

R o a d m a p

State-wide Springshed Management

Inter-departmental Roundtable for Springshed Management
Manipur



Manipur State



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Glossary of terms

ACWADAM	Advanced Centre for Water Resources Development and Management
COSFOM	Community Based Sustainable Forest Management for Water Resource Conservation
DM	Dhanamanjuri
EbA	Ecosystem-based Adaptation
GIS	Geographic Information System
GoM	Government of Manipur
GPS	Global Positioning System
ICIMOD	International Centre for Integrated Mountain Development
IWRM	Manipur Integrated Water Resource Management
NbS	Nature-based Solutions
PMKSY	Pradhan Mantri Krishi Sinchayee Yojana
SAPCC	State Action Plan on Climate Change
SDC	Swiss Agency for Development and Cooperation

1 Introduction

Government of Manipur, through different line Departments, in collaboration with Universities and related Institutions, is preparing to engage in a State-wide approach on springshed rejuvenation to tackle one of the most critical environmental threats for upland and valley communities in terms of seasonal water shortage and extreme drought during dry season following the depletion of natural springs.

The roadmap outlines a holistic approach to be followed as a joint effort towards a State-wide rejuvenation and sustainable management of natural springs.

The State-level roundtable for springshed management is intended to act as think tank and to improve coordination between line Departments in order to maximise synergies and harmonised efforts towards this goal.

1.1 Background and Rationale

Addressing springshed management at the state level offers several advantages over focusing solely on village, watershed or project efforts which among others include:

- **Holistic Perspective:** State-level management allows for a broader understanding of interconnected ecosystems, addressing issues that cross village boundaries and ensuring that upstream and downstream impacts are considered.
- **Increased Funding and Resources:** States can allocate more significant resources through the participating line Departments and funding for springshed management projects, enabling larger-scale initiatives.
- **Consistent policies:** State-level management can establish standardized policies and regulations that apply across multiple regions, ensuring uniformity in practices and enhancing compliance.
- **Enhanced Training and Support:** State-level initiatives can provide comprehensive training programs through international cooperation projects and technical support to local communities, empowering them with the knowledge and skills necessary for effective springshed management as a nature-based solution for addressing water challenges and biodiversity co-benefits.
- **Integrated Land Use Planning:** State level management allows for integrated planning that considers agriculture, urban development, and conservation, minimizing conflicts and promoting sustainable land use.
- **Broader Stakeholder Engagement:** State-level management facilitates collaboration among a wider range of stakeholders, including government agencies, NGOs, academic institutions, and private sector partners, enhancing the effectiveness of management efforts.
- **Gender Equality and Socially Inclusive:** State-level approach ensures active participation of women, youth and marginalised sections of the community in planning, implementing and monitoring of springshed management, as well as integration of traditional knowledge systems with scientific methods.
- **Systematic Data Collection:** The line Departments can implement a comprehensive monitoring and research initiatives to gather data on springshed health, leading to informed decision-making and adaptive management strategies.
- **Strategic Response to Climate Change:** A state-level approach can better address climate change impacts through coordinated responses, disaster preparedness, and the implementation of resilience-building measures across larger areas.
- **Mediation and Negotiation:** State-level management can help mediate conflicts between communities over water use, land rights, and resource management, providing a neutral platform for negotiation.

- **Sustainable Development Goals:** State-level management allows for the integration of springshed management into broader state-level sustainability and development goals, ensuring long-term planning and commitment.

To conclude, State level authorities can ensure and leverage above mentioned benefits to create a more effective, equitable, sustainable, and comprehensive approach to water resource management that ultimately supports both ecological health and community well-being.

1.2 Ongoing Initiatives in Manipur State

The Directorate of Environment & Climate Change has initiated the first springshed pilot for Manipur State at Lunghar village, Ukhrul district in cooperation with ACWADAM, ICIMOD and SDC since 2021. Based on the positive results in Lunghar village, the Directorate has further completed the inventory and hydrogeological surveys for additional 12 villages in 6 hill districts of Manipur. Physical interventions for these springsheds are being initiated.

The COSFOM project has initiated a springshed pilot in Teinem village, Ukhrul district in 2024 in cooperation with ICIMOD. As part of the ongoing capacity building program with ICIMOD, additional 5 villages have been surveyed, and physical interventions are planned for Q2 2025.

1.3 Objectives

Key objectives of the Roundtable are as follows:

- To promote direct communication, cooperation and synergies between line Departments, Universities, Research Institutions, Private Sector and Projects through the institutionalisation of a State-level roundtable for springshed management in Manipur.
- To promote the pooling of funds and resources and to increase efficiency of State funding under a well-coordinated State-wide implementation of springshed management.
- To promote a supportive and consistent State policy frame to sustainably manage springsheds and surrounding ecosystems.
- To facilitate capacity building towards a long-term pool of hydrogeologists to facilitate state-wide implementation of springshed surveys and physical interventions at village level.
- To institutionalize the capacity on springshed management and to develop a pool of resource persons at the state level line departments, universities, and research institutions.
- To engage communities in springshed stewardship and responsible water use.
- To function as a lead agency for State-wide Spring Rejuvenation interventions.
- The Roundtable will, as and when required, register itself as a Society under Government of Manipur to execute the objectives mentioned above.

1.4 Scope and Methodology

Springshed management aims to be applied comprehensively throughout the State of Manipur, covering all springs and associated springshed areas, regardless of their geographic placement within particular watersheds or their classification under various ownership regimes.

Implementation will be guided by the Inter-Departmental Roundtable on Springshed Management for Manipur State, serving as the primary coordination and policy advocacy body.

Implementation of the roadmap is foreseen to be guided along the following **main methodological** steps as summarized below.

