day, and the USA uses 578 litres of water

per person per day. The total global annual water consumption amounts to a staggering 3.8 trillion cubic meters. Currently, the level of water usage and generation is relatively stable, but this presents a concerning outlook for the future.

Globally, we need approximately 3800 cubic kilometre of freshwater annually to sustain ourselves. This includes the use of freshwater for agriculture, industry, and human consumption. In contrast, we generate around 52,580 cubic kilometre of freshwater annually through renewable resources such as rainfall, snow, and surface runoff, which replenish lakes, rivers, and groundwater. Although the majority of the freshwater is locked in glaciers and ice caps, smaller amounts are available for use in groundwater, lakes, and rivers. Only about 1.2% of the total freshwater generated annually is surface water that we can access, which amounts to only 630 cubic kilometre available for use. Moreover, the distribution of this freshwater is highly uneven. Countries like Brazil, Russia, the USA, and China have the largest reserves of freshwater, while nations such as Bahrain, Cyprus, Kuwait, Lebanon, Oman, and Qatar have the least. Ironically, some Gulf countries have the highest consumption rates of freshwater despite their low reserves.

The UN Water Summit has brought attention to an imminent global water crisis, with demand for fresh water projected to outstrip the supply by 40% by the end of 2030. Johan Rockstrom, the director of the Potsdam Institute for Climate Impact Research and co-chair of the Global Commission on the Economics of Water, emphasises that neglecting water resources is leading to disaster. 'The scientific evidence is that we have a water crisis. We are misusing water, polluting water, and changing the whole global hydrological cycle, through what we are doing to the climate. It is a triple crisis.' This situation is more serious than climate change itself!!

At Development Alternatives we are aware of the ongoing crisis and are actively supporting various communities and cities in raising awareness, collaborating on research with academic institutions and implementing creative solutions. One of the most important initiatives is mapping existing water bodies and understanding their ecological status through the use of GeoAI technology. Our findings indicate that most of the permanent water bodies are receding or their water-holding capacity is decreasing due to siltation. We are also focusing on creating awareness about reducing water wastage in our daily lives. Additionally, we are working on finding solutions for recycling greywater for dedicated uses and even processing blackwater. A key area of our work is helping villages in rural areas become self-sufficient in water. This includes utilising greywater for agriculture purposes and recycling of wastewater for everyday use.

At an organisation level, we are actively promoting the implementation of water harvesting structures, check dams, and efficient water management systems to prevent surface runoff. These efforts will help preserve freshwater from rainfall and recharge groundwater systems. One significant initiative focuses on purifying water contaminated with arsenic, fluoride, iron, bacteria through innovative filtration systems. This also reduces the adverse effects on health. While these initiatives may seem small, coordinated efforts are required to undertake more innovative solutions, such as extracting water from air, low-cost desalination technologies to obtain water from the sea, and developing purification systems, and water from rain forests. Given that oceans contain 97% of the Earth's water, we must seek creative solutions to access and utilise this vital resource effectively. ❐

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Drops of Hope: Innovation for India's Water Crisis

A rejuvinated lake brings hope for a sustainable community

Water is often called the elixir of life, essential for sustaining ecosystems, economies, and human well-being. However, this invaluable resource is under increasing stress worldwide, particularly in water-scarce regions like India. With a growing population, intensifying industrial and agricultural demands, and the looming impact of climate change, India's water crisis has reached a critical stage, threatening both public health and economic stability.

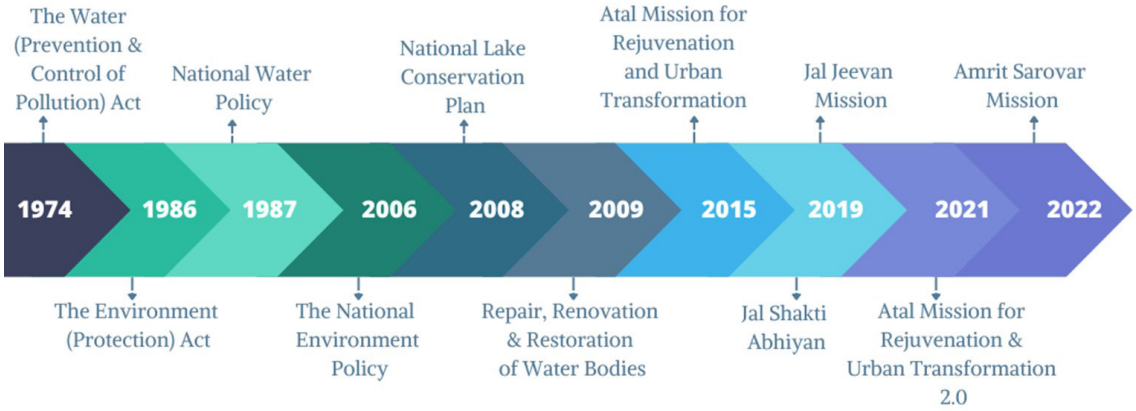
Water consumption has risen by approximately 1% per year over the last four decades. Currently, 26% of the global population lacks access to clean drinking water. In India, where around 700 million people live in rural areas, nearly 63 million struggle to access safe drinking water. The country's per capita water availability is decreasing—from 1486 cubic metres in 2021 to a projected 1367 cubic metres in 2031—putting India on the brink of water scarcity. A further decline could severely impact the country's gross domestic product, as reported by NITI Aayog.

