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Springshed management and governance roadmap

(2025–2030)



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Springshed management and governance roadmap

(2025–2030)

List of abbreviations

AF	Adaptation Fund	KU	Kathmandu University
BS	Bikram Sambat (Nepal's official calendar)	LAPA	Local Adaptation Plans of Action
CFUGs	Community Forest User Groups	MEL	Monitoring, Evaluation, and Learning
CRPs	Community Resource Persons	MoF	Ministry of Finance
CSOs	Civil Society Organisations	MoFAGA	Ministry of Federal Affairs and General Administration
CSR	Corporate Social Responsibility	M&E	Monitoring and Evaluation
DoI	Department of Irrigation (Nepal)	NGOs	Non-Governmental Organisations
DRR	Disaster Risk Reduction	NWRP	National Water Resource Policy
DSS	Decision Support System	PES	Payment for Ecosystem Services
DWRC	District Water Resource Committee	PWDs	Persons with disabilities
FY	Fiscal Year	RM	Rural Municipality
GCF	Green Climate Fund	SDGs	Sustainable Development Goals
GEDSI	Gender Equality, Disability, and Social Inclusion	TU	Tribhuvan University
GESI	Gender Equality and Social Inclusion	WASH	Water, Sanitation and Hygiene
GoN	Government of Nepal	WECS	Water and Energy Commission Secretariat
HI-GRID	Building Capabilities for Green, Climate Resilient and Inclusive Development	WSM	Watershed Management
HI-REAP	Himalayan Resilience Enabling Action Programme	WUGs	Water User Groups
ICIMOD	International Centre for Integrated Mountain Development		
INGOs	International Non-Governmental Organisations		
IWRM	Integrated Water Resources Management		
KPIs	Key Performance Indicators		

Executive summary

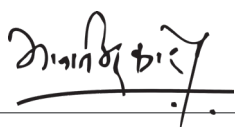
Millions of people in the hill and mountain communities rely on fresh water from springs. Unfortunately, these vital sources are now in a state of crisis. Recent mapping in participating municipalities of Kavrepalanchok and Dhankuta of Nepal, reveals that over a quarter of springs have dried up completely, and 60-75% of those remaining show declining discharge. This degradation, driven by climate change, land-use change, and unsustainable development, threatens water security, livelihoods, and community resilience. This directly undermines progress towards national and global development goals.

This roadmap on springshed management (2025-2030) provides an actionable path to reverse this trend. Developed through a collaborative sub-national policy workshop with mayors and technical officials from four municipalities and two rural municipalities of Kavrepalanchok district, one municipality and one rural municipality of Dhankuta district and one municipality of Khotang district this document outlines a unified strategy to mainstream springshed management across all levels of governance, especially at the local level.

The roadmap is guided by 12 core principles that blend community stewardship and gender equality and social inclusion (GESI), with scientific knowledge and policy action. It presents a phased action plan with strategic goals, dedicated pillars for implementation, and a robust framework for monitoring, evaluation, and learning. The collective vision is to transform springshed management by uniting communities, technology, and governance to ensure the perpetual flow of springs for generations to come. Achieving these demands requires immediate and committed action from every sector of society.

Endorsement of the sub-national springshed management roadmap

This roadmap has been jointly reviewed, endorsed and adopted by four municipalities and two rural municipalities of Kavrepalanchok district; one municipality and one rural municipality of Dhankuta district and one municipality of Khotang district. Through this endorsement, the participating local governments affirm their shared commitment to the sustainable conservation, restoration and management of springs and springsheds, and to the implementation of the strategic priorities and actions outlined in this roadmap.



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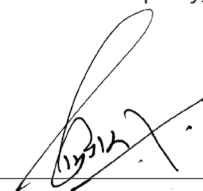
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Chintan Tamang

Mayor

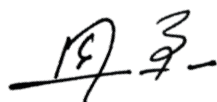
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CHAPTER 1

Introduction

Background

Addressing springshed and watershed management challenges at the municipal and provincial levels offers clear advantages over fragmented, village-level, or project-based interventions. A sub-national approach allows for holistic management of upstream-downstream linkages, enables pooling of resources and financing, and ensures consistent policies through harmonised regulations. It supports capacity building, technical assistance, integrated land-use planning, and broader stakeholder engagement, while promoting gender equality and social inclusion (GESI). Institutionalised data systems and monitoring facilitate adaptive management, climate-resilient strategies, and conflict mediation. By aligning with national and global commitments, including the Sustainable Development Goals (SDGs) and Nepal's National Watershed Management Strategy (2080), this approach enables systematic, inclusive, and sustainable springshed management, especially when federal guidance and technical support are also effectively leveraged. Nepal's sub-national governments, including provinces and municipalities are pivotal in leveraging these advantages. With federal policy guidance and technical support, they can create a more effective, equitable, and sustainable approach to springshed and watershed management that safeguards ecosystems while securing water for people, agriculture, and future generations.

Prepared through a participatory approach in collaboration with government counterparts, municipalities, and partners following the sub-national policy workshop on integrating springshed management into local plans and policies held on 21–22 July 2025, in Godavari, Lalitpur, this roadmap is tailored to Nepal's federal context and integrates workshop insights and recent evidence of a growing water crisis due to springs drying up.

A roadmap rooted in community experience

The roadmap builds on ongoing springshed management initiatives implemented with local governments in Kavrepalanchok (central Nepal) and Dhankuta (eastern Nepal). The International Centre for Integrated Mountain Development (ICIMOD), in collaboration with local governments, initiated springshed management programmes across nine municipalities and rural municipalities in Kavrepalanchok, Dhankuta and Khotang districts.

These initiatives began with sensitisation workshops for municipal and ward-level representatives to strengthen understanding of springshed management and sustainable water governance. They were followed by citizen-science-based mapping of springs and ponds, which generated baseline data for identifying critical springs, recharge areas, and community priorities.

ICIMOD, municipal governments, ward representatives, Community Resource Persons (CRPs), and local communities jointly identified priority springs through participatory mapping and field verification. Based on this evidence, municipalities and community groups, with technical support from ICIMOD, implemented pilot springshed management interventions for spring revival and source protection in selected priority sites in Namobuddha Municipality, Dhankuta Municipality, and Chhathar Jorpati Rural Municipality.

The positive outcomes of these pilots, including improved spring discharge, strengthened community participation, and increased municipal interest, have encouraged several municipalities to allocate dedicated budget lines for springshed management. These experiences provide the practical foundation for this roadmap and demonstrate why a more systematic, institutionalised, and scalable approach is needed.



THE SUB-NATIONAL POLICY WORKSHOP HELD IN GODAVARI BROUGHT TOGETHER GOVERNMENT REPRESENTATIVES, POLICYMAKERS, AND TECHNICAL EXPERTS TO COLLECTIVELY ADVANCE THE INTEGRATION OF SPRINGSHED MANAGEMENT INTO MUNICIPAL PLANNING AND GOVERNANCE.

Objectives of the roadmap

The objective of this roadmap is to provide a clear and actionable framework for mainstreaming springshed management into local planning, budgeting, implementation, and monitoring systems in the participating municipalities of Kavrepalanchok, Dhankuta and Khotang districts from 2025 to 2030, thereby strengthening water security, ecosystem and climate resilience.