1. Assessment and Inventory

- Conduct comprehensive mapping of springs and water bodies such as ponds and lakes

- Collect data on water quality, quantity, and usage patterns
- Identify threats, such as pollution and land-use changes
- Identification of critical springs and springsheds
- Hydrogeological assessment and identification of recharge zone for critical springs
- Conduct participatory land-use planning and zoning
- Planning and implementation of spring augmentation measures

2. Stakeholder Engagement

- Foster collaboration among local communities, government bodies, NGOs and private sector
- Develop a true sense of ownership, management, and monitoring capacities at village level

3. Management Strategies

- Implement best management practices for land use and conservation
- Co-develop pollution control measures and habitat restoration initiatives

4. Monitoring and Evaluation

- Establish regular spring discharge and rainfall monitoring systems
- Establish key performance indicators to assess the health of springs and springsheds
- Develop a regular monitoring schedule to track water quality and ecosystem health/biodiversity

5. Education, Communication and Outreach

- Create awareness programs to inform communities about the importance of springshed management
- Encourage participation in conservation activities and sustainable practices
- Document and disseminate stories of change from the ground
- Co-create an open access state-level dashboard for springshed management
- Incorporate springshed management in the curricula of schools, colleges, and universities

6. Funding and Resources

- Identify potential funding sources and allocate resources for effective implementation
- Explore partnerships for technical and financial support

7. Adaptive Management

- Implement a flexible framework that allows for adjustments based on new data, community feedback and lessons learned from other Indian Himalayan states or countries.

2 Importance of Springsheds

2.1 Definition of Springsheds

A springshed can be defined as the specific area of land that contributes water to a spring. It encompasses the surrounding terrain, including hills, valleys, and soil layers, through which rainwater or surface water infiltrates, stores and flows underground to emerge as spring water. Springsheds play a crucial role in the hydrological cycle, acting as natural reservoirs that filter and store water before it surfaces.

This definition highlights the interconnectedness of land, water, and ecosystems, emphasizing that the health of a spring is directly linked to the management of its surrounding environment. Effective

springshed management involves understanding these relationships and implementing practices that protect both the water source and the landscape that sustains it. This approach not only ensures a sustainable water supply but also fosters biodiversity and resilience in local ecosystems.

2.2 Importance of Springs in Manipur

Springs in Manipur play a crucial role in the region's ecology, economy, and culture. The importance of springs in Manipur cannot be overstated. They are essential for water supply, ecological balance, cultural identity, and economic development. Protecting and sustainably managing these vital resources is crucial for the region's future.

2.3 Ecosystem Services Provided by Springs

Springs provide a variety of important ecosystem services that benefit both the environment and human communities. They serve as reliable sources of freshwater for drinking, irrigation, and sanitation, supporting both human and agricultural needs.

Springs and their surrounding ecosystems provide habitats for a diverse range of plant and animal species, contributing to overall biodiversity and ecosystem health. The presence of springs helps maintain soil moisture and stability, reducing erosion and promoting healthy soil formation.

Healthy springsheds contribute towards adapting to climate change by influencing temperature and humidity levels, as well as carbon sequestration through vegetation. Springs often hold cultural significance for local communities and provide recreational opportunities, such as hiking, fishing, and wildlife observation.

Natural filtration processes in springsheds help purify water by removing pollutants and sediments, improving water quality before it reaches the spring and contribute to the health of aquatic ecosystems, providing habitat for fish and other aquatic organisms, which supports local fisheries.

Above mentioned ecosystem services highlight the vital role that springs play in maintaining ecological balance, supporting livelihoods, and enhancing the quality of life for communities.

3 Current Status of Springs in Manipur

3.1 Inventory of Springs

A State-wide inventory of springs is incorporated into a number of existing planning documents for the State of Manipur with the following examples summarized below.

State Action Plan on Climate Change version 2 (SAPCC-II)

- Inventory of water sources (springs, streams, ponds, lakes and rivers)
- Identification of potential spring sheds and notify as spring shed sanctuary with water conservation society in different clusters of villages.

Water Resource Department (ISHWAR app for spring census)

Water Resource Department has the official mandate for conducting spring census using ISHWAR app for the State of Manipur.

Water and Natural Resources Management through Spring & Catchment Rejuvenation in Manipur.

- Inventory of Sources (Springs, Streams & Rivers), Artificial and natural water recharge of springs, Rejuvenation of springs at catchment area Construction of small check dams.

Directorate of Environment & Climate Change

Addressing rural water scarcity and climate change induced vulnerability of the water sector by rejuvenating natural springs in the hill districts of Manipur.

- To revive impaired springs through spring shed development works in the landscape approach to maintain base flow of springs.

- Ensure water security for the stockholders through the scientific and participatory management techniques and reduce vulnerability of dependent communities to ensure livelihood security.

However, as of now a comprehensive spring inventory for entire Manipur State has yet to be completed.

3.2 Monitoring Water Quality and Quantity & Meteorological Data

Secondary level meteorological data is available with the Indian Meteorological department and is being utilised for the monitoring purposes in Manipur and additionally, the DoECC has 37 weather stations in the state including hilly areas. Given the variation in local climate, it is pertinent to have more weather monitoring stations to understand the impact of the local weather on spring recharge and for better management.

Assessment of water quality using BIS Standards and quantity at the source of the springs is forming a crucial monitoring tool to evaluate the success of investment into springshed management. Up today, no state-wide system is operational to facilitate this process.

In view of sustainability, available finance and manpower as well as the importance of creating a real sense of ownership, a village-based assessment of water quality and quantity for springshed management is proposed. A village-based assessment of water quality and quantity in springshed management not only provides critical information on the status of water resources but also empowers local communities to take charge of their water security. By using a participatory approach, integrating scientific data with traditional knowledge, and involving stakeholders in all stages of the assessment, this approach ensures that springs are managed in a way that is ecologically sustainable, socially equitable, and economically viable.

The approach involves a participatory approach that engages local communities, builds on their traditional knowledge, and incorporates scientific tools to monitor and manage spring resources sustainably. Monitoring will follow the technical specifications as described in the “**Protocol for reviving springs in the Hindu Kush Himalayas¹**” and will encompass the following aspects:

Water Quality Monitoring: Physical, chemical, and biological water quality from the springs, including:

- **Physical:** Temperature, turbidity (cloudiness), and colour.
- **Chemical:** pH, dissolved oxygen, electrical conductivity, hardness, nitrate levels, and presence of harmful substances (e.g., heavy metals, pesticides).
- **Biological:** Presence of pathogens (e.g., coliform bacteria), algae, and aquatic life indicators.

