

# Call for Proposals Research Grants for “Urban Shallow Aquifer Management”

## Research Grant Opportunity on Urban Shallow Aquifer Management under AMRUT 2.0

### AN OPPORTUNITY TO CONTRIBUTE TO ENHANCE INDIA'S URBAN GROUNDWATER RESILIENCE THROUGH EVIDENCE-BASED RESEARCH

The National Institute of Urban Affairs (NIUA) under the Ministry of Housing and Urban Affairs (MoHUA) invites applied and practical research proposals to strengthen the understanding and management of shallow aquifers in Indian cities under the Shallow Aquifer Management (SAM 2.0) initiative of AMRUT 2.0.

The purpose of this call is to build a stronger scientific evidence base for shallow aquifer management through interdisciplinary and solution-oriented research.

Up to 10 high-quality research proposals will receive upto INR 5 lakh grant to conduct short and impactful research.

#### WHO SHOULD APPLY?

- Academic & Research Institutions
- Think-Tanks
- NGOs

#### Benefits for Applicants

1. A grant of up to INR 5,00,000 to undertake the research activities.
2. Opportunity to translate research into actionable projects in SAM 2.0 cities, if found feasible.
3. A special Certificate of Meritorious Achievement.
4. Opportunity to participate in a two-day workshop in Delhi to help fine-tune the research idea and have knowledge exchange with other awardees.
5. Opportunity to publish in a special issue publication of a reputed journal.

Scan the QR Code  
to Learn More and  
Apply Now



APPLICATION WINDOW  
22<sup>nd</sup> July – 21<sup>st</sup> August 2025

Open for Indian Nationals

For any queries, contact [sam@niua.org](mailto:sam@niua.org)

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#### Apply Now

Application Form:

<https://forms.gle/NRq9aY8wYa8SEzpa8>

Template for Proposal Submission (to be submitted with the application form):

[https://docs.google.com/document/d/1kqphmdzsR\\_cJR6UHLfNHLvrTcAKeW5bC/edit?usp=sharing&ouid=111065772918922451759&rtopof=true&sd=true](https://docs.google.com/document/d/1kqphmdzsR_cJR6UHLfNHLvrTcAKeW5bC/edit?usp=sharing&ouid=111065772918922451759&rtopof=true&sd=true)

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# Background

In response to the increasing stress on urban groundwater systems, the Shallow Aquifer Management (SAM) initiative was launched under the Atal Mission for Rejuvenation and Urban Transformation (AMRUT 2.0) in 2022. Launched as a pilot in 10 cities under SAM 1.0, the initiative focused on aquifer mapping, recharge structure implementation, and integrating groundwater concerns into urban planning.

Led by the National Institute of Urban Affairs (NIUA) under the aegis of Ministry of Housing and Urban Affairs (MoHUA), SAM 1.0 demonstrated measurable improvements in groundwater levels, increased local capacities, and laid the foundation for a scalable model of shallow aquifer management. The outcomes are documented in the **SAM 1.0 Compendium ([Link](#))**.

Building on the success of SAM 1.0, SAM 2.0 was launched under AMRUT 2.0 in 2025. SAM 2.0 seeks to build on SAM 1.0 both horizontally and vertically. The horizontal agenda is to scale up the outputs and learning from SAM 1.0 to new cities under SAM 2.0. The vertical agenda is to deepen the understanding and application of urban aquifer management practices.

A key component of the vertical agenda of SAM 2.0 is to plug knowledge gaps in the area of urban aquifer management through action research that addresses technical, institutional, and policy challenges.

To this end, NIUA is launching the SAM 2.0 Research Grant, aimed at supporting practical, interdisciplinary research that informs and strengthens groundwater management across Indian cities. The selected studies will contribute directly to refining existing approaches, informing decision-making, and supporting the long-term sustainability of SAM 2.0.

## About the Research Studies

The SAM 2.0 Research Grant is designed to interested stakeholders in conducting applied research that strengthens the scientific and practical foundations of shallow aquifer management in urban India. Through this initiative, NIUA seeks to support action-oriented studies that not only generate new insights but also contribute directly to the capacities of Urban Local Bodies (ULBs) and other stakeholders engaged in city-level groundwater management.

Entities applying under this call are expected to undertake research that is rooted in real urban contexts. Each selected study should demonstrate a clear pathway for implementation, pilot testing, or framework development in at least one city preferably from the list of 75 cities under SAM 2.0 mentioned at the end of this document. This on-ground relevance will ensure that the outcomes are meaningful, scalable, and aligned with the broader goals of SAM 2.0.

