Springshed management in the Himalaya

Ensuring water security and enhancing climate resilience

Background

Drying up of springs has increased water insecurity for many communities in the Indian Himalayan Region (IHR). According to a NITI Aayog report (2018)[1], nearly 50% of springs in the IHR have dried up or have reduced discharge. Spring water quality has also diminished. Drying up of springs not only affects rural water security, but also river flows, riparian and wetland ecosystems, and biodiversity. Climate change is expected to further exacerbate these problems.

To address the issue of drying springs and deterioration of water quality across the Hindu Kush Himalaya (HKH) region, ICIMOD and its partners are implementing an action research project to support and strengthen the capacity of state actors and institutions for spring rejuvenation in the IHR. The aim is to promote science based and socially inclusive springshed management approaches and community-based solutions to build resilience against climate change and other evolving threats to water security.

About the project

The core purpose of the project is to advance scientific and socially inclusive spring revival strategies. The project will contribute to the conservation and rejuvenation of springs using a multi-disciplinary springshed management approach – one based on local and scientific hydrogeological knowledge, and mechanisms for inclusive governance. The project aims to improve policies and programmes around springs through action research, capacity building, and the development of a Decision Support System (DSS) and guidelines for implementation of springshed management interventions tailored to the diverse contexts of the IHR. The project also complements the efforts of ICIMOD to promote systematic management of springsheds in the HKH Region.

The project is supported by the Swiss Agency for Development and Cooperation (SDC) as a part of the Strengthening State Strategies for Climate Action (3SCA) Phase 2 known as the Strengthening Climate Change Adaptation in Himalayas (SCA-Himalayas) Project.

Impact of the project

The project will contribute to water security and enhance socio-ecological and climate resilience through springshed management in the Indian Himalayan Region.

Outcome

Springshed management will be mainstreamed into national and state level policies and district level plans in the IHR, while ensuring both practical and research-based evidence from the ground.

Outputs

The project will have the following outputs:

Output 1: Evidence-based information and knowledge developed through action research.

Output 2: Improved knowledge and skills for mainstreaming and scaling up springshed management through capacity building.

Output 3: Policy and decision-making processes supported for expanding springshed management in IHR.

Output 4: Project findings strategically communicated at local, national, regional, and global levels.

The approach

The project will use a scientific and participatory approach and methodology based on a customised six-step protocol for spring revival (Shrestha et al. 2018)[2] and advanced scientific techniques co-developed by ICIMOD, Advanced Center for Water Resource Development and Management (ACWADAM) and Indian Institute of Technology (IIT) Roorkee. This approach will be implemented with ground-level local partners at four pilot locations.