Water Quantity Monitoring: Water availability over time and seasonal variation, including:

- Discharge rate (spring flow rate)
- Volume of water available in the spring during different seasons
- Water table levels or groundwater depth
- Rainfall patterns to understand how changes in precipitation affect spring flow

Regular Monitoring: Periodic monitoring by village monitoring teams (e.g., fortnightly, monthly) to track changes in water quality and quantity. Engage the community in ongoing data collection and reporting.

Adaptation and Learning: Collected data and community feedback is used to adapt management practices over time. Continuously improve the assessment and management plan based on changing conditions and new insights.

¹ Source: <https://lib.icimod.org/record/34040>

3.3 Socio-Economic Context

The majority of people in Manipur are engaged in agriculture, primarily subsistence farming, where water is essential for irrigation, especially in the predominantly hilly regions. Springs contribute significantly to irrigating fields, particularly in the monsoon and winter or lean seasons. Without proper springshed management, the availability of water can decline, leading to crop failure and food insecurity.

Proper springshed management is necessary to ensure both sustainable water supply and biodiversity conservation, which are critical for the livelihood of the communities dependent on them.

Springs serve as the primary source of potable water in rural areas. In many regions, the infrastructure for piped water systems is either underdeveloped or absent, and rural communities rely on these springs to meet their daily water needs.

Besides agricultural activities, livestock farming also depends on springs for water. Additionally, springs are often located in forested areas, where local communities depend on forest resources for fuelwood, medicinal plants, and non-timber forest products. The health of the springs is therefore directly linked to forest management and conservation practices.

Many communities in Manipur have a deep connection with their natural environment, and traditional knowledge of water management practices is widespread. Traditional governance structures, such as village authorities, often play a key role in regulating access to water resources and resolving disputes over water use.

However, these traditional knowledge systems face pressure from modernization, population growth, and external governance systems that may not always prioritize local needs or practices. As a result, there is a need to integrate traditional knowledge with modern scientific methods for springshed management.

Addressing GESI in the context of springshed management in Manipur shall be integrated through collaboration across multiple sectors, from local governance to State policy.

4 Problem Analysis

The northeast region of India is characterised by a difficult mountainous topography, with rather limited access to (i) irrigated agricultural production sites, (ii) infrastructure networks and (iii) local and regional markets.

Manipur state is part of the Eastern Himalayas, and its hydrological systems are heavily reliant on groundwater-fed springs. Village springs, often located in remote and difficult-to-reach areas, provide water to rural populations, especially in the dry season when surface water resources may be scarce or not available.

Springs, which are crucial water sources for both drinking and agricultural purposes, have historically been a vital part of the rural water supply system in the region.

However, in the past decades, due to unsustainable land use including forest degradation and climate change impacts, a sharp decline in springs water discharge and degradation of water quality have been witnessed.

A brief assessment of existing threats to natural springs in Manipur and the wider Northeast region is provided in the following paragraphs.

4.1 Environmental Degradation

Deforestation and Land Use Change

- Increasing deforestation and conversion of land for intensive agriculture and settlements can lead to soil erosion, reduced water retention, and degradation of spring ecosystems.

Pollution and Contamination

- Agricultural runoff, waste disposal, and industrial activities contribute to pollution, affecting water quality in springs.

Climate Change

- Changes in precipitation patterns and increased frequency of extreme weather events can impact the recharge and sustainability of springs and ecosystem health.

4.2 Research and Public Awareness

Geographical Diversity

- The hilly and diverse terrain makes it difficult to access and monitor springs effectively.

Lack of Data and Research

- Insufficient data on spring locations, water quality, water demand and supply assessment and hydrological dynamics hampers effective management and decision-making.

4.3 Socio-political Issues

Community Awareness and Participation

- Limited awareness among local communities about the importance of springshed management can result in unsustainable practices.

Institutional Coordination

- Springshed management typically involves multiple stakeholders, including government agencies, NGOs, and local communities. Fragmented governance and lack of coordination among various government departments and stakeholders can hinder effective management.

Policy gaps

- Existing policies may not adequately address the specific needs of springshed management, and there is often a lack of enforcement of environmental regulations.

Funding and Resources

- Poor infrastructure in remote areas can impede monitoring, data collection, and the implementation of management practices.
- There is often insufficient funding allocated to springshed management initiatives, limiting the scope of potential interventions.

Economic Pressures

- Economic dependence on agriculture and resource extraction may lead to practices that compromise spring health, as communities prioritize immediate economic needs over long-term sustainability.

Cultural Factors

- Traditional practices and beliefs have the potential to contribute to a holistic springshed management and create a sense of ownership promoting sustainability.
- The role of women in decision-making should be strengthened by involving them as stewards for Springshed management across all levels.
- There is a growing recognition of the importance of springs and springshed management, which presents an opportunity for developing state-wide strategies.

5 Vision and Goals for Springshed Management

5.1 Vision Statement

In line with the above-mentioned problem analysis, the **vision** of the Roundtable has been defined as:

"To foster resilient and sustainable springshed ecosystems in Manipur, where local communities thrive in harmony with nature, ensuring equitable access to clean water, preserving biodiversity, and enhancing the well-being of present and future generations through collaborative management and conservation practices."

5.2 Short-term and Long-term Goals

In order to achieve above mentioned vision, the following goals disaggregated by short-term and long-term objectives are described below.

Short-Term Goals (12 – 18 months)

Baseline Assessment:

- Conduct a thorough inventory and assessment of existing springs and springsheds as NbS, including water quality, quantity, and ecological health & biodiversity.

Community Engagement:

- Involve local stakeholder groups to promote awareness and in implementation of GESI responsive springshed management initiatives.