## Key Objectives

- **Contribute to ongoing efforts under AMRUT 2.0 and MoHUA's Missions** by enhancing practical knowledge to guide shallow aquifer management in urban India.
- **Map the research landscape on urban shallow aquifers** for understanding the existing research, knowledge gaps, and region-specific needs related to shallow aquifer management across Indian cities.
- **Strengthen implementation and city capacities:** Enable the piloting, testing, or application of research outputs in urban settings, while building the capacity of cities to adopt and scale such interventions.
- **Identify Innovative Solutions and Start-ups:** Bring to the fore emerging technologies, frameworks, and operational models from academic institutions and start-ups that can be applied or adapted for urban groundwater management.

# Thematic Areas



## Governance and Planning

Explore institutional frameworks, regulatory tools, zoning practices, and inter-agency coordination mechanisms that can support sustainable shallow aquifer management in urban areas. Studies may also examine how groundwater considerations can be embedded into Master Plans, building bye-laws, and urban infrastructure projects.



## Citizen Engagement

Explore strategies to increase public awareness, participation, and stewardship in managing shallow aquifers. This may include behaviour change communication, community-led monitoring, local recharge initiatives, or participatory decision-making processes that empower residents and civil society.



## Hydrogeology, Mapping and Quantification

Focus on techniques and tools to identify, delineate, and quantify shallow aquifers, recharge zones, discharge areas, and groundwater flows. This may involve developing methodologies for aquifer mapping, identifying vulnerable recharge areas, or estimating recharge/discharge rates and water quality potential.



## Data Science in Groundwater Management

Develop or test digital solutions and data-driven frameworks that support monitoring, modelling, and decision-making for shallow aquifer management. This could include mobile-based tools, GIS platforms, dashboards, remote sensing applications, or integrated groundwater information systems tailored to urban settings.

A set of indicative research topics has been developed to address specific and emerging challenges related to shallow aquifer management in urban India. These questions reflect on-the-ground issues identified through SAM implementation, city consultations, and ongoing discourse in the sector.

However, institutions are encouraged to propose their own research narratives and ideas, so long as they clearly align with the overarching themes and challenges outlined in this document. The questions provided are meant to guide thinking, not restrict innovation and applicants are welcome to build upon, combine, or diverge from them as long as the objectives of the research grant are met.

# Indicative Research Topics

**Proposition 1:**

Integration of Shallow Aquifer Zonation into Urban Planning Instruments

**Research Theme:** Governance and Planning

**Research Question:**

How can shallow aquifer zonation be integrated into urban planning instruments (such as master plans and zoning bylaws) at various governance levels (national, state and local)?

**Research Hypothesis:**

- Currently, urban groundwater conservation is primarily restricted to regulations on anthropogenic activities, such as borewell drilling. However, physical excavation of aquifer material and groundwater exploitation in strategic locations requires strengthening and enforcement of planning regulations. In most cases, Shallow aquifers of urban areas are largely ignored.
- Cities that embed shallow aquifer management in their planning frameworks and pair it with formal regulatory mechanisms show improved groundwater conditions, reduced illegal extraction, that lead to the judicious use of groundwater.
- Institutional coordination among a range of stakeholders, ranging from planning and design to implementation, as well as its monitoring and regulatory bodies facilitate sustainable management of groundwater.

**How will it influence groundwater management in India?**

- Aquifer-sensitive planning instruments will enable urban development that ensures the sustainability of groundwater.
- Helps draft enforceable development regulations that protect natural groundwater recharge and discharge areas.
- Offers a framework for urban local bodies to build participatory and implementable groundwater policies and programmes complementary to state and national provisions.



**Proposition 2:**

Participatory Approaches for Shallow Aquifer Conservation

**Research Theme:** Citizen engagement and participation

**Research Question:**

What novel approaches or mechanisms can enable citizens to become active stakeholders in the conservation, protection, and maintenance of shallow aquifers in Indian cities?

**Research Hypothesis:**

- Communities that are sensitized about the importance of conservation of shallow aquifers are more likely to contribute to its management.
- Community involvement will lead to participatory initiatives and improved understanding of the status quo of groundwater in their areas, i.e. identification of potential recharge zones, maintenance of recharge structures & vulnerable areas.
- Behavioral interventions, citizen science, and decentralized monitoring of shallow aquifers can significantly enhance public ownership of groundwater resources.

**How will it influence groundwater management in India?**

- Helps mainstreaming participatory roles in shallow aquifer management (e.g., RWAs/Societies allocating their resources, ensuring voices of marginalised communities, youths).
- Strengthens implementation of national, state and local schemes by integrating community-driven data and local stewardship models.
- Supports decentralization in overall water governance by embedding public-involvement mechanisms.