India's water crisis is evident in two key areas: **availability** and **quality**.

Declining water availability: The country's annual water availability is dictated by hydro-meteorological and geological factors, but with an ever-growing population, the per capita share is dwindling. If this trend continues, India could face extreme water shortages, jeopardising agriculture, industry, and daily life.

Alarming water quality issues: Even when water is available, its quality continues to be a major concern. Factors such as over-extraction of groundwater, agricultural runoff, industrial waste, and poor sanitation contribute to severe contamination. Harmful pollutants, including arsenic, fluoride, and bacteria, render much of India's drinking water unsafe, placing the country among the lowest in global water quality indexes.

Adding to this concern, **contaminants of emerging concern (CECs)**—pollutants not yet routinely monitored but with harmful effects—are increasingly found in wastewater effluents. The Central Pollution Control Board reports that over 50% of India's wastewater remains untreated, endangering both environmental and human health.



The evolution of India's water and environmental policies

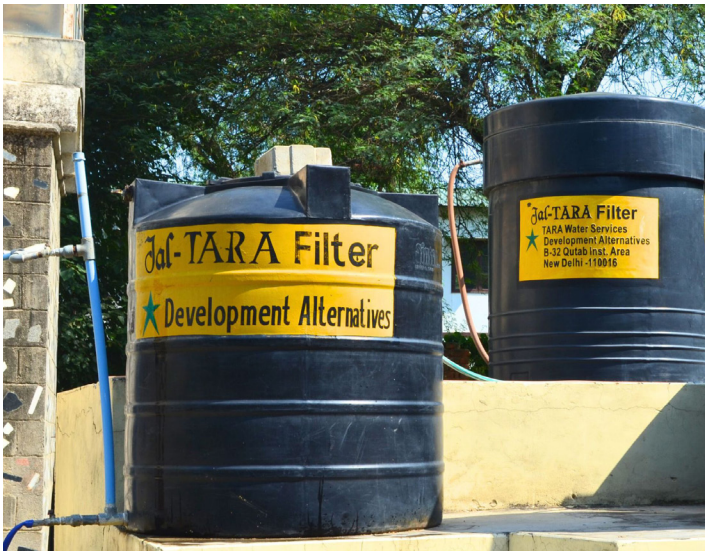
The Indian government, along with state agencies, non-governmental organisations, and research institutions, is actively working to mitigate this crisis. Sustainable development goal (SDG) 6 aims to ensure universal access to clean and affordable drinking water by 2030, which aligns with India's Vision 2030 Development Strategy.

Solving India's water crisis requires a **multi-disciplinary approach** that integrates technological innovation, community participation, and sustainable management. Cost-effective technological solutions tailored for households, communities, and cities can help in the following efforts:

- Provide clean drinking water through **community-based filtration systems**.
- Treat wastewater using **nature-based decentralised treatment technologies**.
- Rejuvenate water bodies and increasing **water storage capacities**.

At Development Alternatives (DA), we actively implement sustainable water management solutions across India. Over the past year, our initiatives have made significant progress in the following areas:

- Provided clean drinking water to **6,500+ families** through affordable, community-driven filtration systemslike JalTARA filter, Nano filter, and Arsenic filter in Himachal Pradesh, Haryana, Uttar Pradesh, Punjab, and Bihar.
- Treated **400 ml of greywater** using decentralised nature-based wastewater treatment technologies like MiToX, Constructed wetland in Maharashtra and Madhya Pradesh.
- Revived and increased the holding capacity of **50+ water bodies**, ensuring long-term water security in Himachal Pradesh, Uttar Pradesh, Haryana, and Madhya Pradesh. ❐



The Jal TARA water filter helps to transform contaminated water into safe drinking water