The roadmap aims to:

1. Strengthen local government capacity to plan, implement, and monitor springshed management interventions using scientific evidence and community knowledge.
2. Institutionalise springshed management within municipal policies, annual plans, budgets, and local water governance mechanisms.
3. Promote inclusive and community-led governance by strengthening the role of women, Indigenous Peoples, marginalised groups, Water User Groups, Community Forest User Groups, and Community Resource Persons in planning, implementation, monitoring and decision-making processes.
4. Support spring revival and recharge interventions through Nature-based Solutions, protection of recharge zones, and integration of springshed-sensitive infrastructure planning.
5. Develop a common and participatory monitoring, evaluation, and learning system to track spring discharge, water quality, household benefits, GESI outcomes, and local government investment in springshed management.
6. Create a replicable model for scaling springshed management across hill and mountain municipalities in Nepal.

Importance of springshed management

Definition of springshed

Springshed refers to the specific landscape area that feeds water to a spring, including surrounding hills, forests, valleys, and soil layers through which rainfall and surface water infiltrate, recharge, and flow underground before emerging as spring water. Reflecting the valley–hill–valley connection, springsheds are central to the Himalayan hydrological system, acting as natural reservoirs that filter, store, and regulate water.

In Nepal's hill and mountain regions, springsheds sustain rural households, agriculture, and ecosystems by ensuring a reliable water supply. The health of springsheds is inseparably linked to the management of land, forests, and catchments. Protecting and restoring springsheds is therefore critical not only for water security but also for conserving biodiversity, reducing disaster risks, along with strengthening the livelihoods and resilience of communities across Nepal.

Importance of springs in Nepal

Springs and ponds, fed by groundwater discharge, are the backbone of water security in Nepal. They sustain ecosystems, irrigate farmlands, and provide drinking water to millions, particularly in remote settlements where rivers are inaccessible (Andermann et al., 2012; Chapagain et al., 2019). Across the Himalayas, springs supply nearly 90% of rural drinking water and support

over 100 million people, forming a critical component of hydrological cycles (Immerzeel et al., 2010; Nepal et al., 2021; Rathod et al., 2021). In Nepal's mid-hills alone, about 10 million people depend directly on springs (Agrawal and Bhuchar, 2023). However, these lifelines are rapidly degrading. Studies reveal sharp declines in spring discharge across the Himalaya, with Nepal's mid-hills facing some of the steepest losses (Adhikari et al., 2021; Pandit et al., 2024; Poudel and Duex, 2017).

The crisis of spring degradation is driven by multiple, interlinked pressures: climate change, deforestation, land-use change, unplanned infrastructure development, degradation of recharge areas and unsustainable water extraction (Chapagain et al., 2019; Poudel and Duex, 2017; Thapa et al., 2023). The consequences are severe and multifaceted. Water scarcity disproportionately burdens women and children, persons with disabilities (PWDs), increasing their time spent on water collection and reducing educational and economic opportunities (Pandit et al., 2023). Irrigation shortages threaten food security, especially for subsistence farmers (Dahal et al., 2021). Spring-fed ponds are disappearing, undermining biodiversity and increasing disaster risks like landslides (Sharma et al., 2016). Collectively, these impacts threaten Nepal's progress toward Sustainable Development Goal (Clean Water and Sanitation) and broader national development priorities (Nepal et al., 2021).



WOMEN COMMUNITY RESOURCE PERSONS PARTICIPATE IN A CITIZEN SCIENCE TRAINING ON MOBILE-BASED SPRING SOURCE MAPPING, ORGANISED IN COLLABORATION WITH PANCHKHAL MUNICIPALITY.

CHAPTER 3

Status of springs and springshed management in Nepal

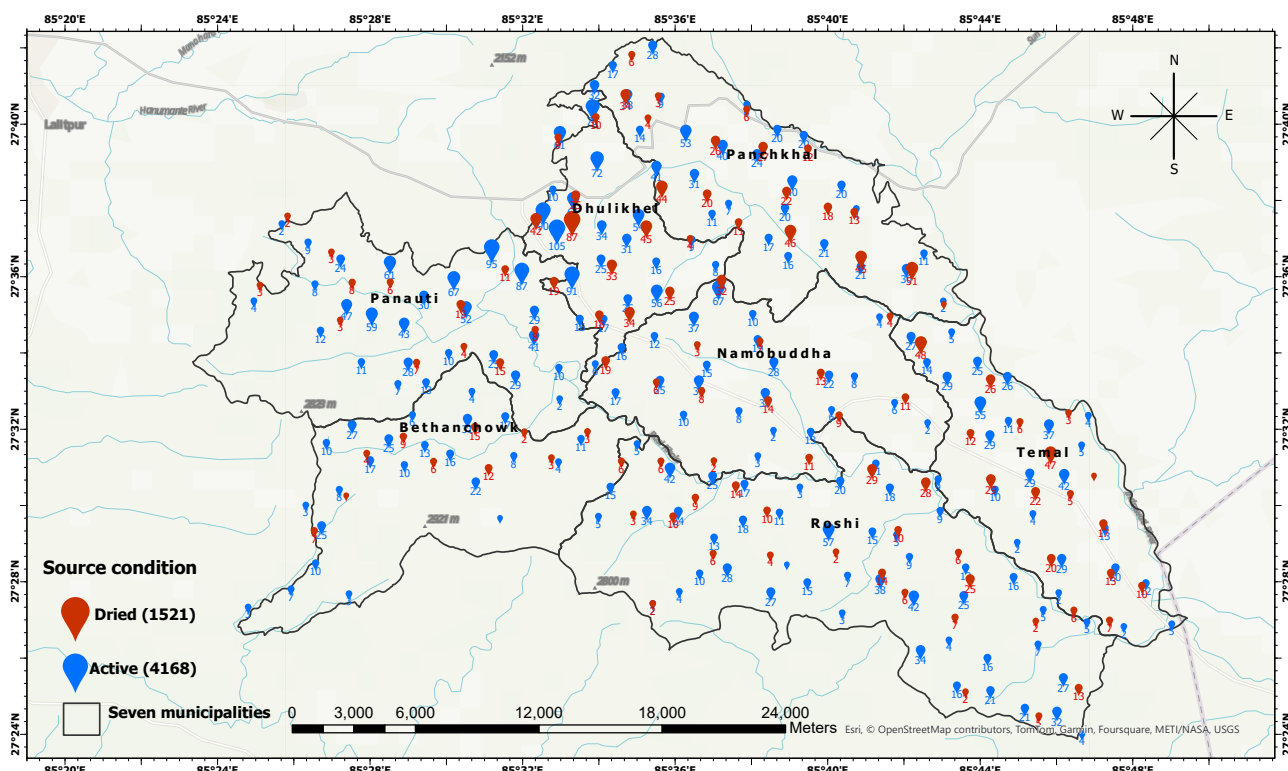
Inventory of springs

Based on spring mapping assessments conducted in Dhankuta, Chhathar Jorpati, and Kavrepalanchok districts, the current status of springs is highly concerning. An estimated 12% to 27% of springs have completely dried up, while ponds have faced even greater losses, with more than 50% disappearing in some areas. Alarming, revival efforts have been

minimal, with communities attempting interventions in fewer than 6% of dried-up sources. Among the active springs, which remain a lifeline for mountain communities, 66% to 75% are showing a declining flow trend, indicating worsening water security. The primary reasons attributed to this decline include drought, earthquakes, infrastructure development, and neglect of the sources.