Pilot Projects:

- Launch springshed management pilots in key areas to test sustainable practices and to gather monitoring and research data.

Capacity Building:

- Provide training for local communities and related stakeholders on sustainable water management and conservation techniques.
- Strengthen capabilities of mandated state institutions for mainstreaming springshed management into their capacity building programmes.
- Training strategy to develop future trainers (ToT) for state wide roll out of springshed management.

Policy Development:

- Draft and advocate for state-level policies that support springshed management while incorporating gender sensitive community participation.

Long-Term Goals (2 - 6 years)

Sustainable Management Framework:

- Develop a comprehensive and integrated management framework for all springsheds in the state, ensuring sustainable water use and conservation.

Ecosystem Restoration:

- Implement restoration projects for degraded springsheds to enhance biodiversity, improve water quality, and increase resilience to climate change.

Data-Driven Decision-Making:

- Establish a robust monitoring and evaluation system to track springshed health using digital tools for real time monitoring and data based informed decision-making for developing adaptive management strategies.

Resilient Communities:

- Foster community resilience by ensuring equitable access to clean water and integrating springshed management into local development plans.

Long-Term Funding Mechanisms:

- Create sustainable funding sources for springshed management initiatives, including partnerships with NGOs, government agencies, and private sector stakeholders.
- Sustainable financing of hydrological surveys to be promoted through demand-driven consulting services by certified para-hydrogeologists who have undergone a comprehensive training program (ToT).

6 Strategies for Effective Springshed Management

6.1 Community Engagement and Participation

Active community participation in all the implementation stages will be key to ensure that indigenous knowledge is utilised, a sense of ownership is created and that sufficient capacities are developed to ensure an independent follow-up.

The establishment of village monitoring teams (spring discharge, water quality and biodiversity monitoring) will provide sustained monitoring data for a state-wide impact monitoring system.

6.2 Integrated Water Resource Management

Integrated Water Resource Management in the context of springshed management refers to a holistic approach that aims to manage water resources in a way that balances social, economic, and environmental objectives.

6.3 Biodiversity Conservation Initiatives

Combining springshed management with biodiversity monitoring can lead to holistic environmental management, ensuring that water resources are protected while also preserving the ecosystems through habitat restoration and biodiversity enhancement. This integrated approach can enhance resilience to climate change and promote sustainable livelihoods for local communities.

6.4 Capacity Building and Education

Sustainability of capacity building will be ensured through cooperation with schools, Universities and Educational Institutions in the State by integrating springshed management in university curricula.

7 Policy Framework and Institutional Arrangements

7.1 Current Policies and Regulations

Manipur state-wide spring inventory will contribute towards achieving the goals of nationwide spring census (2025)

In Manipur, several state policies, government schemes and other initiatives focus on water resource management including the following:

Manipur Water Policy: A comprehensive framework aimed at sustainable management of water resources, focusing on equitable distribution, conservation, and community participation.

State Action Plan on Climate Change (SAPCC): Includes strategies for water resource management to address climate impacts on water availability and quality. The Climate Change Action Plan 2.0 for Manipur is a strategic framework aimed at addressing the challenges posed by climate change while promoting sustainable development.

Pradhan Mantri Krishi Sinchayee Yojana (PMKSY): Promotes sustainable irrigation practices and watershed management to improve water use efficiency in agriculture.

Manipur Integrated Water Resource Management (IWRM) Program: Focuses on holistic management of water resources, integrating various sectors and promoting stakeholder participation.

Water Supply and Sewerage Policy: Aims to ensure safe drinking water supply and proper sewage management in urban and rural areas.

National Water Policy Implementation: The state aligns its water management practices with the principles of the National Water Policy, promoting sustainable and efficient water use.

Rainfed Area Development Program: Encourages the conservation and efficient use of rainwater in agriculture and other sectors.

Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA): Includes provisions for water conservation and management projects, contributing to local water resource development.

Watershed Development Component-Pradhan Mantri Krishi Sinchayee Yojana (WDC-PMKSY) 2.0: The Watershed Development Component of the Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) is an initiative by the Government of India aimed at enhancing agricultural productivity and ensuring sustainable water management through the development of watersheds. Currently the Department of Land Resources, Ministry of Jal Shakti is working towards a scheme on Springshed management in the Indian Himalayan region alongside WDC-PMKSY and the Manipur efforts shall contribute to this.

Jal Jeevan Mission: The Jal Jeevan Mission focuses on providing safe and adequate drinking water supply to rural households through sustainable water management practices.

Watershed Management Programme in Manipur: The Watershed Management Programme in Manipur was officially launched in 2008 as part of the National Watershed Management Programme by the Government of India. The initiative aimed to enhance soil and water conservation, promote sustainable agricultural practices, and improve livelihoods in the region. Over the years, various projects have been implemented under this program, focusing on community participation and capacity building.

7.2 Recommended Policy Development

Anticipating a State-wide and continued implementation of springshed management as long-term goal of the roadmap the following policy development are considered crucial:

Institutionalisation of an Inter-Departmental Roundtable on Springshed Management for Manipur State, with the approval of Honourable Chief Minister, to serve as a science-policy-practitioner interface for the entire State of Manipur.

Integration of springshed management into curricula of educational institutions including Universities in view of a continued capacity building and refinement of the methodology to establish a linkage between research and education on this crucial topic. DM university of Manipur has already articulated their interest in this matter.

Policy framework on Payments for Environmental Services to provide tangible financial incentives for springshed management and protection by local communities.

7.3 Institutional Roles and Responsibilities

State line Departments

Role: Springshed management requires an integrated approach, as water resources, land management, environmental conservation, and human activities are all interconnected. Therefore, effective springshed management depends on collaboration between different line departments.

Line departments need to work together in cross-sectoral planning, share data, and align their policies to manage springsheds in a comprehensive way. Coordination ensures that policies and actions are complementary rather than contradictory.