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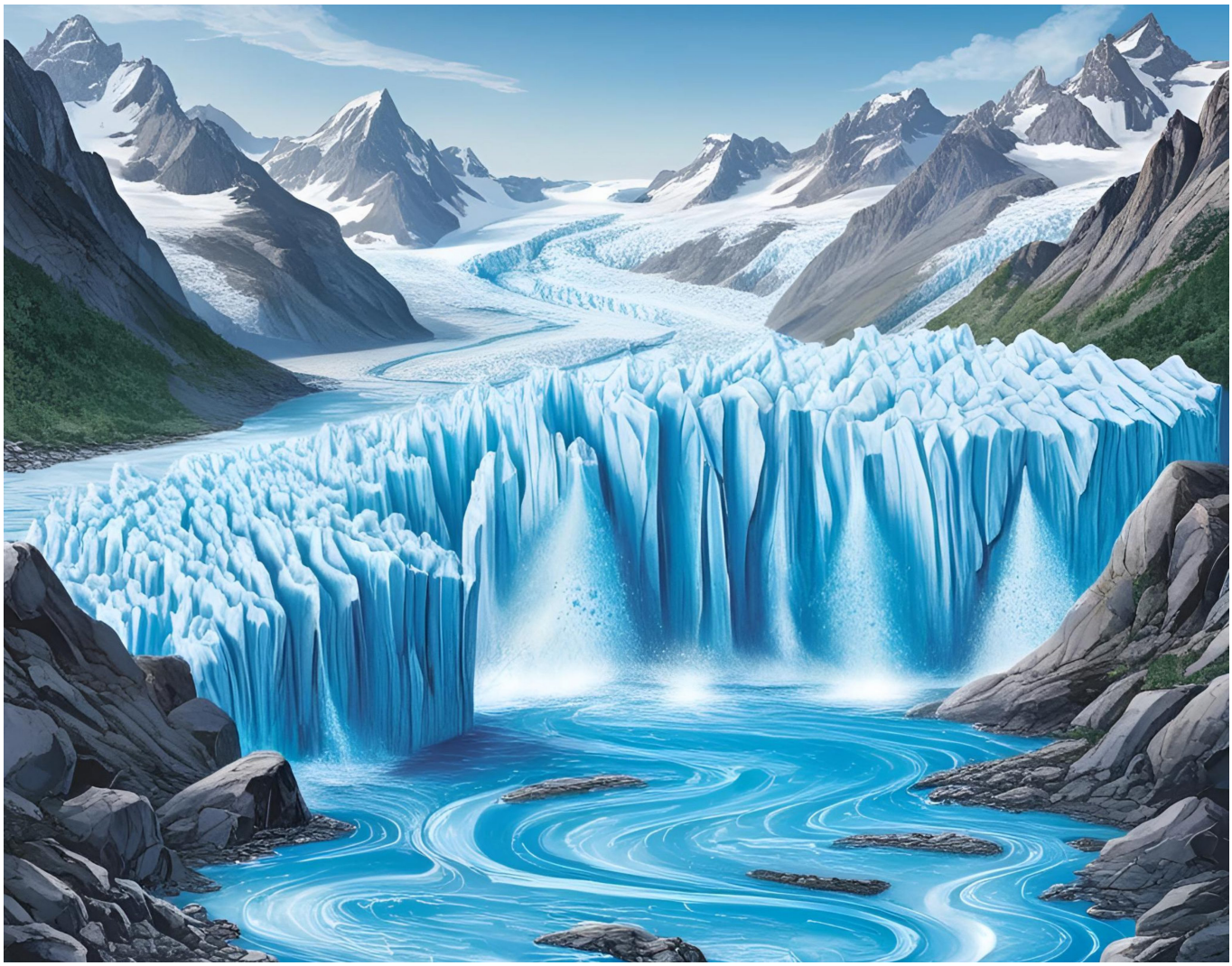
Third Pole and the Glaciers



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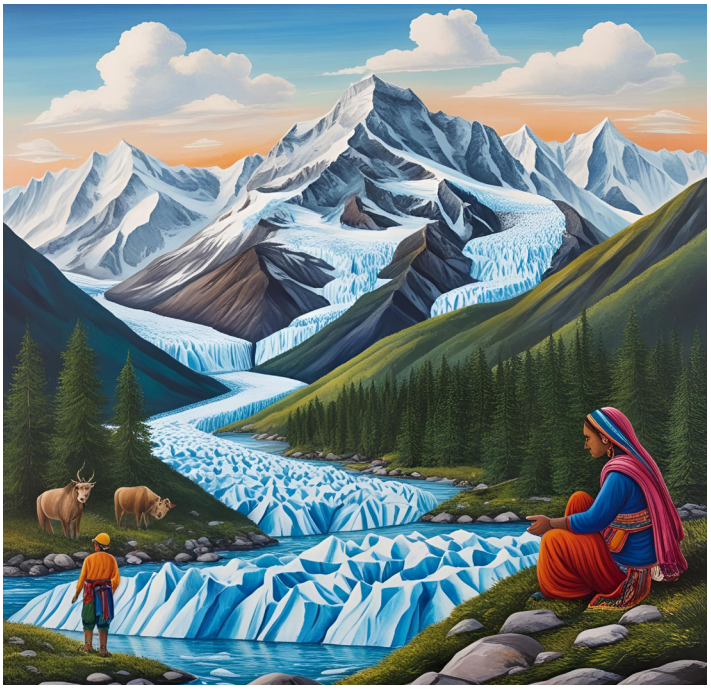
Glaciers, important freshwater reservoirs, play a crucial role for both people and the environment. They are the source of mighty rivers like the Ganges, Indus, and the Brahmaputra, providing water for domestic consumption, agriculture (food), hydropower (energy), and sustaining the ecosystems (biodiversity), both mountain and riverine. However, according to the Hindu Kush Himalayan Monitoring and Assessment Programme (HKH-MAP), even if global warming is limited to 1.5°C, it is estimated that one-third of the region's glaciers could disappear by 2100 (IPCC 2019, ICIMOD 2023). The rapid melting of glaciers threatens to reduce freshwater availability, which could have severe implications for society and the economy, while simultaneously increasing the region's vulnerability to floods and lake bursting.