FIGURE 1

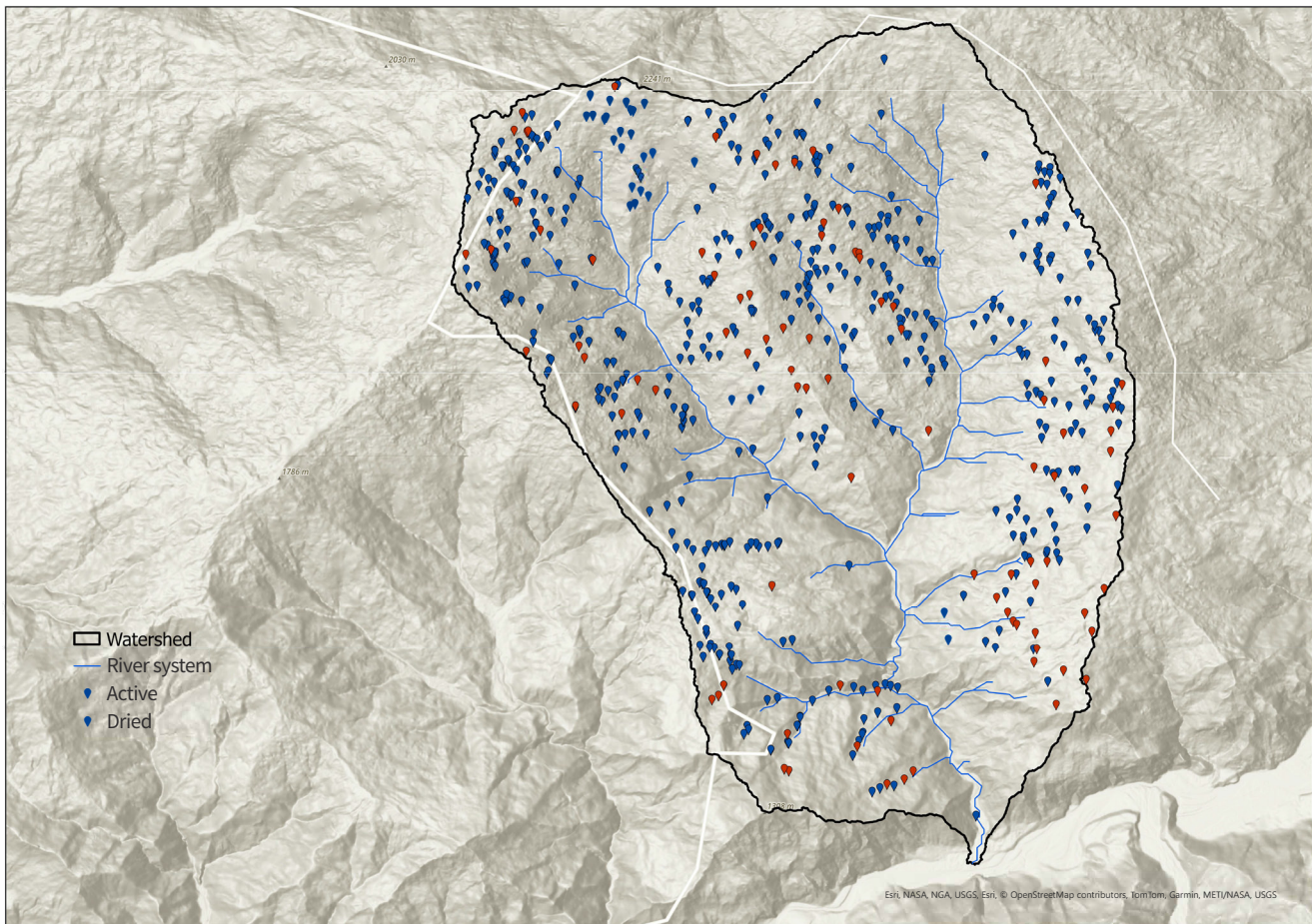
STATUS OF MAPPED WATER SOURCES IN SEVEN MUNICIPALITIES AND RURAL MUNICIPALITIES OF KAVREPALANCHOK DISTRICT, NEPAL



SOURCE: ICIMOD SPRING MAPPING DATABASE

FIGURE 2

STATUS OF MAPPED WATER SOURCES IN THE NIBUWA-TANKHUWA WATERSHED IN DHANKUTA DISTRICT, NEPAL



SOURCE: ICIMOD SPRING MAPPING DATABASE

Despite these challenges, springs continue to support a high-level of dependency, with each one serving an average of nine to 23 households. This continued reliance highlights the vital role springs play in sustaining rural livelihoods and local water security.

However, increasing environmental and socio-economic pressures are threatening the long-term sustainability of these water sources. Springs are increasingly under pressure from climate variability, land-use change, infrastructure development, and weak local management systems. These challenges highlight the urgent need for an integrated springshed management approach that combines conservation measures, scientific evidence, inclusive and accountable governance mechanisms and proactive policies to ensure the long-term sustainability of these critical water sources.

Springshed management

The springs in the mid-hills of the Hindu Kush Himalaya (HKH) are drying up due to both natural and anthropogenic factors; erratic and high-intensity rainfall; prolonged dry spells; earthquakes; land-

use change leading to reduced infiltration; road and infrastructure construction; degradation of traditional ponds; groundwater extraction through pumps; and lack of proper management systems.

While these drivers are often discussed in environmental and hydrological terms, the crisis also reflects deeper institutional and governance challenges, requiring strong and inclusive local institutions for effective management and long-term sustainability. In many rural areas, springs are managed through local committees, user groups, or informal community arrangements.

Although women are primarily responsible for water collection and management at the household level, they are often excluded from decision-making in water management. While women are involved in water user committees and may serve as treasurers, their representation in leadership roles such as chairperson remains low. This reflects persistent GESI gaps, where those who carry the greatest responsibility for daily water collection have the least influence over policies and governance structures that shape water access and management.

Strengthening inclusive governance is therefore essential to ensure meaningful participation and leadership of women, Indigenous peoples, PWDs and other marginalised groups in planning, implementation, monitoring, benefit-sharing and decision making processes related to springshed management.

Accessibility is another important concern. Around 7% to 13% of active spring sources face access restriction due to private ownership, socio-cultural norms, or water scarcity reinforcing existing inequalities, especially for women and marginalised groups who rely most on these sources. At the same time, many springs hold religious and cultural significance, highlighting their role not only as water sources but also as important social, cultural, and spiritual assets within communities.

Proven revival: evidence and economics from the field

The alarming trend of spring degradation is not an irreversible fate. Pioneering spring revival initiatives in the roadmap's participating municipalities provide tangible proof that decline can be reversed. These interventions, which blend scientific assessment with community-based implementation and Nature-based Solutions, have yielded significant ecological and socio-economic returns, offering a robust proof-of-concept for the strategies outlined in this document.

