

# Reviving and protecting our springs

Community-based mapping, rehabilitation, and management of springs and springsheds across the HKH

## Fountains of life

Springs are capillaries of the water supply system in the mid-hills of the Hindu Kush Himalayan (HKH) region, which extends across Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal, and Pakistan. They are a profoundly important source of water, feeding into and replenishing streams, rivers, and lakes, and other surface water bodies. They sustain ecosystems and millions of people in the region – supplying water for consumption, irrigation, and domestic use – and are deeply intertwined with religious rituals and cultural identity.

Alarmingly, springs are drying up across the HKH region because of a multitude of factors: climate change, land use change and deforestation in the upper catchments, degradation and loss of traditional ponds and wetlands, poor spring management systems, and unfettered urbanization. The reduced discharge and drying of springs has led to acute water stress among mountain communities, bringing new hardships especially for women and children, who bear the primary responsibility of fetching water in the region.

Springs need to be protected and revitalized if we are to safeguard our ecosystems and secure the well-being of millions.

## Mapping and rejuvenating springs

### MAPPING

To understand where and how springs are drying, we comprehensively study local spring hydrogeology and map spring sources. We try to understand the socioeconomic, policy, and governance aspects of spring management and promote an integrated, gender-responsive springshed management approach. This approach considers groundwater together with surface water. We have been collaborating with partners across the HKH region to map springs in Bhutan, India, Nepal, and Pakistan (Table 1). We will begin mapping activities in Bangladesh in 2021.

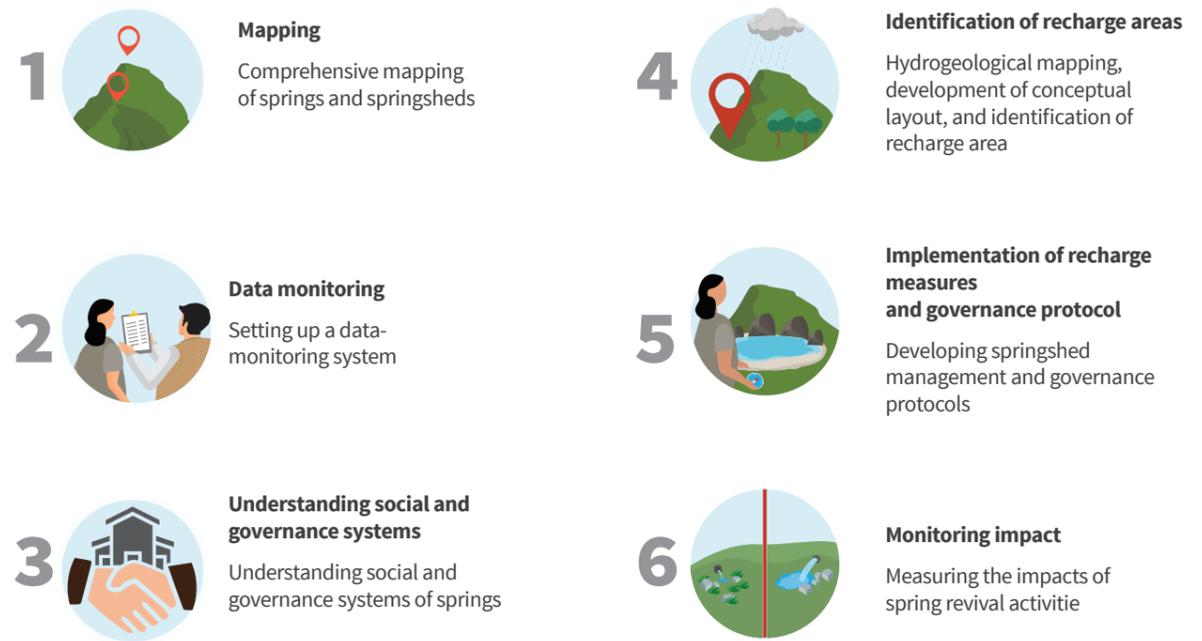
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## Springs mapped by ICIMOD and partners in the HKH region