Retreating Glaciers and Monitoring Systems

The Government of India, through various agencies including the Ministry of Earth Sciences (MoES), Department of Science & Technology (DST), the Ministry of Environment Forest and Climate Change (MoEFCC), Department of Space (DoS), the Ministry of Mines (MoM), and the Ministry of Jal Shakti (MoJS), monitors Himalayan glaciers for various scientific studies related to glacier melting. Reports indicate accelerated heterogeneous mass loss in Himalayan

glaciers. The Indian Space Research Organisation's (ISRO's) Space application Centre (SAC) has mapped 5234 glaciers in the Himalayan-Karakoram (H-K) region using primarily IRS LISS III data. This mapping illustrates the differing rates of glacier area loss throughout the region. Additionally, the Geological Survey of India (GSI) and various institutes and universities, under the projects funded by the DST, have conducted mass balance studies on a number of glaciers. The findings reveal that most Himalayan glaciers are melting or retreating at varying rates in different regions.

According to *Steps To Preserve The Himalayan Glaciers* (Rajya Sabha Unstarred question, 2023), the mean retreat rate of the Hindu Kush Himalayan glaciers is 14.9 ± 15.1 metre/annum (m/a). This rate varies by river basin: 12.7 ± 13.2 m/a for the Indus basin, 15.5 ± 14.4 m/a for the Ganga basin, and 20.2 ± 19.7 m/a for the Brahmaputra basin. However, glaciers in the Karakoram region have shown comparatively minor length change (-1.37 ± 22.8 m/a), indicating more stable conditions.



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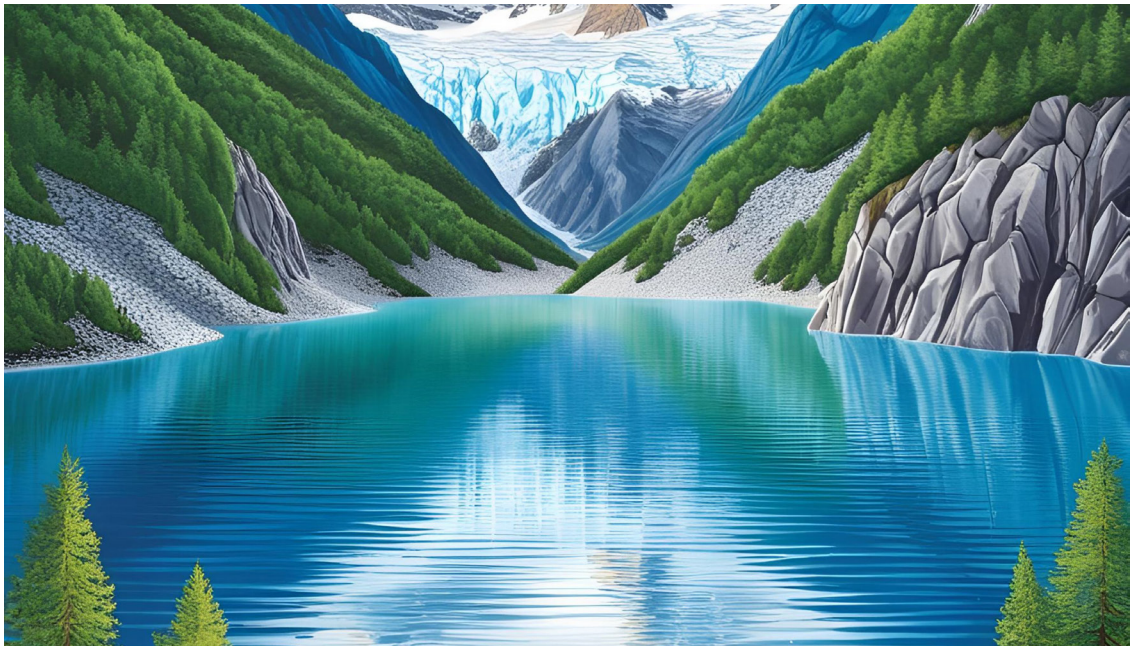
Glacial Lake Outbursts

One of the major consequences of glacier melting is the creation of glacial lakes, which can lead to devastating floods. This was seen in Sikkim in 2023, where numerous casualties occurred and extensive damage was inflicted on infrastructure. In response, a high-level committee chaired by the Union Home Minister has approved a glacial lake outburst flood (GLOF) risk mitigation project worth Rs 150 crore for the states of Himachal Pradesh, Uttarakhand, Sikkim, and Arunachal Pradesh. This project aims to support state governments in implementing various mitigation measures related to GLOF (PIB, 2024). Following the 2023 Sikkim disaster, the government initiated an early warning system for 188 critical lakes in the Indian Himalayan Region prone to GLOFs. Joint expeditions have been organised to assess risks and plan mitigation measures.