**Proposition 3:**

Impact of Urban Underground Infrastructure on Shallow Aquifers

**Research Theme:** Hydrogeology, Mapping and Quantification

**Research Question:**

How do underground infrastructures (e.g., metro lines, basements, underground parking, underpasses, etc.) affect the existence, flow dynamics and quality of shallow aquifers in Indian cities?

**Research Hypothesis:**

- Informed infrastructure design with respect to different aquifer systems will help in sustainable management and conservation of shallow aquifers.
- Modelling flow dynamics can help quantify shallow aquifer volume losses and guide better trade-offs between development impacts and aquifer disruption.
- Reducing disruptions to groundwater ecosystems will help decrease instances of localized flooding and land subsidence.

**How will it influence groundwater management in India?**

- Impact Assessment mechanisms for infrastructural development will be more cognizant of shallow aquifers
- Encourages integration of urban groundwater monitoring into environmental clearance norms.
- Will help in plugging the gap of understanding of shallow aquifer dynamics.



**Proposition 4:**

Identification and Conservation of Vulnerable Recharge Areas for Shallow Aquifer Management

**Research Theme:** Hydrogeology, Mapping and Quantification

**Research Question:**

How to identify and map vulnerable recharge areas in a city like paleo-channels or permeable formations?

**Research Hypothesis:**

- Vulnerable recharge areas, including paleo-channels and permeable formations, can be effectively identified through the integration of remote sensing, geospatial analysis, and geophysical surveys.
- Cities that adopt multi-method approaches, combining historical satellite imagery, geomorphological mapping, and subsurface profiling are better equipped to delineate critical recharge zones with accuracy.
- Accurate mapping of such features enables targeted protection and prioritised interventions, leading to improved natural recharge and resilience of shallow aquifers.

**How will it influence groundwater management in India?**

- With climate-specific or other appropriate methods, city planners will be able to accurately map the most crucial infiltration zones, floodplains, paleo-channels, low-lying areas that should be prioritised for protection.
- Evidence from this research will guide ULBs in designing recharge structures in the most effective locations.
- This knowledge will help policy makers implement incentives for citizens to safeguard these areas.
- Improve urban water security and climate resilience by reducing flood-risks by leveraging on these areas.

**Proposition 5:**

Quantifying Rainwater Harvesting Impact and Influence Zones of Recharge Structures

**Research Theme:** Hydrogeology, Mapping and Quantification

**Research Question:**

How can indicators such as recharge rate, infiltration depth, and lateral flow of various rainwater harvesting and recharge structures be accurately estimated in different shallow urban aquifer settings?

**Research Hypothesis:**

- Cities that integrate aquifer-specific performance assessments are more likely to design effective recharge structures suited to shallow aquifer characteristics.
- Estimating recharge rate, infiltration depth, and lateral flow using context-sensitive methods (such as tracer studies, observation wells, and hydrogeological modelling) enhances understanding of structure performance.
- When recharge structures are informed by such assessments, shallow aquifers show improved recharge efficiency and more stable water levels.

**How will it influence groundwater management in India?**

- The outcomes of this research will enable planners, policy makers, and practitioners to strategically site rainwater harvesting structures to maximize their collective benefits and avoid redundancy.
- By identifying the zone of influence of each structure and understanding its recharge rate, interventions can be designed to synergise their effects, strengthening groundwater recharge across a larger area.
- This approach will provide a scientific basis for developing guidelines, incentives, and policy mechanisms to promote rainwater harvesting and infiltration practices in urban settings.

**Proposition 6:**

Governance Mechanisms for non-networked water supply and other Informal Industries

**Research Theme:** Governance and Planning

**Research Question:**

What governance mechanisms or policy models can be designed to effectively regulate water tankers and other informal groundwater-dependent industries for equitable, efficient, and sustainable groundwater use?

**Research Hypothesis:**

- A well-structured governance framework comprising licensing, pricing, zoning controls, and monitoring can be designed to regulate groundwater extraction by tankers and informal industries.
- When these mechanisms are aligned with local hydrogeological and socio-economic conditions, they improve compliance and discourage unsustainable extraction practices.
- Cities implementing such frameworks are more likely to achieve balanced groundwater use, reduced aquifer stress, and equitable access across user groups.

**How will it influence groundwater management in India?**

- This research will provide policy makers, regulators, and water authorities with strategies to manage and control the operations of water tankers and informal industries.
- Prevent over-exploitation of groundwater resources and reduce unfair practices and pricing in the water market.
- Such a framework, if applied will improve the sustainability of water resources and help communities become more resilient to climate impacts.