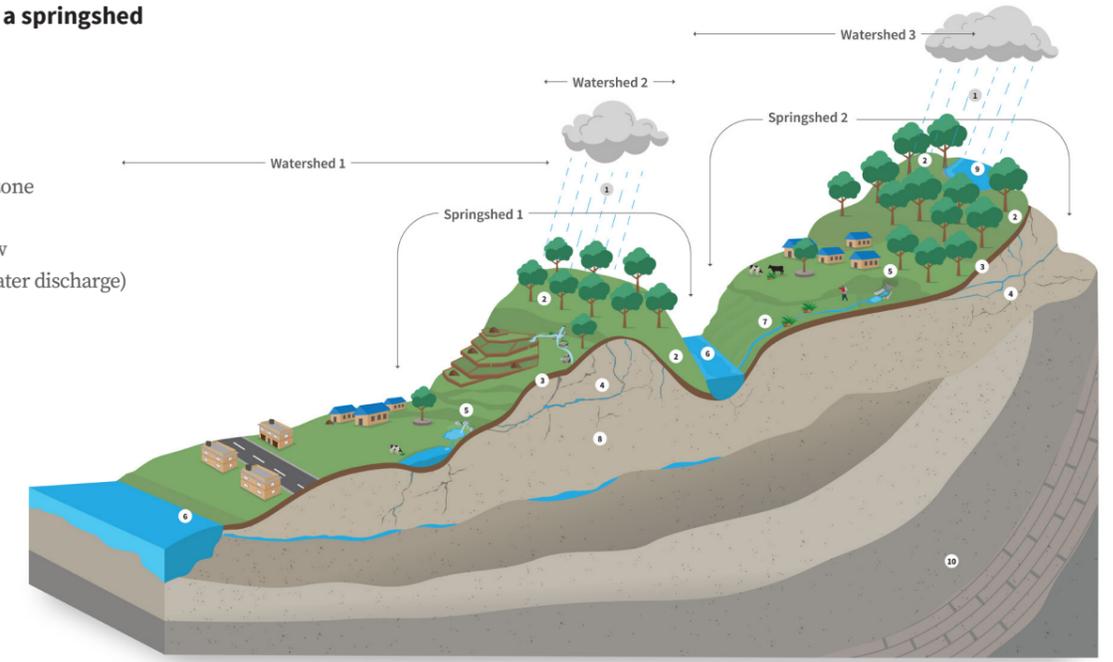
### SIX-STEP PROTOCOL

We are working in close collaboration with our partners across the HKH to revive drying springs following our six-step protocol, developed with the Advanced Centre for Water Resource Development and Management (ACWADAM).



## Cross section of a springshed

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



### RECHARGE INTERVENTIONS

We have implemented recharge interventions in Dailekh, Nepal; Pithoragarh and Kalimpong, India; and Lholing, Bhutan. For spring mapping, we conduct a detailed field survey of springs and other water sources using GPS. Then, we prepare a Google Earth map showing the springs in an area and identify critical springs, which we monitor in the long term through a data monitoring system. This system measures discharge twice a month and collects rainfall data every day through a rain gauge and a local technician. Such data – along with socioeconomic surveys on spring use – help improve understanding of spring behaviour and aquifer characteristics. Comparing data collected before and after the implementation of revival measures shows how effective the recharge interventions have been.

Through hydrogeological mapping of springs, we develop a conceptual layout for each spring, which helps identify spring typology, recharge zone for each springshed, and interventions required within the recharge area. Our recharge interventions involve a broad range of technical, on-field interventions, which are based on the following criteria:

- High dependence of nearby communities
- Low discharge
- Availability of land for intervention

### Ongoing projects

- Resilient Mountain Solutions Initiative: Kavrepalanchok District, Nepal
- Koshi Basin Initiative and Resilient Mountain Solutions Initiative
- Koshi Basin Initiative (in partnership with Department of Forest and Soil Conservation, Government of Nepal and in collaboration with Dhankuta Municipality): Dhankuta, Nepal
- Building water security and resilience in the Himalaya through springshed management: Indian Himalayan Region

### Policy

- Contributed to the sections on data monitoring, analysis on social and governance components and hydrological and social impacts, and capacity building in the report on “Inventory and Revival of Springs in the Himalayas for Water Security”, published by NITI Aayog, Government of India
- Based on the recommendations of the report, spring revival activities are being implemented in all mountain states in India. ICIMOD is supporting implementation of the six-step protocol in four states – Himachal Pradesh, Manipur, Sikkim, and Uttarakhand.



- Collaborated with ACWADAM and the Government of Bhutan's Watershed Management Division to undertake spring and springshed management as a major activity in the country's 12th Five Year Plan (2018–2023)
- Initiated a project in Nepal with the Nepal Water Conservation Foundation (NWCF) on mainstreaming springshed revival and focusing on policy support to government

## Outreach and knowledge sharing

### KNOWLEDGE PRODUCTS

To bolster the implementation of the six-step protocol for reviving springs and springshed management, from 2015 to 2020, we organized nine trainings in Bhutan, India, Nepal, and Pakistan; two exposure visits for Bhutanese officials to pilot sites in India and Bhutan; and six knowledge-sharing events in Bhutan, India, and Nepal. During the same period, we also published numerous knowledge products on springshed work across the HKH region.

### DOCUMENTARY ON SPRING REVIVAL

We produced a short video in 2016 documenting how residents of Dapcha village in central Nepal are coping with drying springs, and how we used a grassroots approach to improve spring water flow and management. The video presents our pilot project in Kavrepalanchowk District, where we mobilized and trained the community to map springs, understand the area's hydrogeology, and identify recharge areas.

Link to video: <https://www.youtube.com/watch?v=9wwnxinE44Q>

### Himalayan spring portal

We are developing a standardized web-based database – the Himalayan Spring Portal – for the storage, analysis, visualization, and reporting of spring-related data for the HKH region.

Link to portal: <http://geoapps.icimod.org/springportal>

### For further information

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