

An Integrated Springshed Management Approach Linking Science, Policy and Practice

Collaborative applied research in the Kailash Sacred Landscape (India and Nepal)

Springs play an important role in the daily lives of thousands of communities in the hills and mountains of the Himalayas. However, in many places once reliable springs are drying up, presenting rural communities, and women in particular, with new challenges. In the Himalayan region, natural springs and their sustainable development are not given due importance at both policy and practice levels, even though they play a critical role in water security. To develop innovative solutions toward sustainable management of these traditional sources of water, there are large gaps in data and understanding that must first be filled. There is also a need to raise awareness among relevant policy and decision makers and to develop skills and share knowledge on this critical topic with field practitioners and community members. There is a gap in quality data on the level of dependence of local populations on springs and the role these play in nurturing cultural services and building resilience.

The International Centre for Integrated Mountain Development (ICIMOD), together with partners in the region, is working to understand drying springs, promote awareness of the importance of groundwater recharge in the productivity of springs, and build capacities to protect and develop springsheds across the Himalayas. In several of ICIMOD's transboundary landscape and river basin initiatives (e.g., HI-AWARE, WLE, KSLCDI), a springshed approach is being piloted.

Table 1: Seven-step approach to reviving springs

- Step 1 Comprehensive mapping of springs and springsheds
- Step 2 Setting up a data monitoring system
- Step 3 Understanding spring governance systems
- Step 4 Hydrogeological mapping
- Step 5 Creating a conceptual hydrogeological layout
- Step 6 Classification of spring type, aquifer, and recharge area
- Step 7 Developing springshed management protocols



Opportunities for Applied Research: Bringing the science

Applying hydrogeology for understanding spring systems and their management including recharge and conservation at landscape scale, this adapted approach aims to improve groundwater availability on the basis of a scientific and systematic assessment of water storage and water quality for drinking and agricultural purposes. An initial assessment by ACWADAM in Meghalaya, Sikkim, and Uttarakhand found that 80-90% of the population depends on springs. This is likely true across the mid-hills of the Himalayan region, but there is no accurate data to confirm this. ICIMOD sees this as an opportunity to contribute to filling data gaps, including through embedding a hydrogeological-based springshed approach in integrated watershed management strategies, developing a regional map on springs, and preparing simple 'how-to notes' on techniques that can be used to support groundwater recharge and improve groundwater quality. Through the Kailash Sacred Landscape Conservation and Development Initiative (KSLCDI), mapping of springs, including hydrogeology, and building the capacity of locals on managing groundwater and sanitation issues in Pithoragarh District in India and Darchula District in Nepal is underway.

Understanding 'lithodiversity'

Forests, land, and farms have obvious links to biodiversity. These landscapes are seen at the surface level – such as different types of trees and animal species. What people, including scientists, don't yet recognize is that what is underneath the Earth's surface – the lithosphere (rocks and geology) is an ecosystem in itself. The term 'lithodiversity' has been coined within the context of springshed management to represent the diverse underground elements that influence groundwater flow.

If a spring dries up, there are direct consequences on the larger ecosystem it is a part of: the soil will go dry, the nutrients in the soil will reduce and forests will suffer. If a wetland that supports a unique bird dries up, then what happens to the entire wetland ecosystem? There is no holistic concept of the ecosystem that doesn't consider hydrogeology. Biodiversity in conjunction with lithodiversity is something that needs to be looked into in the future, ICIMOD's efforts to study springs under this initiative will generate good understanding of how these two are entwined.

Figure 1: Demonstration sites for reviving drying springs in the Kailash Sacred Landscape of India and Nepal