Benefits: Involving line departments in springshed management ensures that a wide range of expertise, resources, and responsibilities are brought together to address the complexities of managing these vital water resources and leading to a comprehensive, coordinated, and sustainable approach to protecting these critical water sources. The comprehensive involvement of multiple departments ensures that all factors impacting the springshed (from land use practices to water extraction) are considered and managed together, avoiding fragmented or conflicting policies and actions.

By involving line departments from diverse sectors (e.g., water resources, agriculture, forestry, health, and environment), springshed management becomes more holistic and integrated leading to more effective resource management, better coordination, improved monitoring, and long-term sustainability, all of which contribute to ensuring that springs remain viable sources of water for both ecosystems and human communities.

Better coordination leads to more effective use of available resources and ensures that essential tasks, such as water quality monitoring, vegetation restoration, and community engagement, receive adequate attention and funding.

A coordinated approach will promote the development of a supportive legal framework ensuring that all relevant actors are aligned toward a common goal of sustainable springshed management, increasing the effectiveness of interventions.

Inter-Departmental Roundtable on Springshed Management for Manipur State

Role: The roundtable will serve as a science-policy-practitioner interface for the entire State of Manipur (kindly see **Annex 1** for further details).

Benefits: A multi-departmental approach ensures that springshed management is not treated as a one-off project but as an ongoing, sustainable effort that is prioritized over time, with continuous support from various government entities.

8 Implementation Plan

8.1 Action Plan and Timeline

Short-Term Goals (12-18 months)	Responsibilities	Scope	Funding Source
Capacity Building			
Continue cooperation with ACWADAM, ICIMOD, NIHE to develop pool of Para-hydrogeologist	Directorate of Environment and Climate Change in collaboration with ACWADAM (Advanced Centre for Water Resources Development and Management), Maharashtra. COSFOM-KfW in collaboration with ICIMOD, Nepal.	Sufficient para-hydrologists for state-wide roll out	Swiss Agency for Development and Cooperation UK International Development COSFOM-KfW
Coaching of hydrogeological surveys conducted by trainees/students	As above		
Conduct physical interventions for springshed rejuvenation (piloting)	Directorate of Environment and Climate Change along with ACWADAM. COSFOM-KfW along with ICIMOD.	12 sites in Chandel, Kamjong, Noney, Senapati, Tamenglong 23 sites in Ukhul	
Establish and continuously coach a pool of gender balanced para-hydrogeologists capable of guiding field surveys and physical interventions with communities	ACWADAM, ICIMOD, DM University, Manipur University, NIT	At least 30 para-hydrogeologists available for continued field surveys	

Short-Term Goals (12-18 months)	Responsibilities	Scope	Funding Source
Capacity Building			
Train local leaders and community members in sustainable land use management techniques	Agriculture and Horticulture Department		
Community awareness and engagement, Volunteering opportunities for local residents, Partnerships with local CSOs	COSFOM-KfW, DoECC and participating line departments of the Roundtable.		
Operationalise village-based monitoring system for spring discharge and water quality	Para-hydrogeologists	All existing springshed rejuvenation sites	
Updated technical guidelines and training material to be published on the State interface	ACWADAM and ICIMOD	ICIMOD Manual (2018) Protocol for Reviving Springs in the Hindu Kush Himalaya: A Practitioner's Manual	
Printing and dissemination of guidelines, awareness and PR material	COSFOM-KfW		
Conduct inter-state exposure trips to States with advanced policy frame on springshed management (e.g., Sikkim, Himanchal Pradesh, Uttarakhand)	COSFOM-KfW		

Short-Term Goals (12-18 months)	Responsibilities	Scope	Funding Source
Inventory and Assessment			
Apply the national Data Collection Framework: Location (GPS coordinates), water flow (volume and seasonal variability), water quality (pH, turbidity, contaminants), ecological conditions (surrounding vegetation, habitat), socio-economic importance (community use, cultural significance), create app-based data collection system to be operated by village monitoring teams, establish NbS/EbA baselines and end lines. NbS: Nature-based Solution; EbA: Ecological-based Adaptation	NIT, Manipur University, IT consultant Dhanmanjuri (DM) University- Data collection/inventory WRD (ISHWAR App)	Spring rejuvenation sites	
Organize field teams to conduct district baseline surveys on-site water quality testing. Collect water samples for lab testing.	COSFOM-KfW Roundtable Members	As above	
Compile and analyse the collected data to identify patterns, assess the health of springs, and understand their ecological and social significance, water demand and supply/availability assessment at a State-level interface to be maintained by the respective line Department	PHED, COSFOM-KfW Tezpur University Dhanmanjuri University Manipur University	As above	
Prepare a detailed State report summarizing findings, methodologies, and recommendations for springshed management, including interactive maps and visual representation of the data using Decision Support System (DSS)	DoECC/ ICIMOD		

Establish a framework for continuous monitoring of springs to track changes over time, adapting management practices based on findings and new challenges with a strong focus on village-based monitoring	COSFOM-KfW ICIMOD		
Short-Term Goals (12-18 months)	Responsibilities	Scope	Funding Source
Annual planning and evaluation			
Develop annual work plan and budget	Planning Department		
Deliver semi-annual progress reports at State level	Core-committee (Roundtable)		
Annual review of funding requirements and sources for State fund requests and effective fund utilisation	Planning Department		
Policy Advocacy / Strengthening Policy Framework			
Organise roundtable meetings on a quarterly/semi-annual basis	Rotating chairmanship to promote shared leadership	Inter-Departmental Roundtable on Springshed management in Manipur	
Conduct at least one village level PES pilot as example for a sustainable financing mechanism	COSFOM-KfW ICIMOD	Shirui village, Ukhrul	
Develop annual policy brief on springshed management status for Manipur State. Develop communication materials with evidence	Core-committee (Roundtable)		
Institutionalisation of the Roundtable for the Roundtable to become a State Institute to lead, advise, and implement Springshed Management initiatives in the State.	Manipur Forest Department which shall be the lead institution/ Nodal Agency in collaboration with the participating line departments.	Manipur State	