Policies and Programmes

To address glacier retreat while considering the delicate balance of nature, it is essential to emphasise policies and regulations at both mitigating climate change and implementing adaptation-based measures with community involvement. Reducing greenhouse gas emissions, establishing protected areas around glaciers, regulating tourism activities in glacial regions, managing water resources, and building community resilience in affected areas are some effective strategies to reduce or slow down glacial melting. Additionally, initiatives that use traditional water harvesting techniques, build artificial glaciers, set up early warning systems, and use AI/satellite-based glacier monitoring can be prioritised. Protecting and restoring forests to act as carbon sinks, providing carbon credit for conservation within communities, promoting investment in renewable energy, and ensuring adherence to energy efficiency standards are also important actions to take.

In India, glacier preservation is guided by policies and initiatives that address climate change, particularly the National Mission for Sustaining the Himalayan Ecosystem (NMSHE). The mission is part of the National Action Plan on Climate Change (NAPCC), launched in 2008. The NMSHE focuses on enhancing our understanding of the Himalayan environment and its conservation, including preserving glaciers. In 2023, the Parliamentary Standing Committee on Water Resources recommended the establishment of an overarching apex body for glacier management in the country. The committee highlighted the inadequacy of current monitoring systems and emphasised the



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need for proactive hazard assessment and risk management. Given these concerns, it is therefore urgent to draft a glacier preservation and governance framework across the Hindu Kush region with enhanced coordination across various institutes, organisations, and government machinery for the preservation of glaciers and to reduce the vulnerability of people to unprecedented disasters.

Conclusion

Taking cognisance of the strategic role of glaciers to maintaining planetary health, the UN General Assembly adopted a resolution in 2022 to declare 2025 as the International Year of Glaciers' Preservation. Additionally, it proclaimed March 21 of each year as the World Glacier Day, beginning in 2025. This initiative provides a unique opportunity to prioritise the preservation of these vital ecosystems, raise awareness about the importance of glaciers, snow, and ice in the climate system and hydrological cycle, and engage stakeholders in raising awareness, promoting action, and strengthening policy frameworks. Since glaciers in the Himalayan region span multiple boundaries, it is often important to promote scientific understanding of this fragile ecosystem. This collaboration can facilitate the implementation of sustainable measures and best practices for the preservation of glaciers, encouraging transboundary cooperation, knowledge-sharing, innovative approaches, and financing efforts. ❐

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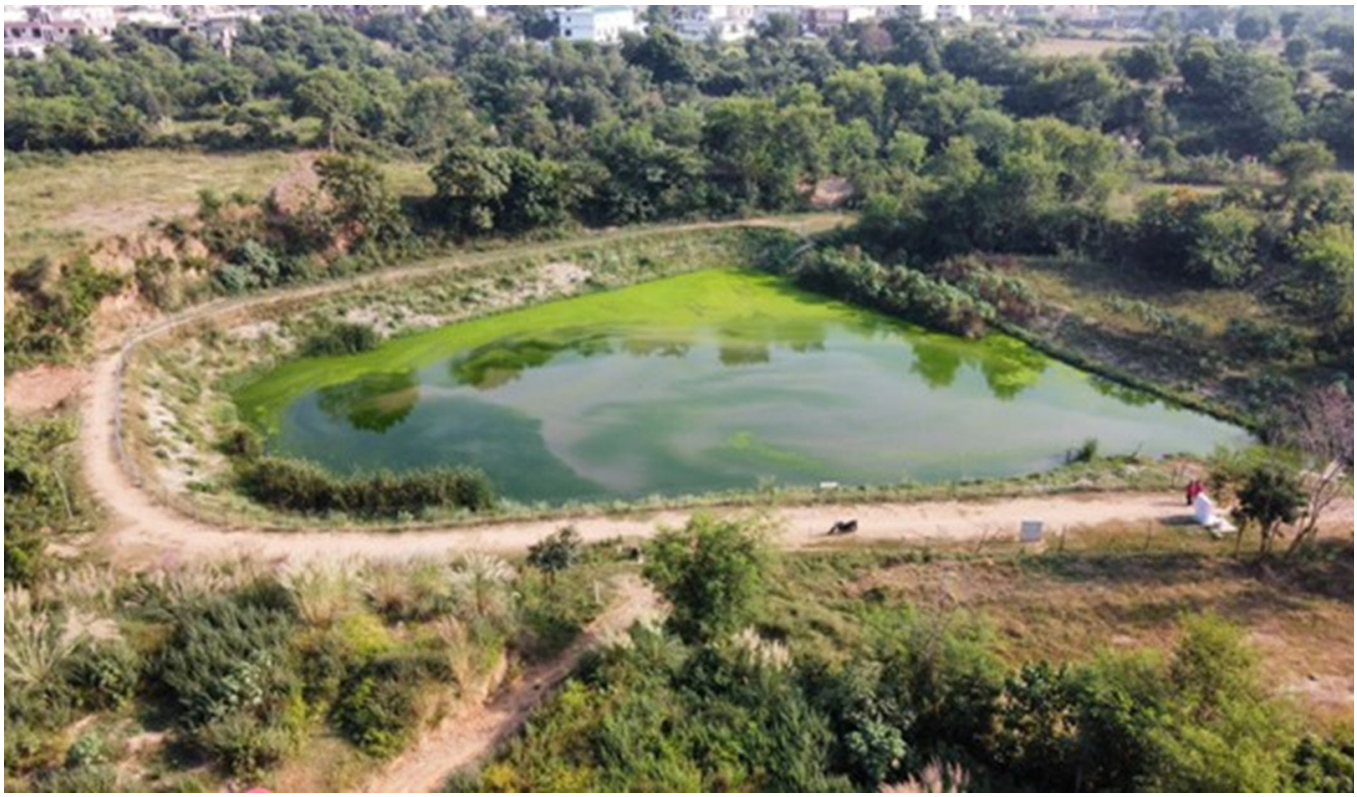
Reviving Life: One Pond at a Time!