ROADSIDE SPRING PROTECTION (RoSPro) IN DHANKUTA

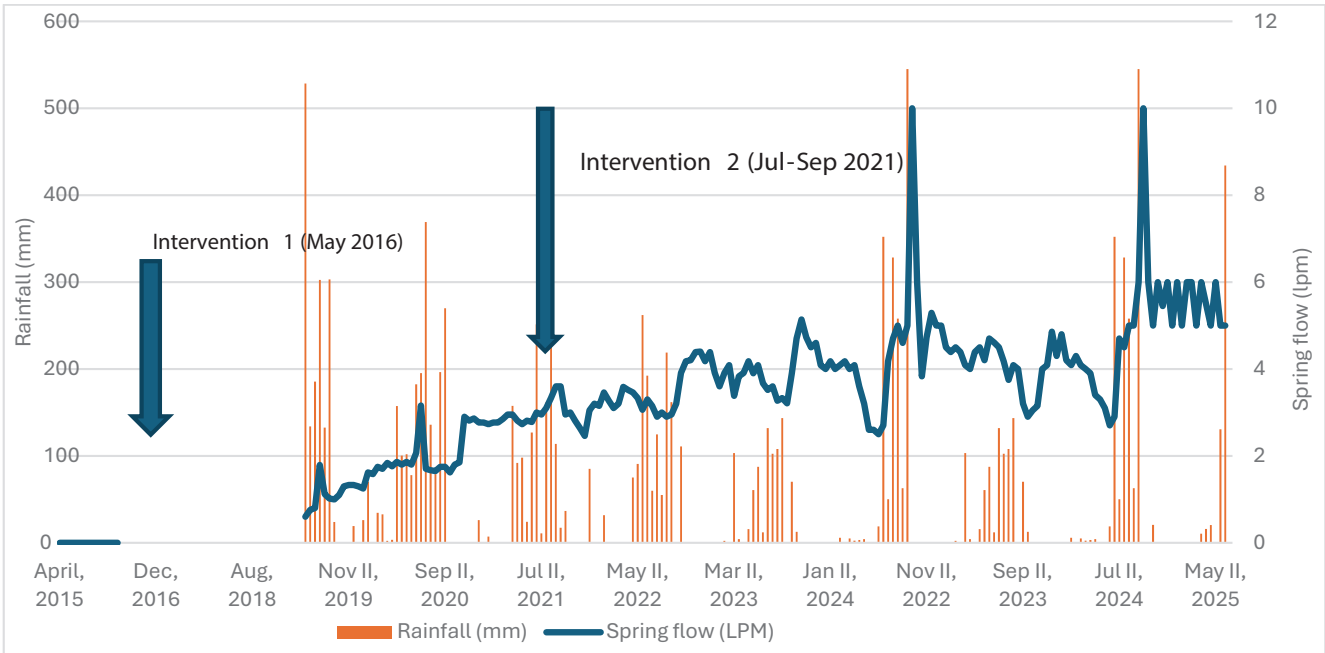
In the Nibuwa Tankhuwa Watershed of Dhankuta, communities faced a dual crisis: springs were declining by 25-50% between 2014-2024, while water from roadside springs was damaging essential infrastructure. The RoSPro project addressed this by integrating spring and road management. Through participatory interventions like spring boxes and drainage systems, the project boosted dry-season water flow by over 20%, significantly reduced road damage, and reduced women's water-fetching time by 33-47%. A cost-benefit analysis confirmed the intervention's high economic return, showing a net present value 4 to 8 times the investment and an internal rate of return between 44% and 121%.

NATURE-BASED SPRING REVIVAL IN NAMOBUDDHA, KAVREPALANCHOK

In Namobuddha Municipality, springs like Patalko Dhara and Bhagwate Pakhako Kuwa had severely degraded, with one drying up completely by 2019. A nature-based revival approach was implemented, using hydrogeological mapping to guide the construction of trenches, ponds, and check dams. This successfully restored water flow, revived the local ecosystem, and empowered communities through inclusive management. The results included household savings of roughly USD25 annually on water purchases and a reduction of up to two hours per day in water collection time for women. The demonstrated success prompted the municipality to formally mainstream springshed management into its local policies and budgets.

FIGURE 3

HYDROGRAPH OF THE PATALKO DHARA SPRING, SHOWN AS A REPRESENTATIVE EXAMPLE, ILLUSTRATING A SIGNIFICANT INCREASE IN SPRING DISCHARGE FOLLOWING SPRINGSHED MANAGEMENT INTERVENTIONS IN NAMOBUDDHA MUNICIPALITY



SOURCE: ICIMOD

The compelling economic case

Spring revival is a cost-effective investment, not merely a social or environmental expense. A recent benefit-cost analysis (Butte et al., 2024) revealed that for every rupee invested, communities gain between 1.62 and 4.05 rupees in benefits, primarily from time savings for women, ecosystem improvements, and increased agricultural productivity. This makes a powerful economic argument for strategic investment in springshed management as a cost-effective strategy for achieving local economic development, climate resilience, and public health.

Under Nepal's 2015 Constitution, municipalities and rural municipalities hold the primary mandate for local water governance (GoN, 2015). This decentralised system was intended to empower communities through context-specific policies and programmes. Yet, evidence shows that most local governments lack adequate technical expertise, institutional frameworks, and financial resources to manage springs effectively (White and Haapala, 2019).

Some municipalities, such as Dhulikhel, Namobuddha, Panauti, Roshi (Kavrepalanchok), and Dhankuta have pioneered dedicated budgets, community-led spring mapping, and integrated springshed management programmes. However, these are exceptions. Many municipalities still rely on fragmented, short-term water supply projects without systematic integration of springshed management. Closing this gap requires strengthening technical capacity in hydrogeology and participatory water management (Shrestha et al., 2018), mainstreaming springshed management into local adaptation plans of action and national frameworks (GoN, 2021), and establishing institutionalised partnerships that connect communities, non-governmental organisations (NGOs), and research institutions (Sahay, 2019).

The progress in Kavrepalanchok and Dhankuta districts demonstrates that when local governments blend science with community engagement, they can effectively combat spring degradation. Achieving this nationwide demands systemic investment in capacity, coherence, and collaboration bridging the gap between policy ambitions and ground realities (White and Haapala, 2019).

Problem analysis

Opportunities and challenges in springshed management

Springshed management in Nepal holds both great promise and clear challenges. The most significant opportunity for scaling lies in the proven success of a pioneering group of municipalities. In these front-runners, springshed management has moved from theory to practice, demonstrating that it is a replicable and sustainable solution to water scarcity. This is evidenced by concrete actions, such as Dhulikhel's dedicated funding for spring conservation and recharge ponds, Dhankuta and Chhathar Jorpati's investment in spring source conservation and maintenance, and the integration of springshed management into the core planning frameworks of Namobuddha, Roshi, and Panauti. Municipal annual plans now include dedicated budget allocations for springshed management, signalling a shift from rhetoric to action. These practical efforts create a foundation for developing a more robust, standardised approach to springshed management across all municipalities through targeted capacity building, knowledge sharing, and policy harmonisation. This progress is underpinned by critical enabling frameworks: Local Water Resource Acts provide a mandate for enforcement, while GESI strategies ensure equity and holistic management. Simultaneously, partnerships with research institutions and NGOs/INGOs have yielded proven technical and participatory governance models. The convergence of these elements – tangible success, strategic policy, dedicated funding, and supportive legal frameworks creates a replicable model for standardising springshed management across all municipalities.

Despite these notable advances, springshed management in Nepal faces a complex array of interconnected challenges that hinder its effective implementation and scalability. The most fundamental barrier is a pervasive awareness and capacity gap. In many municipalities, understanding of springshed management remains in a nascent stage, which fuels a cycle of inaction and insufficient prioritisation. This manifests directly as critical financial and technical constraints. Many municipalities lack dedicated budget lines, relying instead on inconsistent, project-based external funding, and the scale of existing allocations is often insufficient for large-scale water conservation.



REPRESENTATIVES FROM MUNICIPALITIES/GRAM PANCHAYATS (VILLAGE COUNCILS) IN A FOUR-DAY TRAINING ON SPRING REVIVAL AND SPRINGSHED MANAGEMENT WITH PRACTICAL FIELD-BASED SESSIONS AT GODAVARI.

This financial uncertainty is compounded by a significant shortage of local expertise in hydrology and geoscience, limiting the ability to design and monitor effective programmes.

These capacity gaps are reinforced by substantial institutional barriers. Weak policy implementation is evident in municipalities, where existing water acts still require updates to explicitly include springshed management, and where Local Adaptation Plans of Action (LAPAs) are still outdated. Even where policies are in place, poor enforcement of regulations such as those against source privatisation or ecological degradation undermines conservation efforts. Data scarcity poses another critical hurdle, as insufficient hydrological and spring-specific information prevents evidence-based planning and prioritisation. The inconsistent level of reporting across municipalities further reflects underlying challenges in systematic data collection, knowledge management, and the replication of successful models.