Advocate for the inclusion of springshed management in local and state policies, emphasizing the need for sustainable management and monitoring practices.			
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Policy Advocacy / Strengthening Policy Framework Contd...	Responsibilities	Scope	Funding Source
Establish robust policies and institutional arrangements for springshed management at local and state levels, ensuring long-term commitment and resources.	DoECC Forest Department		
Identify key entities as contact point for springshed management at State and District level, to be appointed by the Government.	Roundtable		
Set-up a platform on springshed management in the North Eastern Himalayan States	DoECC		

Long-Term Goals (year 2-6)	Responsibilities	Scope	Finance
Sustainable Water Management			
State-wide coverage of springshed hydrogeological surveys.	Participating line Departments of the Roundtable	Manipur State	
State-wide physical interventions to be conducted by village level teams under the supervision of para-hydrogeologists.		Manipur State	
Achieve sustainable management of all springs in Manipur, ensuring that water extraction meets both community needs and ecological requirements.		Manipur State	
Ecosystem Restoration			
Restore degraded springshed areas to enhance biodiversity and improve water quality, aiming for increased resilience to climate change			

Develop integrated Resource Management Framework			
Integrate springshed management into State Board / University/College curriculum and scientific research (e.g., schools, colleges, and universities).	DM University Manipur University NIT, State Board of Education		
Implement an integrated framework for land, water, and resource management that incorporates traditional knowledge and modern practices.			
Monitoring and Adaptation			
Create a continuous monitoring and evaluation system to assess the health of springs and adapt management practices based on findings and changing conditions.	To be anchored within the structures of the Roundtable		
Identify sustainable financing for the operation of a State-wide Spring Monitoring System.	Forest Department		

8.2 Stakeholder Involvement

Effective springshed management is fundamentally collaborative, requiring the active engagement of multiple stakeholders. The roles of local communities, government bodies, experts, NGOs, the private sector, and academic institutions need to be harmonized to ensure sustainable management of water resources. By working together, stakeholders can design solutions that address the ecological, social, and economic challenges associated with springshed management, ensuring water security for present and future generations.

Stakeholders foreseen in the process are summarised as follows:

1. Local Communities

Role: The primary stakeholders in springshed management are the local villagers, as they are the ones who directly depend on the springs for water for drinking, irrigation, livestock, and other daily needs. Their active involvement is crucial for the long-term success of springshed management including participatory mapping and data collection, monitoring and maintenance and water use regulations.

Benefits: Empowering local communities fosters a sense of ownership and responsibility for the health of the springshed, increasing the likelihood of sustainable management practices.

2. Local Government and Panchayats

Role: Local government bodies, such as village authorities and municipal authorities, are key actors in village-based springshed management. They help in coordinating and facilitating springshed activities, implementing policies, and providing technical and financial support.

Local government bodies can draft policies and regulations around water use, land conservation, and spring protection. They also have the authority to enact water-sharing agreements, waste management rules, and other governance frameworks for the springshed area.

Village authorities and local governments can access funding from various state or central government programs to support springshed restoration, rainwater harvesting, and water infrastructure development.

Benefits: The local government can provide the organizational framework, resources, and legal support for springshed management, ensuring that the initiatives are in line with larger state and national water management policies.

3. Environmental and Water Management Experts/Institutions

Role: Environmental scientists from Academic institutions, universities, and research organizations, as well as (para-) hydrogeologists bring technical expertise to the springshed management process. They help in designing recharge areas, sustainable management plans, conducting scientific assessments, and ensuring that the interventions are environmentally sound.

Benefits: Experts bring scientific knowledge that supports evidence-based decision-making, ensures the long-term sustainability of water resources, and helps mitigate risks from external environmental pressures.

4. Non-Governmental Organizations (NGOs) and Civil Society Groups

Role: NGOs, community-based organizations (CBOs), and other civil society groups often serve as intermediaries between local communities, the government, and technical experts. They can help bridge knowledge gaps, mobilize resources, and facilitate community engagement.

NGOs play a key role in organizing meetings, workshops, and community dialogues. They ensure that local voices are heard, and that the management process is inclusive, particularly for marginalized groups such as women, indigenous peoples, and the landless.

They can provide training and capacity-building programs in water management, sustainable agriculture, conservation practices, and disaster risk reduction. They may also help design and implement monitoring and evaluation systems.

NGOs help raise awareness about the importance of springshed protection and educate communities about the impacts of overuse, pollution, and unsustainable practices. They can also advocate for policy reforms that benefit local communities and springshed conservation.

Benefits: NGOs enhance community capacity, build local leadership, and facilitate resource mobilization. Their involvement ensures that springshed management practices are inclusive, participatory, and sustainable.

5. International / National / Projects and Cooperations

Role: International projects provide access to global expertise and best practices on innovative approaches, tools, and technologies for monitoring, data collection, and sustainable management of springsheds. They further can contribute financial resources, which are crucial for large-scale springshed management initiatives. These resources can be used to enhance infrastructure, conduct scientific studies, or implement restoration projects. Implementing state-of-the-art monitoring techniques, such as satellite imaging, GIS-based tools, or remote sensing, which provide accurate, real-time data on water quality, quantity, and springshed health can be provided through expert inputs.

Benefits: Involving international projects in springshed management at the state level offers a wide range of benefits, particularly in terms of improving the sustainability, effectiveness, and scalability of water resource management. Participating in international projects facilitates capacity building by providing training and skill development opportunities for local professionals, government officials, and community leaders.

Springshed management at the state level aligns with several of the UN's Sustainable Development Goals (SDGs), particularly Goal 3 (Good Health and well-being), Goal 6 (Clean Water and Sanitation) and Goal 13 (Climate Action). By involving international projects, states can integrate global sustainability frameworks and targets into local water management practices.

Manipur State will benefit from the extensive networks of international organizations, donors, research institutions, and environmental NGOs that can provide support, share resources, and drive advocacy efforts for springshed management, e.g. as currently applied under the cooperation between ICIMOD and COSFOM.