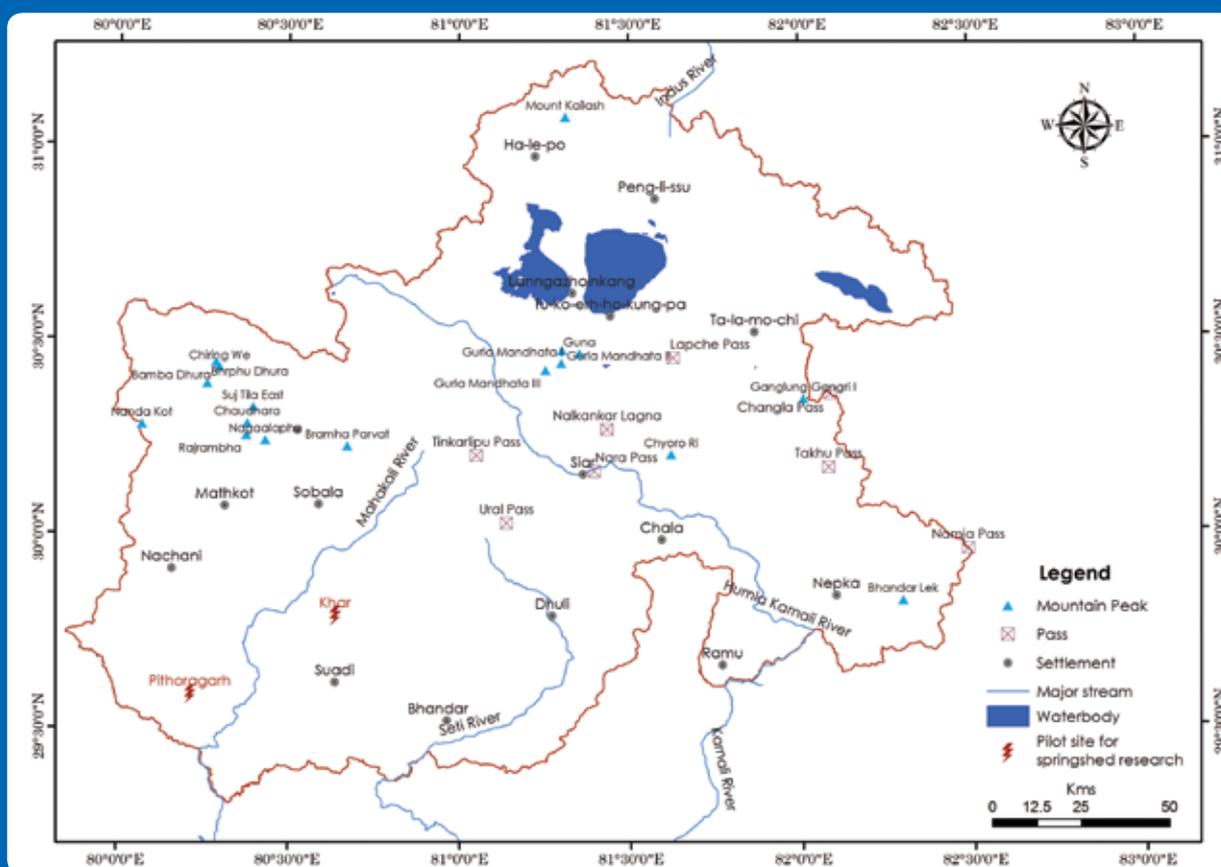
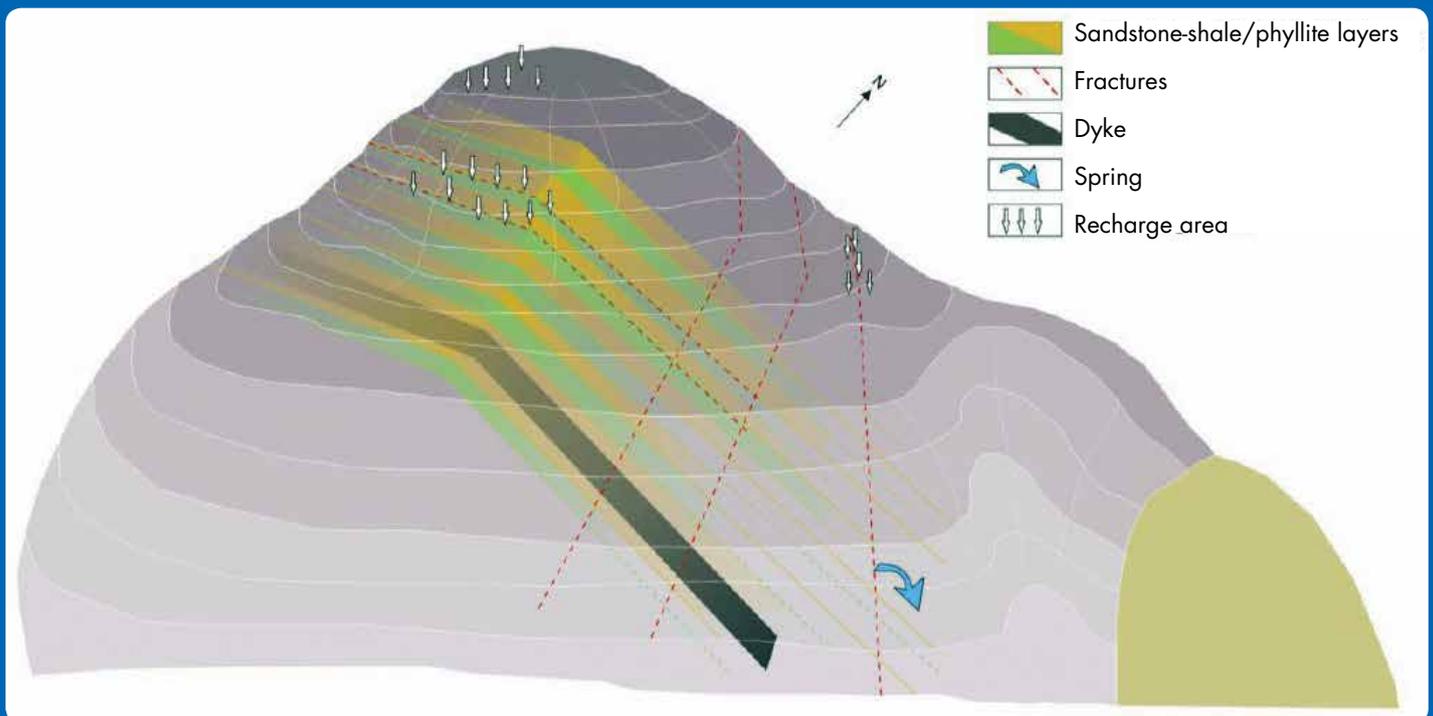