The pond in Nalagarh after it was rejuvenated

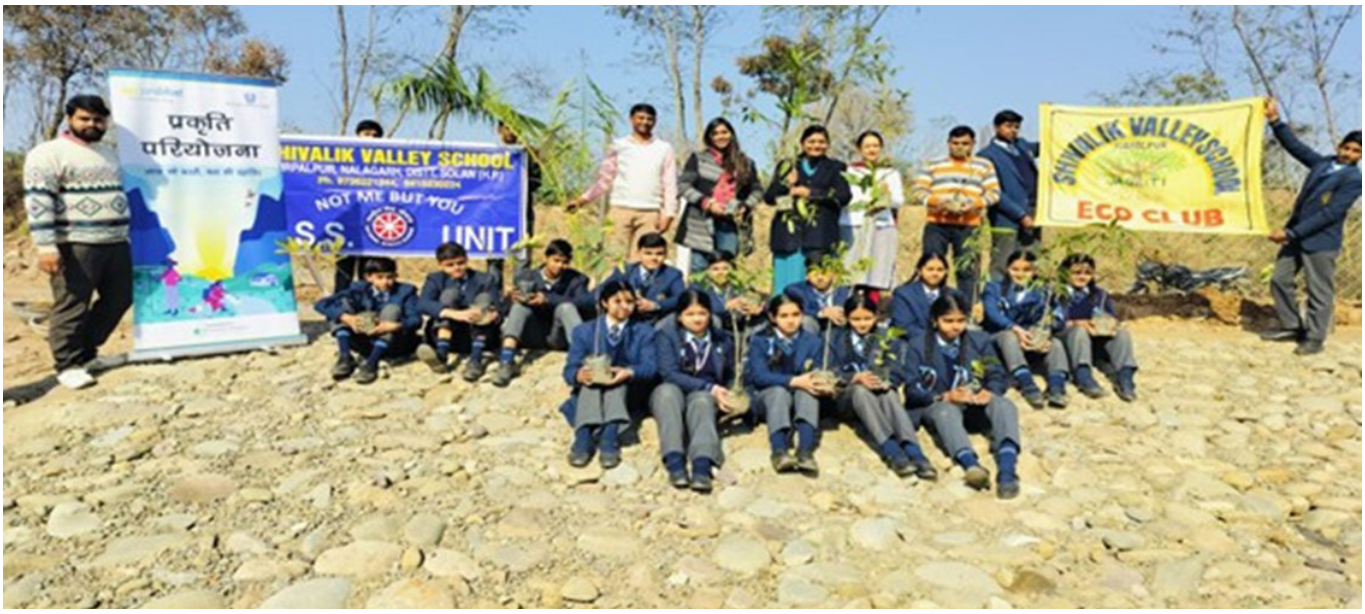
Just a year ago, the pond in Nalagarh, located in the Solan district of Himachal Pradesh, was a neglected wasteland. Layers of silt had settled at its bottom, turning it into a dumping ground. Over time, it became a forgotten relic of what was once a vital water source for the community, symbolising lost potential.

However, today, the situation tells a different story. Birds skim the surface of the water, trees line its banks, and villagers once again gather by its edge. Through strategic community engagement and collaboration with the Gram Panchayat, the pond's transformation is the result of an ambitious rejuvenation project under the HUL Prakriti initiative, supported by HUL Prabhat and led by Development Alternatives.