These issues are further exacerbated by broader systemic challenges, including conflicts between development and conservation, where infrastructure projects often proceed without adequate consideration for springshed integrity, thereby accelerating source depletion. Spring systems are also highly vulnerable to climate-induced disasters such as landslides and droughts, which can cause irreversible damage to water sources. Unregulated groundwater extraction threatens spring recharge through uncontrolled withdrawal, while low community awareness and engagement impede local ownership and sustained action. Ultimately, the central challenge is a "know-do" gap: translating the proven models from pioneering municipalities into efficient, equitable, and sustained action elsewhere. The path forward hinges on systematically bridging the awareness and capacity gap to transform isolated successes into a nationwide standard, ensuring the long-term resilience of Nepal's vital spring systems.

Status of springshed management in participating municipalities

The participating municipalities demonstrated varying levels of progress in institutionalising springshed management within their local governance frameworks. A comparative overview of key aspects, including policy integration, budget allocations, and ongoing initiatives across selected municipalities is presented in Annexe 1.

The analysis of springshed management implementation across municipalities reveals a spectrum of progress, with some emerging as leaders in institutionalising springshed management and others in earlier stages of adoption. Leading this effort, Dhulikhel Municipality serves as an exemplary case, not only for its internal comprehensive springshed management integration, evidenced by dedicated funds for spring conservation and the supportive legal framework of its Water Resource Utilisation Act, but also for its pioneering role in cross-municipality collaboration. Dhulikhel has successfully secured its water supply by negotiating a series of Payment for Ecosystem Services (PES) agreements with upstream communities in the Roshi watershed (now part of Panauti Municipality). This model, which leverages economic incentives and socio-political relationships, provides a critical blueprint for managing shared water resources across administrative boundaries.

Similarly, other municipalities are also finding different pathways to advance springshed management based on their specific contexts. Namobuddha Municipality has made significant strides by incorporating springshed management into its LAPA, with its annual plan featuring multiple activities from natural source conservation to collaborative springshed management with ICIMOD. Although budget details remain unspecified, Panchkhal Municipality has an ambitious plan for 107 recharge ponds (two per ward) and integration of water security into its "One House One Tap" programme. Similarly, Roshi Rural Municipality has taken important policy steps by mandating watershed programmes and allocating dedicated funds for partnership programmes, with LAPA updates currently in progress. Chhathar Jorpati Rural Municipality and Dhankuta Municipality have shown high-level commitment through substantial financial investments that fund the entire springshed management process, from spring source mapping to conservation and maintenance.

Foundational principles for springshed management

Vision statement

To ensure sustainable, inclusive, and climate-resilient management of springsheds in Nepal's hill and mountain municipalities through community stewardship, scientific knowledge, indigenous wisdom, and responsive local governance.

To achieve this vision, the roadmap is guided by the following foundational principles. Collectively, these principles provide the basis for planning, implementation, financing, monitoring, and institutional coordination for springshed management.

1. Nature-based restoration: Prioritise green infrastructure measures such as recharge ponds, and afforestation to restore natural hydrological process and improve groundwater recharge.
2. Participatory governance: Empower local communities through inclusive Water User Associations and apply GESI protocols.
3. Science-informed planning: Combine hydrogeological surveys with indigenous knowledge for systematic spring mapping, identification of spring recharge areas, and evidence-based decisions.
4. Development-conservation balance: Mandate Environmental Impact Assessments (EIA) for projects to protect recharge zones of critical springs and ensure responsible growth.
5. Sustainable infrastructure: Integrate spring conservation into infrastructure development plans (e.g., road projects) to prevent source degradation.
6. Shared resource management: Formalise springs as common pool resources, governed by community agreements and legal Water User Associations to prevent conflict.
7. Local capacity building: Train municipal staff as springshed management experts and foster peer-learning between municipalities to institutionalise knowledge.
8. Policy integration: Embed springshed management into local laws, annual plans, and budgets for long-term, enforceable conservation.
9. Protected land use: Use Geographic Information System (GIS) mapping to define and enforce protected buffer zones around springs and incentivise conservation-friendly agriculture.
10. Jurisdictional coordination: Establish inter-municipal task forces and PES models to manage shared springsheds cooperatively.
11. Develop safeguards: Implement mandatory spring impact assessments and a no-net-loss policy for water discharge as a condition for project approvals.
12. Integrated water governance: Create cross-sectoral committees to align policies and include springshed management in climate resilience strategies, supported by annual spring health reporting.

In essence, this approach advocates for community-centric, policy-guided, and science-informed management to ensure long-term spring health and water security of the communities that depend on them.

Strategic goals

The strategic goals are organised into short-, medium-, and long-term priorities to support the phased implementation of springshed management. The short-term goals focus on establishing baseline information, awareness, and institutional foundations. The medium-term goals focus on strengthening local governance, scaling pilot interventions, and integrating GESI-responsive planning. The long-term goals aim to institutionalise springshed management within policies, budgets, monitoring systems, and sustainable financing mechanisms.

Short-term goals (within a year)

- Conduct baseline assessments: Inventory key springsheds to establish baseline data on spring and ecological health.
- Initiate community mobilisation: Train and deploy Community Resource Persons (CRPs) as local champions and establish inclusive Springshed Management Committees.
- Launch awareness campaigns: Implement awareness, education, and behaviour change campaigns on water conservation and efficient water use in local languages.
- Build foundational capacity: Conduct sensitisation and training programmes for local representatives (elected officials, user group leaders), municipal technical officers and CRPs on springshed management principles.
- Pilot key interventions: Launch small-scale pilot projects to test sustainable practices, incentive mechanisms, and participatory monitoring.
- Draft initial policy frameworks: Begin the process of integrating springshed management into municipal plans and policies.

Medium-term goals (one-two years)

- Strengthen local governance: Formalise the roles of springshed management committees and ensure their inclusive operation, with strong representation from women and marginalised groups.
- Enhance technical and policy integration: Provide advanced technical assistance to municipalities, revise local policies for better water governance, and develop mechanisms for cross-sectoral review and public accountability.
- Implement GESI action plans: Execute targeted strategies for equitable resource allocation,

leadership development for marginalised groups, and ensuring their participation in decision-making.

- Scale up successful pilots: Expand proven conservation and recharge practices from pilot areas to other springsheds.
- Secure initial funding and harmonise policies: Advocate for and secure grants for scaling up and begin work on harmonising local policies with provincial and national frameworks.

Long-term goals (three-five years)

- Establish a sustainable management framework: Develop and implement a comprehensive, integrated springshed management framework for the participating municipalities in Kavrepalanchok, Khotang, and Dhankuta districts, with potential for scaling to other hill and mountain municipalities in Nepal.
- Institutionalise springshed management and financing: Mainstream springshed management into all relevant local development plans (like LAPA) and establish sustainable, long-term funding mechanisms for ongoing conservation.
- Achieve ecosystem resilience: Implement large-scale restoration projects for degraded springsheds to enhance biodiversity, improve water quality, and increase climate resilience.
- Build a robust data culture: Establish a digital monitoring and evaluation and learning system for data-driven decision-making and adaptive management.
- Ensure resilient and equitable communities: Foster community resilience by ensuring equitable access to clean water for all and foster community resilience by ensuring equitable access to clean water for all and build inclusive water governance institutions.
- Implement harmonised policy and disaster risk reduction (DRR): Achieve policy harmonisation across government tiers and integrate DRR principles into springshed/watershed management.