Figure 2: Understanding lithodiversity and spring hydrogeology



Source: ACWADAM



Opportunities for Policy Change: Contouring for influencing policy

Springshed management aims to identify local level governance issues related to the management of springs and – based on pilot knowledge across larger landscapes of the KSL – link these to future water security related policies, public schemes, and development strategies. There are opportunities to work and collaborate on:

- Inventory of springs in the region
- Inventory of key policy issues
- Understanding policy issues through scientific and participatory springshed management by working with state and local governments in pilots
- Defining the contours for policy improvement and national springs programme

There is a need for policy change related to groundwater conservation and use in the Himalayan context. Due to a lack of understanding on springs and groundwater resources, private holdings and enclosing water are serious concerns related to water security and water use rights. In most customary traditions on land and water use, the right to use water has been dependent on the use or ownership of land. Further to this, climate change is impacting springs and unplanned development across the Himalayas is disturbing the flow of groundwater systems and affecting spring discharge.

Opportunities for Community-Level Water Management: Governing the mountain million

Springshed management looks into community level water management systems and has the potential to change the perception of springs from a 'source' to a 'resource'. There is a need to look into issues of equity, demand and supply, rights of landless people, community participation, and the sustainable use of water. Springshed management could also empower communities to establish rights over the water they manage and address issues of efficiency, equity, and sustainability. At the same time, it is an approach that comes with a word of caution that no intervention leads to unlimited augmentation of water and that managing both supply and demand are important.

- Training local village men and women in basic hydrogeology
- Socioeconomic surveys and improved understanding existing governance structures
- Conceptualizing springshed development programmes
- Implementation of spring management plans (including the construction of ponds and trenches, plantations in recharge zones, and addressing grazing and open defecation to ensure water quality)
- Monitoring spring revival, including includes continuous spring discharge measurements for which revival plans have been implemented
- Sensitizing policy makers and other research and development institutions to look at springshed management from a different angle.



For further information contact

Nawraj Pradhan
Rajan Kotru
Aditi Mukherji

nawraj.pradhan@icimod.org
rajan.kotru@icimod.org
aditi.mukherji@icimod.org

© ICIMOD 2015

International Centre for Integrated Mountain Development

GPO Box 3226, Kathmandu, Nepal

Tel +977 1 5003222 Email info@icimod.org Web www.icimod.org

Photo: Jitendra R Bajracharya, Nawraj Pradhan, Corinna Wallrapp

ICIMOD gratefully acknowledges the support of its core donors: the Governments of Afghanistan, Australia, Austria, Bangladesh, Bhutan, China, India, Myanmar, Nepal, Norway, Pakistan, Switzerland, and the United Kingdom.

Prepared by ICIMOD Publications Unit, November 2015