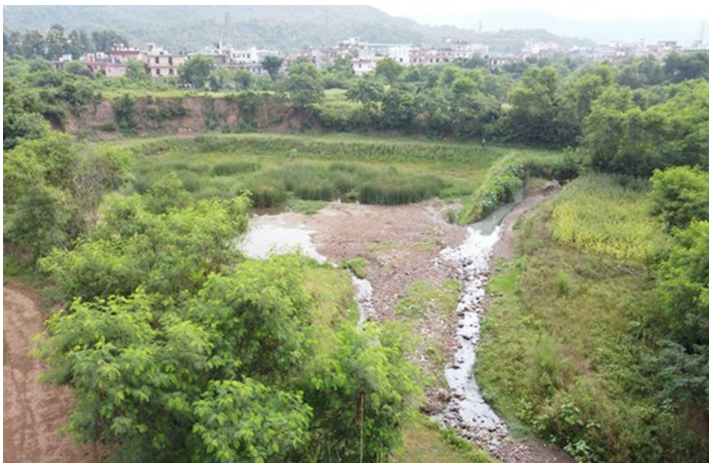
The revival process began with essential steps to restore the pond's original depth and capacity. Extensive excavation and bund strengthening were carried out, along with strategic stone pitching reinforced by the engineers to prevent monsoon-driven erosion that had gradually choked the pond's water levels. A significant enhancement was the construction of a new concrete check dam, ensuring a consistent water supply throughout the year. Sustainable measures, such as fencing and afforestation, have redefined the landscape, making it a biodiversity hotspot that attracts migratory birds and instills community pride.

For the people of Nalagarh, the benefits of this revival extends beyond being a scenic recreational hub. The pond now serves as a crucial water source for the village, supporting not just households but also livestock. The project positively impacts a 20-hectare catchment area, directly benefiting 3 hectares, with a substantial water storage capacity of 10,060 cubic meters.

Recognising the pond's long-term significance, Development Alternatives envisioned it as a valuable asset to be leveraged by the community and future generations. Shivalik



Shivalik Valley School in Nalagarh officially adopted the pond to promote its sustainability



A pre-rejuvenation picture of the pond

Cleaning and desilting of the pond

Valley School, located nearby, stepped forward to officially 'adopt' the pond, pledging to ensure its upkeep. What began as a promise of maintenance quickly evolved into a more ambitious project. Through a series of impactful activities, including plantation drives, eco-friendly events, clean-up initiatives, and landscaping projects, the partnership demonstrated how educational institutions can play a pivotal role in instilling a deep-rooted understanding of ecological conservation among students.

Initiated in May 2024, this partnership between Development Alternatives and HUL Prabhat has yielded tangible impacts. It has reinforced the idea that conservation is not just about restoring nature but about ensuring its sustainability. By engaging local institutions, the project has sparked a small but significant shift—turning a neglected pond into a blueprint for how communities can reclaim their natural resources. ❐

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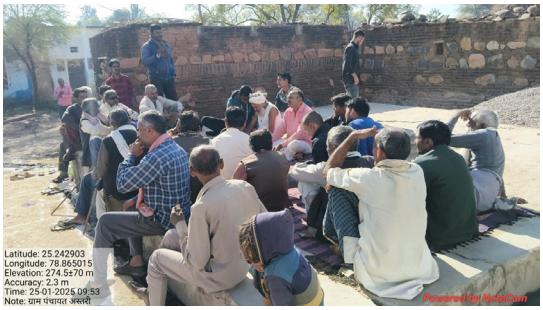
Reviving Water Security in Bundelkhand: A Community-Led Initiative

Water quality testing and demonstration by water user group members

Just a few months ago, water accessibility in the Niwari district of Bundelkhand was a significant challenge for rural communities. Limited resources, poor water management, and minimal representation of marginalised groups in decision-making processes contributed to inequitable water distribution. However, a new initiative under the Jal Jeevan Mission, supported by Development Alternatives and the Azim Premji Foundation, is paving the way for a more inclusive and sustainable future.

The project began its first quarter with an extensive assessment and planning phase, focusing on 25 villages in the Niwari district. Key activities included participatory rural appraisal (PRA), baseline surveys, drainage mapping, and village profiling. These activities provided critical insights into existing water resources and community needs, ensuring that future interventions are both informed and effective.



Focus group discussion with community for village action plan formation

The PRA exercises, conducted in 20 out of the 25 targeted villages, were instrumental in engaging community members and identifying urgent water-related issues. Baseline surveys are currently in the early stages, with finalised questionnaires now ready for data collection. This data will be used to develop village action plans (VAPs) in the upcoming quarter, allowing for strategic water management interventions.

Key Achievements: Progress So Far

The project has made considerable progress in strengthening water security in Bundelkhand. PRA exercises were successfully completed in 15 villages, with the approval of the respective gram panchayats. These activities identified key water-related challenges and potential areas for improvement. Through active community participation, village profiling and mapping exercises were also carried out, documenting socio-economic

PRA exercise in Gram Panchayat Devrinayak

conditions and water resource availability. This effort led to the creation of social and resource maps.