Strategic framework for springshed management

Ensuring the long-term sustainability of springshed systems requires two interconnected foundations: community stewardship and institutional capacity at the local, provincial, and federal levels. The framework below outlines an integrated set of strategies that combine community-driven initiatives with policy and institutional reforms, offering a resilient and adaptive pathway for springshed management.

TABLE 1

STRATEGIC ACTIONS FOR SPRINGSHED MANAGEMENT

Aspect	Considerations	Responsible agencies
Policy reform and institutional alignment	• Adopt a springshed approach for water source conservation • Ensure horizontal and vertical coordination among three tiers of government • Localise land use policies to protect recharge zones • Encourage public and private investment in local water resources	Federal, provincial, and local governments
Coping with water security challenges	• Promote efficient water use at household, community, and municipal levels • Introduce innovative water management models at watershed/springshed scale	Federal, provincial, and local governments; private sector
Spring revival and recharge enhancement	• Integrate local knowledge with scientific techniques • Rehabilitate traditional ponds, lakes, wallows, recharge ponds • Construct conservation ponds, trenches, and check dams • Promote rooftop rainwater harvesting and greywater management • Implement ward level campaigns (e.g., "One Ward, One Pond") • Undertake afforestation with water-retaining species • Mobilise village-level groups for participatory revival	Wards, local user organisations, communities
Spring protection and risk mitigation	• Strengthen environmental assessments and mitigation measures for infrastructure projects • Restrict heavy equipment near spring sources • Ban pesticide and chemical fertiliser use around recharge zones • Establish, strengthen PES schemes • Improve water quality monitoring and treatment	Wards, local user organisations, communities
Capacity building and governance	• Train municipal officials, local representatives and local community on GESI-responsive springshed management • Build technical expertise via <i>Pani Heralu</i> (water watchers) and CRPs • Promote GESI responsive citizen science for spring mapping, and discharge and water quality monitoring	Federal, provincial, and local governments; NGOs; community institutions
	• Train young professionals in recharge pond construction and springshed management • Strengthen local government capacity for climate adaptation	
Research and knowledge generation	• Map springs, aquifers and recharge zones • Establish long-term monitoring sites for discharge, vegetation and climate impacts • Study causes of spring degradation and evaluate revival methods • Collaborate with universities and research institutions for applied research	Universities, research institutions, governments, donors
Awareness, education, and inclusive engagement	• Mainstream spring conservation into school/college curricula • Document and promote traditional/indigenous practices • Conduct awareness campaigns in local languages • Ensure participation of women, Indigenous peoples and marginalised groups • Strengthen existing groups (CFUGs, WUGs, Mothers Groups) for collective action	Local governments, communities, schools, civil society organisations (CSOs)

Action plan and implementation framework

To translate the foundational principles and strategic actions into tangible results, the following action

plan is proposed. This matrix outlines key activities, outputs, responsible entities, and timeframes for the short (1 year), medium (1-2 years), and long term (3-5 years).

Strategic pillar	Key activities	Expected outputs	Primary responsible agencies	Timeline
1. Policy and institutional reform	Develop and endorse municipal level springshed management guidelines and by-laws	Springshed management mainstreamed into 100% of participating municipalities' plans by 2027	Municipalities	Short to long-term
	Integrate springshed management into LAPAs, periodic plans, and annual budgets	Springshed management actions and dedicated budget lines incorporated into local plans and annual programmes	Municipalities	
	Establish inter-municipal task forces for transboundary springsheds	Inter-municipal springshed management agreements initiated	Municipalities, federal government	
	Advocate for provincial and federal policy updates to explicitly include springshed management	Springshed management included in revised National Water Resource Policy implementation guidelines	ICIMOD	
2. Spring revival and recharge	Conduct detailed hydrogeological surveys of priority springsheds	500+ recharge structures constructed by 2030	Municipalities (Ward offices), CFUGs (Community Forest User Groups), NGOs, ICIMOD	Short to long-term
	Construct recharge ponds (e.g., "One Ward-One Pond" campaign)	20+ critical springs targeted for revival/conservation attempts		
	Rehabilitate traditional water systems (stone spouts, ponds, canals)	Measurable increase in dry season discharge in targeted springs	Municipalities (Ward offices), CFUGs, NGOs	
	Launch large-scale afforestation with native, water-retaining species	Priority recharge zones restored using native and water-retaining vegetation	Ward offices, CFUGs	
3. Capacity building and governance	Train municipal technical staff as springshed management champions	100+ technical staff and 200+ CRPs trained by 2027	Municipalities, ICIMOD	Short to medium-term
	Train and deploy CRPs and <i>Pani Heralu</i> in every ward	All Springshed Management Committees (SMC) have >33% women in leadership roles	Municipalities, wards	
	Establish and empower inclusive SMCs	A functional knowledge-sharing platform established	Wards, CFUGs	
	Organise cross-municipal exposure and learning exchanges	Regular cross-municipal learning events conducted and lessons documented	Municipalities	
4. Knowledge and data management	Complete comprehensive spring inventory using citizen science	Decision Support System populated with 5000+ springs in Nepal	Municipalities, CRPs	Short to long-term
	Establish a standardised digital monitoring and evaluation system for spring health (discharge, quality)	State of springs report/posters published	ICIMOD, municipalities	
	Commission applied research on effective revival techniques for different geologies	5+ case studies on best practices documented and shared	ICIMOD, municipalities	
	Develop and disseminate awareness materials in local languages	Knowledge and data management: Posters, manuals, videos, and community-awareness materials produced and disseminated	Municipalities, ICIMOD, CRPs, wards	

Strategic pillar	Key activities	Expected outputs	Primary responsible agencies	Timeline
5. GESI mainstreaming and inclusive engagement	Conduct GESI audits of existing water policies and programmes	All municipal springshed management budgets include a dedicated line for GESI activities	Municipalities, NGOs, schools, community groups	Medium to long-term
	Implement leadership training for women and marginalised group members for SMCs	50% of SMC leadership positions held by women, Dalits, and Indigenous peoples by 2028	ICIMOD, municipality, CRPs	
	Ensure all springshed management initiatives include targeted benefits for vulnerable communities (e.g., reduced water collection time)	Reduced water-collection burden and improved access for women, Dalits, Indigenous peoples, and vulnerable households	Municipalities	
	Integrate spring conservation into school curricula	Spring conservation modules and school-based activities introduced in participating municipalities	Provincial Government, municipalities	
6. Financing and sustainability	Municipalities allocate dedicated annual budget lines for springshed management	Participating municipalities establish dedicated annual budget lines for springshed management, with gradual increases in allocation based on local priorities and available resources	Municipalities	Medium to long-term
	Leverage private sector Corporate Social Responsibility (CSR) funding for conservation	Incentive mechanisms established for community-led springshed management	ICIMOD, NGOs, banking and financial institutions	



BIMALA RAI, MAYOR OF HALESÍ TUWACHUNG MUNICIPALITY, KHOTANG ADDRESSES PARTICIPANTS AT THE SUB-NATIONAL WORKSHOP IN GODAVARI. TO HER LEFT IS KUNSANG LAMA, MAYOR OF NAMOBUDDHA MUNICIPALITY.

Monitoring, Evaluation, and Learning (MEL) framework

A robust MEL system is critical for tracking progress, measuring outcomes, generating evidence and supporting adaptive management in springshed programmes.

Key Performance Indicators (KPIs):

- **Quantity:** Number of springs with improved/stable discharge; number of recharge structures built.
- **Quality:** Percentage of springs meeting national drinking water quality standards.
- **Coverage:** Number of households with improved water access; area under protected recharge zones.
- **Governance:** Percentage of municipalities with springshed management-integrated plans and dedicated budgets; composition and percentage of functional SMCs.