8.3 Funding and Resource Mobilization

- GoM
- External aided projects
- Public-Private Partnership
- Payments for Environmental Services
- CSOs

9 Monitoring and Evaluation

9.1 Evaluation Framework

An evaluation framework will be established to allow for a comprehensive impact monitoring of applied measures. The following key steps are therefore proposed:

- Determine the primary objectives of springshed management (e.g., water quality/quantity improvement, biodiversity enhancement, sustainable water supply).
- Involve stakeholders (local communities, water users, conservation groups) to gather inputs and align objectives.
- Develop Evaluation Criteria related to biodiversity, habitat quality, and ecosystem health-climate benefits (carbon sequestration) as well as hydrological Indicators such as water flow rates, groundwater levels, and recharge rates.
- Assess socio-economic impacts on local communities, including economic benefits, access to water, and recreational opportunities.
- Assess the impact through the lens of drudgery reduction for women.

- Establish baselines on current conditions related to the selected indicators before implementing management actions. Review historical data to understand trends and changes in the Springshed area.
- Develop a Monitoring Plan and create a timeline for regular data collection (e.g., fortnightly, annually, seasonally) and assign tasks to team members or organizations involved in the monitoring process.
- Regularly review and refine the evaluation framework based on new information, changing conditions, and stakeholder needs.
- Use evaluation results to inform policy decisions and management practices related to water resources and environmental conservation.
- Share successful strategies and outcomes to promote broader support for Springshed management initiatives.

9.2 Adaptive Management Practices

Adaptive management for state-wide springshed management offers a dynamic, flexible way to address the complexities of managing these critical water sources. Because springs are sensitive to land use, climate change, and hydrological variations, adaptive management is especially valuable for managing them. By continuously monitoring, evaluating, and adjusting management actions, state agencies can better respond to evolving challenges, such as climate change and land use pressures, while striving to protect both ecological integrity and water resources for the long term. Successful adaptive management requires collaboration, data-driven decision-making, and a commitment to learning and improvement.

Key Components

1. Initial Assessment and Action Plan

Assess the health of springs at a state-wide level, setting goals for spring flow rates and water quality, and identifying the major threats to these resources. Based on this information, an action plan is developed with clear management interventions such as regulating agricultural practises, forest restoration and restoring riparian areas.

2. Monitoring and Data Collection

Establish a monitoring network at village level that measures spring discharge, and water quality at multiple locations within the springshed. Monitoring will be continuously maintained to establish baseline data and track trends.

3. Adaptive Action in Response to New Information

After around five years of monitoring, management practises are re-evaluated and adjusted accordingly leading to a continuous feedback and adjustment cycle.

Quantitative data on spring recharge increase can be utilised for PES related payment standards.

4. Stakeholder Feedback

Local stakeholders, including farmers, conservationists, and municipalities, are brought together to discuss the monitoring results and potential adjustments to the management plan. Their input helps refine management actions and ensure that the solution is equitable and feasible.

10 Case Studies and Best Practices

10.1 Successful Springshed Management Examples

Directorate of Climate Change and Environment & ACWADAM (Lunghar village)

- Directorate of Environment and Climate Change is implementing the project in association with Advanced Centre for Water Resources Development and Management (ACWADAM), International Centre for Integrated Mountain Development (ICIMOD) and Swiss Agency for Development and Cooperation (SDC).

National Bank for Agriculture and Rural Development (NABARD)

- NABARD is supporting springshed based watershed development project at Kalhang village, Chingai Block, Ukhrul District. The project implementing agency is The Volunteers for Village Development (VVD).

Department of Land Resources, Ministry of Rural Development

- Watershed Development Component-Pradhan Mantri Krishi Sinchayee Yojana (WDC-PMKSY) 2.0

COSFOM Project & ICIMOD (Teinem village)

- COSFOM project piloted springshed management in Teinem village in 2024.

11 References

Protocol for reviving Springs in the Hindu Kush Himalayas: A Practitioner's Manual (2018) ICIMOD <https://lib.icimod.org/record/34040>

Resource book on springshed management in the Indian Himalayan: Guidelines for policy makers and development practitioners (2021) <https://lib.icimod.org/record/35772>

12 Appendices

Appendix 1: Concept Note Inter-Departmental Roundtable on Springshed Management

Concept Note on Governance, Mandates, and Modus Operandi for an Inter-Departmental Roundtable on Springshed management for Manipur State

I. Introduction

Springs play a vital role in sustaining ecosystems, providing drinking water, supporting agriculture, and maintaining biodiversity. With increasing threats from climate change, land use changes, and unsustainable water extraction, effective management of springsheds (the land area draining into a spring) is crucial. Springshed management involves the sustainable conservation of spring water sources, their recharge zones, and the surrounding ecosystem.

A multi-stakeholder roundtable on Springshed Management is proposed to foster collaboration, share knowledge, align interests, and develop strategic plans for reviving and safeguarding springs.

The roundtable on springshed management will serve as a platform for collaborative action towards the sustainable management of springs and their ecosystems. By fostering a governance structure that is inclusive, transparent, and action-oriented, the roundtable will contribute significantly to the protection of these critical water sources and the livelihoods of communities dependent on them.

The 1st Inter-Departmental Roundtable on Springshed Management for Manipur State was held on 26th June 2024 in Imphal, Manipur. On the 09th of Dec 2024, the first Nodal officers meeting was conducted in Imphal in preparation for the 2nd Roundtable meeting which was conducted successfully on 24th Feb 2025.

The document at hand outlines the governance structure, mandates, and modus operandi for organizing and executing the Inter-Departmental Roundtable on Springshed Management in Manipur State.