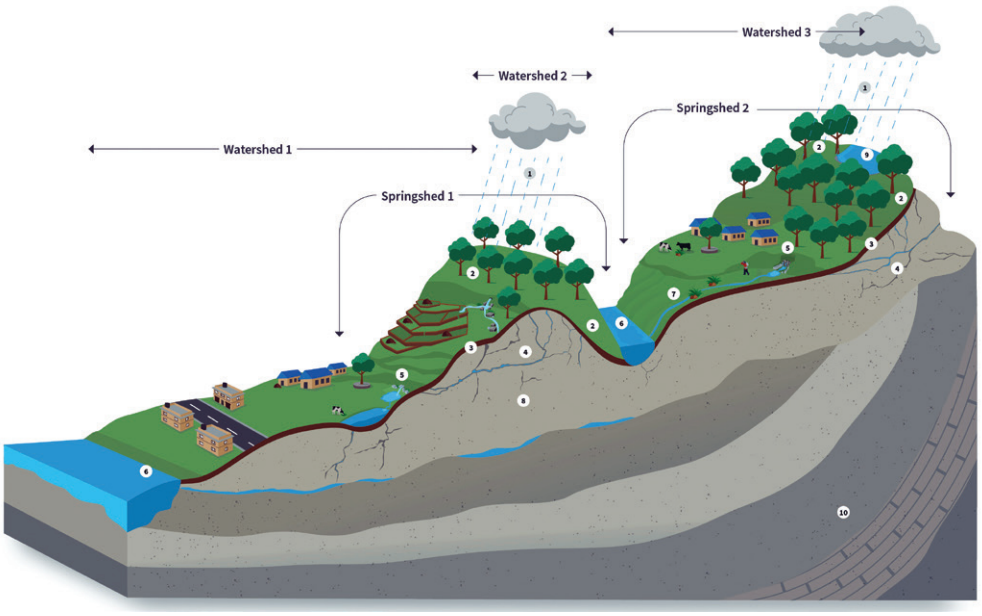
Action research sites

The four action research sites, one each in four selected states across the IHR, vary in geology, ecology,

What is a springshed?

A springshed is a set of watersheds and aquifers that integrate into a system that supplies water to a group of springs.

1. Rainfall
2. Spring recharge zone
3. Top soil
4. Groundwater flow
5. Spring (groundwater discharge)
6. Stream
7. Runoff
8. Aquifers
9. Pond
10. Bedrock



and agro-climatic and socio-economic conditions.

- Himachal Pradesh and Uttarakhand in the western part of the IHR, and Sikkim and Manipur in the eastern part of the IHR.

The location of the sites in these states will be decided in consultation with the respective state governments and local communities.

Methodology

Across all four sites, the project will carry out spring-discharge assessments using flumes. Water sensors will be installed for measuring spring water discharge fluxes and an automatic weather station (AWS) to record weather phenomena.

In two of the four sites, aquifers will be mapped using a piezometer, and water-balance studies conducted using stream flow monitoring. Isotopic studies will be conducted for validating hydrogeological assessments and delineating recharge areas.

An online Digital Support System (DSS) will be developed based on the work in the action research locations by integrating geospatial and remote sensing tools and appropriate climate and hydrological modelling techniques to estimate the water balance at local scale.

Training of trainers

As part of the process, there will be a context and region-specific training of trainers for key resource persons from local communities and relevant state departments. This training will focus on developing springshed management strategies, and build action research capacities in the design, implementation, and impact assessment of springshed management.

Sharing findings and outcomes

There will be a consultation with representatives from all IHR states and union territories to develop common guidelines for Himalayan states to plan and implement springshed management projects and programmes.

Project progress, findings and outcomes will be shared with relevant state departments, NITI Aayog and Swiss Agency for Development and Cooperation (SDC) through a strategic outreach and communication plan. A web portal on springs, designed and developed by ACWADAM under the IHCAP-Phase 2 project of SDC and Department of Science and Technology (DST), Government of India will be further enhanced for dissemination and outreach in other parts of the HKH.

While the field implementation of this project covers four IHR action research sites, the lessons from the experience will inform ways in which spring rejuvenation can be scaled up in IHR through capacity building, knowledge sharing and co-developing guidelines and decision support systems. The knowledge and experiences will also be shared at the regional level, aligning with ICIMOD's Resilient Mountain Solutions work in Bhutan, Nepal, and Bangladesh.

Partners

- International Centre for Integrated Mountain Development (ICIMOD)
- Advanced Center for Water Resources Development and Management (ACWADAM)
- IIT Roorkee
- Field partners / Local NGOs

Strategic partners:

- Relevant central, state government and district agencies
- Training institutions
- Village institutions

[1] NITI Aayog (2018). *Report of Working Group I: Inventory and Revival of Springs in the Himalayas for Water Security*. https://niti.gov.in/writereaddata/files/document_publication/doc1.pdf

[2] Shrestha, RB; Desai, J; Mukherji, A; Dhakal, M; Kulkarni, H; Mahamuni, K; Bhuchar, S; Bajracharya, S. (2018). *Protocol for reviving springs in the Hindu Kush Himalayas: A practitioner's manual*. ICIMOD Manual 2018/4. Kathmandu: ICIMOD

ACWADAM

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