- **GESI:** Reduction in time spent by women/girls on water collection; representation of women, Indigenous peoples, PWDs and marginalised groups in decision-making and leadership positions.

Data sources and methods: Regular spring discharge and quality monitoring (by CRPs); citizen science data household surveys; focus group discussions; review of municipal plans and budgets.

Reporting: Annual progress reviews at the municipal and provincial levels; biennial review and learning workshop facilitated by ICIMOD and government partners to inform adaptive management and scaling of good practices.

Policy framework and institutional arrangements

Current policy structure

The policy landscape for water resource management in Nepal is defined by several key legislative and strategic documents. Yet it exhibits significant gaps in addressing the specific challenges of springshed management and conservation. The Water Resources Act (1992) establishes foundational mechanisms, including the formation of water user associations, prioritisation of water allocations for drinking and irrigation, licensing for water abstraction, water quality standards, and penalties for non-compliance. The Water Resources Strategy (2002) further delineates sectoral priorities, actions, and timelines, promoting Integrated Water Resources Management (IWRM) principles and advocating for river basin planning units and management plans. The National Water Plan (2002-2027) outlines long-term investment strategies and designates the Water and Energy Commission Secretariat as the coordinator for water policy and sectoral development, leading to the establishment of District Water Resource Committees (DWRC) structured around IWRM principles.

The transition to a federal system marked a significant shift in water resource management. The Constitution of Nepal (2015) and the Local Government Operation Act (2017) decentralised authority, mandating local governments with the primary responsibility for water resource management. This includes planning, formulation, implementation, and regulation of water-related policies, explicitly naming the conservation of local water sources, including springs, as a local government duty. The National Water Resource Policy (NWRP 2020) seeks to unify water policy across all users and government tiers to resolve water-sharing conflicts and establishes new entities to optimise water use and protection.

However, a critical analysis reveals that these policies are predominantly oriented toward river-basin level management and large water bodies like rivers and lakes, overlooking the micro-level hydrology of springsheds. This constitutes a major policy gap. While the NWRP (2020) briefly acknowledges the need to identify and protect springs, it lacks specific, actionable strategies for their revival and sustainable management. Consequently, despite the clear devolution of responsibility, local governments are often incapacitated by limited technical expertise and human resource capacity, clear institutional structures, adequate funding, and effective coordination with provincial and federal agencies. The recent National Watershed Management Strategy (2080) also falls short of adequately encompassing and empowering the local level, highlighting a persistent disconnect between policy intent and implementation capacity for effective springshed management.

Recommended policy development and mainstreaming

A coherent policy environment across all levels of government is essential to bridge existing implementation gaps. Key priorities include:

- **Policy harmonisation:** Actively align local, provincial, and national laws and policies to create a consistent, supportive regulatory environment for springshed management. This prevents contradiction and ensures all government tiers are working towards common goals.
- **Climate-adaptive standards:** Develop and promote the use of climate-resilient and springshed-sensitive infrastructure standards for all development

projects. This ensures new construction and upgrades minimise negative impacts on recharge zones and hydrological cycles.

- **DRR integration:** Systematically integrate springshed conservation and management into national and local DRR policies and strategies. Recognising healthy springsheds as critical natural infrastructure for climate adaptation and mitigation should be a key priority.
- **Mainstreaming into planning and policy:** Promote the integration of springshed management principles into all municipal periodic plans (e.g., annual budgets) and sectoral policies particularly within broader watershed and water resource policies to ensure springshed health is recognised as a fundamental component of water security and a core consideration in all development interventions.

Defining institutional roles and responsibilities

Effective springshed management requires clear mandates and coordinated action across all tiers of government.

- **Local governments (Municipalities/Rural Municipalities)** are responsible for leading on-ground planning, implementation, monitoring and coordination of springshed management activities. This includes integrating springshed management into local plans (e.g., LAPA); developing and enforcing protective by-laws; facilitating community-led initiatives; and managing local monitoring systems.
- **Provincial governments** must provide crucial intermediary support. Their primary roles include offering technical assistance and expertise to municipalities; facilitating coordination among government tiers; helping to standardise policies across jurisdictions; and channelling financial support/grants for larger-scale conservation initiatives.

- **Federal government** is responsible for creating an enabling national environment. This entails developing overarching policy frameworks; ensuring policy harmonisation across the nation; mobilising significant national and international resources; and establishing national standards for data collection and conservation practices.

GESI integration

A proactive and intentional approach to GESI is essential for equitable and sustainable outcomes. Policies and institutional arrangements must promote and support:

- **Inclusive participation:** Ensuring a participatory approach in planning that specifically creates space for and values the voices of women, Indigenous peoples, PWDs and other marginalised groups.
- **Equitable access:** Promoting equitable access to water resources and decision-making power, directly addressing existing social hierarchies and disparities.
- **Targeted capacity building:** Conducting awareness campaigns on conservation in local languages and through accessible mediums to ensure inclusive participation and understanding.
- **Empowerment and leadership:** Implementing leadership development programmes specifically designed to empower women, Indigenous peoples and other marginalised groups to take on leadership roles within water user committees and governance bodies.
- **Targeted investment:** Enacting targeted resource allocation to ensure that benefits and resources from springshed management initiatives explicitly reach and prioritise vulnerable groups.

Conclusion and call for action

Call to action

The pioneering work in municipalities like Dhulikhel, Namobuddha, and Dhankuta demonstrates that the decline of springs is not inevitable. Reversal is possible through a combination of community stewardship, integrating indigenous and local knowledge with scientific method for spring restoration and decisive policy action. This roadmap provides the collective path forward, distilled from the wisdom and commitment of Nepal's local governments. The experience from Dhulikhel, Namobuddha, Dhankuta, Chhathar Jorpati, Roshi, Panauti, and other participating municipalities shows that springshed management can be integrated into local planning, budgeting, and community-led implementation. However, scaling these efforts requires stronger institutional capacity, dedicated financing, clear roles across government tiers, improved data systems, and inclusive governance. This roadmap provides a practical framework for moving from isolated pilot interventions to systematic springshed management that supports water security, climate resilience, and sustainable local development.

Our collective call to action is for:

- **Communities** to actively participate in mapping, monitoring, conservation activities, and holding local governments accountable.
- **Municipalities** to take ownership by progressively integrating springshed management into their annual plans and budgets, forming inclusive committees, and initiating spring revival pilots.
- **Provincial governments** to provide coordinated technical support, facilitate inter-municipal collaboration, and champion policy harmonisation.
- **Federal government** to create the enabling environment by updating national policies, unlocking climate finance, and mandating standards for springshed conservation.
- **Development partners and research institutions** to continue providing targeted technical assistance, facilitating knowledge exchange, and supporting innovative pilots.
- **Private sector** actors to support springshed conservation through responsible investment, innovation, corporate social responsibility initiatives, and sustainable water stewardship practices.
- **CSOs** to facilitate community engagement, awareness raising, capacity building, and inclusive participation in springshed management initiatives.