A crucial aspect of the project is to establish and strengthen village water and sanitation committees (VWSCs). To date, 25 active community members from 9 villages have been identified to lead these efforts, ensuring community-led water management and sanitation practices. Additionally, approvals were secured from Gram Panchayats for handpump repairs in five villages. Upcoming steps will include repair work and drafting a standard operating procedure (SOP) for sustainable maintenance.

Building local partnerships remains integral to the project's success. Six key meetings were conducted with Gram Panchayats to introduce project objectives and identify proactive community members for water management initiatives, fostering local leadership and ownership. Water quality testing has commenced in three villages—Churari, Matagarh, and Chandrawan—where eight samples have been analysed for key parameters such as pH, total dissolved solids, turbidity, hardness, alkalinity, chloride, fluoride, iron, nitrate, and faecal coliforms. To enhance community engagement, 13 community members across these villages have been trained to conduct their own water tests using the Jal TARA water testing kit, empowering them with the knowledge to ensure safe drinking water.

Water quality testing orientation in community

Next Steps: Charting the Path Forward

- Finalising the Baseline Survey Report: The collected data will be analysed to draft a detailed report that will serve as the foundation for future interventions.
- Improving VAPs: Tailored strategies will be submitted to Gram Panchayats based on baseline survey findings.
- Expanding VWSC formation and strengthening: Additional community leaders will be identified to establish and empower VWSCs in more villages.

Enhancing community engagement through workshops and training sessions

- Enhancing capacity-building initiatives: Community workshops and training sessions will be conducted to instil long-term knowledge and practices for sustainable water management.

By engaging in strategic planning, community participation, and collaborating with local governance bodies, this initiative, supported by Development Alternatives and the Azim Premji Foundation, addresses not only immediate water concerns but also establishes the groundwork for long-term water security and resilience in Bundelkhand. ❐

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Take Part in the Movement to Ensure Clean Water for All!

EMPOWER YOURSELF WITH WATER QUALITY KNOWLEDGE

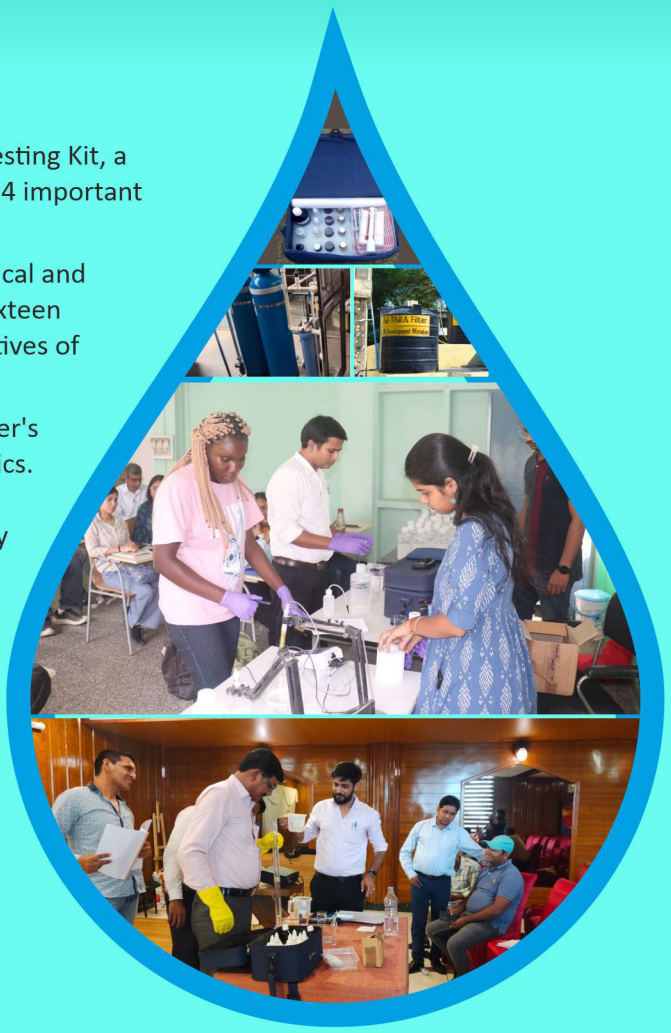
Acquire the necessary abilities to properly evaluate and track water quality. Empower yourself and get professional training!

Key Highlights:

- Practical instruction with the Jal Tara Water Testing Kit, a user-friendly field instrument that evaluates 14 important water parameters.
- Discussions with professionals on the theoretical and practical facets of water quality evaluation. Sixteen candidates participated, including representatives of NGOs and IIT students.
- Experience in the field and lab evaluating water's physical, chemical, and biological characteristics. People are now more equipped to actively participate in their communities' water quality management because to this programme. They are prepared to promote change for safer and cleaner water using the Jal Tara kit and their newly acquired knowledge.
- Sonbhadra's Safe Drinking Water!

  Five villages now have community-operated solar-powered filters.

  Providing Water Free of Fluoride to More Than 250 Households - Powered by LIC Housing Finance Ltd.



Join us in ensuring a sustainable water future!

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