II. Objective of the Roundtable

The main objective of the roundtable is to create a platform for dialogue, cooperation, and coordinated action on springshed management. Specifically, the roundtable will aim to:

1. Serve as a **science-policy-practitioner interface** for entire State of Manipur.
2. **Create a framework for sustainable management** that integrates environmental, social, and economic factors.
3. **Facilitate stakeholder engagement** by bringing together government agencies, local communities, conservation organizations, academic institutions, and the private sector.
4. **Formulate recommendations and actionable policies** for springshed protection and sustainable water resource management.
5. **Facilitate inter-state communication and cooperation** for the Northeastern States and the wider Himalayan region.
6. **Promote synergies and increase efficiency of fund usage** and act as a contact point for Externally Aided Projects

III. Governance Structure

The governance of the roundtable will be designed to ensure transparency, inclusivity, and effectiveness. The governance will consist of three main bodies:

1. Steering Committee

- **Composition:** Steering Committee to be elected by members for a period of 2 years ensuring women representation.
- **Role:** Provide overall strategic direction, set agendas, and ensure that the roundtable's activities are aligned with its objectives.
- **Responsibilities:**

- Approve annual financial and work plans for the roundtable in line with the overall roadmap for springshed management.
- Guide the development of key documents and policy development.
- Oversee the planning and organization of meetings.
- Secure funding and resources.

2. Secretary

- **Composition:** Member responsible for logistics, communications, and record-keeping.
- **Role:** Manage operations of the roundtable and facilitate smooth coordination.
- **Responsibilities:**
 - Organize roundtable meetings and events.
 - Maintain records of meetings and resolutions.
 - Manage communication with stakeholders and the public.
 - Coordinate resource mobilization and funding applications.

3. Members

- **Composition:** Experts and thought leaders from various fields (water management, conservation, community development, etc.) who provide technical support and guidance.
 1. Finance Department
 2. Manipur Forest Department
 3. Planning Department
 4. Public Health Engineering Department (PHED)
 5. Department of Horticulture & Soil Conservation
 6. Department of Agriculture
 7. Department of Veterinary & Animal Husbandry
 8. Directorate of Environment and Climate Change
 9. National Institute of Technology, Manipur (Department of Civil Engineering)
 10. Manipur University (Dept. of Environmental Science, Dept. of Forestry)
 11. Dhanamanjuri University (Dept. of Geology and Dept. of Environment)
 12. KfW COSFOM Project
 13. ICIMOD, Nepal
 14. ACWADAM, Pune
 15. National Institute of Himalayan Environment- NIHE, Almora
- **Role:** Offer expert advice on scientific, technical, and policy matters related to springshed management.
- **Responsibilities:**
 - Review scientific reports and technical documents.
 - Advise on best practices and innovative approaches to springshed conservation.
 - Support capacity building for stakeholders.

IV. Mandates

The roundtable will operate under the following mandates:

1. **Knowledge Sharing:** Create a platform for the exchange of experiences, state-of-the-art research, and best practices in springshed management. Facilitate training and capacity-building workshops to strengthen State expertise.

2. **Research and Data Collection:** Promote scientific research on springs, springsheds, and groundwater systems. Advocate for the collection of reliable data to support decision-making, policy development, and resource management.
3. **Community Engagement:** Empower local communities living in springshed areas by involving them in implementation and impact monitoring. Support their efforts in protecting and managing water resources through participatory approaches and sustainable livelihood development.
4. **Resource Mobilization:** Identify and facilitate access to financial resources for springshed management initiatives, including government funds, donor contributions, and private sector investments.
5. **Policy Advocacy:** Advocate for integrated, cross-sectoral policies that recognize the importance of springs and their sustainable management. Encourage government and local authorities to adopt spring protection into water governance frameworks.
6. **Monitoring and Evaluation:** Establish mechanisms for tracking the effectiveness of springshed management interventions. Ensure adaptive management through periodic reviews and assessments of outcomes.

V. Modus Operandi

The roundtable's modus operandi will prioritize inclusivity, collaborative decision-making, and sustainable outcomes. Key operational features will include:

1. **Regular Meetings:**
 - The roundtable will convene at least twice a year. Additional thematic meetings may be held as necessary, especially to address emerging challenges or focus on specific topics or regions.
 - Virtual meetings may be organized to facilitate broader participation and flexibility.
 - Roundtable meetings will be organised at various Departments/Institutions following a rotating chairmanship.
2. **Thematic Working Groups:**
 - Specific topics, such as policy development, community engagement, or hydrological studies, will be addressed through thematic working groups.
 - Each working group will be led by an expert or lead organization and include relevant stakeholders. The working groups will produce reports, recommendations, and action plans to be presented in plenary during roundtable meetings.
3. **Workshops and Capacity-Building Events:**
 - In addition to meetings, the roundtable will organize periodic workshops and training sessions on springshed management techniques, data collection methods, policy formulation, and community mobilization in cooperation with national and international institutions (e.g. ACWADAM, ICIMOD).
4. **Public Engagement and Awareness:**
 - The roundtable will facilitate public awareness campaigns about the importance of springs and springshed management, involving local communities and the broader public.
 - A dedicated website or online interface will be established to share resources, documents, and news.
5. **Conflict Resolution and Consensus-Building:**
 - Given the diverse interests and stakeholders, the roundtable will adopt a consensus-based decision-making process, aiming to mediate conflicting interests and build common ground.
6. **Reporting and Documentation:**

- Detailed proceedings of each roundtable meeting, along with recommendations and action plans, will be documented and disseminated to all stakeholders.
- An annual report will be prepared to highlight progress, challenges, and next steps in springshed management by a core-committee.

VI. Expected Outcomes

By the end of the roundtable's initial phase, the following outcomes are expected:

1. **Comprehensive Springshed Management Strategy:** A clear, integrated strategy for managing springs and springsheds at national and local levels.
2. **Policy Recommendations:** A set of policy recommendations for the State of Manipur aimed at improving the sustainability of springshed management.
3. **Actionable Projects:** Identified projects and initiatives for immediate implementation, supported by funding, partnerships, and local involvement.
4. **Strengthened Partnerships:** A robust network of stakeholders engaged in springshed management, committed to long-term cooperation.

Appendix 2: Maps, Diagrams, Photos

