A Stepwise Protocol for Reviving Springs in the Hindu Kush Himalaya

ICIMOD

Springs: A lifeline for communities in the midhills

Springs—also called *dhara*, *mool*, *kuwa*, *naula*, and *chasma*, are the most important source of water for millions of people in the midhills of the Hindu Kush Himalaya (HKH). Spring water is used for drinking, irrigation, domestic, and religious purposes. Springs also perform important ecological functions, like supporting local vegetation and wildlife, and maintaining baseflow in rivers.

Uses of springs

Drinking and domestic uses | Irrigation | Ecological services

Springs are drying

There is increasing anecdotal evidence from across the HKH that springs are drying up, leading to acute water stress. This evidence is largely anecdotal as few systematic and scientific studies have been conducted on this topic.

Why are springs drying?

- Climate change, especially rainfall
- Land cover and land use changes
- Socioeconomic and demographic changes

Drying of springs leads to:

- Drinking and domestic water insecurity in rural and urban areas
- Irrigation water insecurity in the hills
- Poor ecosystem services – e.g., low baseflow and human-wildlife conflicts

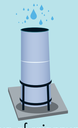
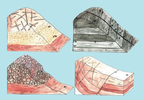
Genesis of the spring revival protocol

In December 2015, researchers and practitioners working in the HKH region came together at a workshop in Gangtok, Sikkim, India, to develop a common methodology for reviving springs. The discussions took into the account the lack of scientific studies on the subject and the need for incorporating elements from the natural and social sciences into spring revival implementation activities.

Integrating physical with social, and science with implementation

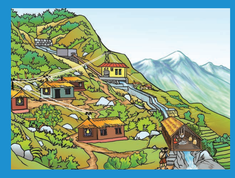
The uniqueness of this methodology lies in its power of integration. Given the complexity of the issue and the urgency with which it needs to be addressed, the methodology has been designed to be as useful to field practitioners as it is to researchers. Each step of the protocol is relatively easy to follow and is capable of generating scientific information necessary for project implementers to decide what infrastructure they need to invest in to help revive springs.

Spring revival protocols

STEPS	SUB-STEPS	LEADS TO	
1. Comprehensive mapping of springs and springsheds	1.1: Collect background information of identified area 1.2: Reconnaissance survey 1.3: Map springs and collect data 1.4: Delineate springshed area	 Delineation of water tower	 Comprehensive map of springs
2. Setting up a data monitoring system	2.1: Data collection (why, who, where, what, how) 2.2: Data storage and management 2.3: Data analysis (software development, app development) —Hydrograph/basic software 2.4: Share data with community	 Setting up of raingauge station	 Hydrometeorological data in Excel
3. Understanding social and governance aspects *Lorem ipsum*	3.1: Analyse existing institutions and systems of management using: questionnaire survey, focused group discussions, key informant interviews, and communication and dialogue with community and public policy makers	 Management of spring by the local community	 Questionnaire survey tool
4. Step 4: Hydrological mapping, layout development, and Identification of recharge area			
4a. Hydrogeological mapping	4.1: Obtain geological map of the area 4.2: Observe geology during transect walk: latitude, longitude, elevation, spring location, geological observations, and measurements 4.3: Create a base map using Google Earth/Toposheet	 Excel format of hydrogeological data	 Google-based base map
4b. Creating a conceptual hydrogeological layout of springshed	5.1: Create a geological map based on the transect walk 5.2: Draft cross-sectional layout	 Geological map of spring and springshed	 Cross-sectional layout
4c. Classifying spring types and identifying mountain aquifer and recharge areas	6.1: Identify spring and aquifer types 6.2: Delineate recharge area	 Example of spring types	 Outline of recharge area
5. Developing springshed management protocols	7.1: Hydrogeological inventory for springsheds 7.2: Negotiable and non-negotiable land use and land cover change 7.3: Institutional mechanism 7.4: Conservation and intervention, measures of recharge and discharge area 7.5: Develop operational and maintenance guidelines	 Revival activities using voluntary labour	 Recharge structures
6. Measuring the impact of spring revival	8.1: Impact study 8.2: Continuous monitoring	 Before	 After

Curriculum development and training

- A detailed curriculum with practical training for field and technical staff from relevant agencies, including NGOS, in ICIMOD regional member countries — Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal, and Pakistan.
- A pictorial manual representing the basic concepts of hydrogeology for community members.



The way forward

The methodology was piloted in Nepal in 2015 and in parts of India before this. Pilot cases have demonstrated that the application of the spring revival protocol helps increase spring recharge substantially. In some cases, average dry season discharge has doubled as a result of recharge interventions.

In India, all 11 mountain states are expected to adopt this approach. The NITI Aayog — formerly, the Planning Commission of India — has constituted a working group for spring revival.

Bhutan's 12th Five Year Plan identifies spring revival as a priority action area. It is expected that this methodology will be implemented in all HKH countries over the next five years.

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