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Annexes

Annexe I: Municipality wise springshed management status review

Municipality/Rural Municipality	Policy and programmes	Budget allocation	LAPA integration	Water resource governance	Other initiatives
Bethanchowk Rural Municipality	One pond/ward policy	Springshed management budget	LAPA formulation	Spring registration system	Gabion flood control
Chattar Jorpati Rural Municipality	Springshed management mapping	NPR 3 lakh (ICIMOD)	Water user committees	Local watershed/forest acts	Smart water initiatives
Dhankuta Municipality	Stakeholder coordination for springshed management	NPR 37 lakh (incl. irrigation)	LAPA formulation in progress	Multiple water-related acts	Development partner coordination
Dhulikhel Municipality	- ICIMOD collaboration for watershed conservation - Bioengineering for springs - Community forest water storage	- NPR 3 lakh (7 springs) - NPR 6 lakh (wetlands/recharge ponds) - Annual traditional structure budget	Water security in local planning	Water Resource Utilization Act (2076 BS)	- 60+ recharge ponds - GESI strategy - Pani Chautara (community water dialogue) discussions
Haleshi Tuwaching Municipality	Source conservation	- NPR 5 lakh (ICIMOD) - 3 crore NPR Halesi Tuwaching (Drinking water supply)		Water User Conservation Act	Recharge pond construction
Namobuddha Municipality	River conservation programmes	NPR 20 lakh - Namobuddha municipality	Watershed management/springshed management in LAPA	Water Resources Act	Comprehensive land management
Panchkhal municipality	107 recharge ponds planned (2/ward)	Historical water structure conservation	“One House One Tap” integration	Water Source Utilization Act (2076 BS)	
Panauti Municipality	Springshed management conservation	FY 2082/83 springshed management funds	Needs development	Existing acts need springshed management update	Landslide/river management
Roshi Rural Municipality	Watershed programmes mandated	NPR 20 lakh partnership programmes	LAPA update in progress	Water Resources Act operational	- GESI strategy - WASH plan

Annexe II: Municipality-wise plan of action (2025-2027)

Municipality/ Rural Municipality	Policy	Capacity building	Implementation	Support needed
Dhankuta Municipality	Policy formulation for springshed management	Local representatives - Policy formulation	Springshed management implementation in Ward 2 within two years	Provincial government-policy harmonisation
	Incorporate these policies into periodic plans	Technical officers training on springshed management	Map the springs sources that were missed during the first mapping	Hydrogeological assessment and capacity building from ICIMOD
	Establish the necessary structure for policy implementation	Community resource persons on multiple aspects of springshed management		Community implementation
	Consideration of springshed management approach while implementing other development interventions as well			
	Ensure that aspects like forest environment, disaster management, and social inclusion are incorporated during policy formulation			
Chhathar Jorpati Rural Municipality	Policy formulation for springshed management	Local representatives - Policy formulation	Springshed management intervention in ward no 3 within two years	Coordinate with provincial government for policy harmonisation
	Incorporate these policies into periodic plans	Technical officers training on springshed management	Map spring sources that were missed during the initial mapping	Hydrogeological assessment and capacity building from ICIMOD
	Establish the necessary structure for policy implementation	Community resource persons on springshed management		Community implementation
	Consideration of springshed management approach while implementing other development interventions as well			
	Ensure that aspects like forest environment, disaster management, and social inclusion are incorporated during policy formulation			

Municipality/ Rural Municipality	Policy	Capacity building	Implementation	Support needed
Halesi Tuwaching Municipality	Policy formulation for springshed management	Local representatives - Policy formulation	Spring sources mapping within December	Springshed management sensitisation, mapping and intervention from ICIMOD
	Incorporate these policies into periodic plans	Technical officers training on multiple aspects of springshed management	Awareness raising for springshed management	Provincial government - Policy harmonisation
	Establish the necessary structure for policy implementation	Community resource person on spring sources mapping		Community implementation
	Consideration of springshed management approach while implementing other development interventions as well			
	Ensure that aspects like forest environment, disaster management, and social inclusion are incorporated during policy formulation			
Dhulikhel Municipality	Integration of springshed management with broader development activities	Policy-level capacity building for elected representatives	Conservation of stone spouts, traditional canals (Raj Kulo), wells, and ponds	Support for capacity building (policy, technical, and implementation levels)
	Institutional ownership of local springs rather than individual landowners Mainstreaming GESI in watershed and springshed programmes	Technical training for municipal staff	Data updating and prioritisation	Financial support
		Implementation capacity building for local user committees	Regular budget allocation Groundwater recharge construction work	
		Institutionalisation of knowledge for future use	Plantation and forest conservation	
		Training on statistical data management	Regular monitoring and evaluation	
Panchkhal Municipality	Budget allocation to conserve identified spring sources starting from FY 2082/83	Collaborating with ICIMOD for technical training on hydrogeology from the current fiscal year	Community-level awareness programmes on spring conservation	Request to ICIMOD for partnership-based programme implementation
		Providing orientation on spring conservation and groundwater recharge to the Water Management Committee	Budget allocation for construction of 107 recharge structures across wards	
			Initiate pond construction from the local level	

Municipality/ Rural Municipality	Policy	Capacity building	Implementation	Support needed
Roshi Rural Municipality	Regular inclusion of watershed and springshed management in planning, policy, and programming processes	Capacity building training for elected representatives and staff	Ensure necessary budget allocation	Financial support (from INGOs, provincial, and central governments)
		Orientation for local communities	Mobilise local human resources Implement recharge activities for at least one source per ward	Technical support (e.g., from ICIMOD)
		Provide hydrogeological training to at least one person from each ward	Construct recharge ponds	Exposure visits for shared learning and experience exchange
			Formation of user committees	
Panauti Municipality	Policy reviews to provide springshed management as priority	Provide capacity to forest user group, drinking water group and Tole Bikash Samiti, elected body, to address issue of climate change and springshed management	Budget allocation	Sharing good practice and exposure visit
	National WASH plan to integrate springshed management	Awareness to Bal Club (children's club) about springshed management (generation to generation)	Collaboration with NGOs/INGOs	Link with IT sector
			Collaboration with expert institution	
			Connecting in ecotourism and trails	
Namobuddha Municipality	Springshed and watershed management policy (review)	Selection of citizen scientist	Connecting livelihood and homestay	Dashboard and web linkage
	WASH plan review and integration, reformation	Training citizen scientist and user community, municipality technical staff, municipal body	Skills and tools provided to citizen scientist, community	Discharge measurement tools
	Re-allocation and reorganisation of springs	Providing different tools and apps for trained staff, citizen scientists and user committee members as per need	Gender equality, disability and social inclusion (GEDSI) elements in six-step process	Training and skill development by different organisations
		Transferring and sharing knowledge gained by citizen scientist to the community	Working in different ward at least on five watershed and springshed (10 in two years)	Workshop on sharing best practices
		Indigenous knowledge transfer from generation to generation		National and international exposure visits
				Metrological and hydrological data collection and sharing

Municipality/ Rural Municipality	Policy	Capacity building	Implementation	Support needed
Bethanchowk Rural Municipality	Springs protection and review	Exchange ideas with senior citizens and work with technical support; training and collaboration with ICIMOD	Identified springs that were relocated following disasters	Research can be done with support from ICIMOD for 74 springs
	Collaboration with expert institute			
	DRR plan including springshed management			

About ICIMOD

The Hindu Kush Himalaya (HKH) region stretches 3,500 km across Asia, spanning eight countries – Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal, and Pakistan. Encompassing high-altitude mountain ranges, mid-hills, and plains, the zone is vital for the food, water, and energy security of up to two billion people and is a habitat for countless irreplaceable species. It is also acutely fragile and vulnerable to the impacts of the triple planetary crisis of climate change, pollution, and biodiversity loss.

The International Centre for Integrated Mountain Development (ICIMOD), based in Kathmandu, Nepal, is an international knowledge organisation focused on the HKH region, working since 1983 to deliver greener, more inclusive, and climate-resilient development. Our work is guided by our [Strategy 2030](#), [Medium-Term Action Plan V \(2023–2026\)](#) and the associated Results Framework, and our various [policies](#). Learn more on our [website](#).

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