**Proposition 7:**

Developing a Framework for Rapid Assessment of Shallow Aquifers

**Research Theme:** Governance and Planning

**Research Question:**

How can a framework for rapid assessment of shallow aquifers be designed to efficiently gather key data and produce actionable information for policy makers and practitioners?

**Research Hypothesis:**

- When cities use rapid assessment frameworks as a first step to evaluate shallow aquifers, they will be able to generate quick and location-specific insights into aquifer health and water quality.
- When these frameworks incorporate indicators such as land use, well, borehole and tube well (as appropriate) data, and indicative water quality (e.g., suitability for drinking or reuse; contamination issues), they help identify areas needing protection, remediation or deeper study.
- As a result, cities can make timely decisions on groundwater use, plan for safe reuse of treated water, and design phased interventions that protect and optimise shallow aquifer systems.

**How will it influence groundwater management in India?**

- Enable rapid identification of stressed or vulnerable shallow aquifers, allowing cities to prioritise intervention areas and implement context-specific strategies for recharge, conservation, and regulation.
- Streamline data collection and analysis, reducing the dependency on time- and resource-intensive studies, and facilitating quicker, evidence-based decisions.



**Proposition 8:**

Integrated Framework Identification of Shallow Aquifer Recharge and Discharge Zones in Urban Areas

**Research Theme:** Hydrogeology, Mapping and Quantification

**Research Question:**

What is an effective and scalable approach to identify and predict recharge and discharge zones of shallow aquifers in urban areas?

**Research Hypothesis:**

- When cities adopt approaches that identify and predict recharge and discharge zones of shallow aquifers, they gain a clearer understanding of how water moves through urban subsurface systems.
- When this understanding is applied to planning and management, it enables proactive actions such as site-specific recharge, demand regulation, and early intervention in stressed zones.
- As a result, cities are better able to stabilise groundwater levels, reduce over-extraction risks, enable ecofriendly exchange of surface water and groundwater and build long-term resilience in their urban water systems.
- Understanding natural recharge and discharge of groundwater will enable protection of such areas, identifying natural springs and enabling estimation of base flows in the streams and rivers of the city/town.

**How will it influence groundwater management in India?**

- Support more proactive and preventive groundwater management by enabling early identification of stressed and high-potential zones across urban areas.
- Help cities move from reactive interventions to predictive planning, allowing for effective recharge interventions, demand augmentation, and better allocation of water resources.
- Create a knowledge base that can be scaled across diverse hydrogeological contexts, strengthening India's capacity to manage shallow aquifers under increasing urbanisation and climate variability.

**Proposition 9:**

Implementation of an Integrated ICT Platform utilizing IoT sensors, satellite data, and AI analytics for real-time urban groundwater monitoring and management

**Research Theme:** Data Science in Groundwater Management

**Research Question:**

How can multi-source data integration and AI analytics be optimally leveraged through an ICT platform to enable real-time monitoring and predictive management of urban shallow aquifers?

**Research Hypothesis:**

- An integrated ICT platform combining IoT sensors, satellite data, and AI algorithms will significantly improve the accuracy, coverage, and responsiveness of urban groundwater monitoring and prediction systems.
- Machine learning models can detect critical aquifer stress patterns and autonomously trigger timely management interventions, enhancing data-driven decision-making over conventional methods.
- AI-enabled multi-source data integration will lead to measurable reductions in groundwater depletion and operational costs, demonstrating the effectiveness of proactive urban water management over traditional reactive approaches.

**How will it influence groundwater management in India?**

- Urban local bodies (ULBs) and planning departments will leverage real-time groundwater data and predictive analytics to optimize water extraction, distribution, and integrate sustainability into development planning.
- Automated monitoring and AI-driven analysis will enhance decision-making for water managers and state agencies by reducing manual data collection costs and enabling timely, targeted interventions.
- Continuous, real-time data streams will support evidence-based policy and regulatory decisions, shifting groundwater governance from periodic assessment to proactive, data-driven management.

**Proposition 10:**

Development of Climate-Adaptive Groundwater Management Strategies: Assessing effect of climate change variables on shallow aquifer dynamics to ensure water security

**Research Theme:** Data Science in Groundwater Management

**Research Question:**

How do climate-induced changes alter shallow aquifer recharge-discharge dynamics, and what are evidence-based adaptive management strategies that ensure groundwater security across multiple climate change scenarios?

**Research Hypothesis:**

- Climate change impacts alters urban groundwater dynamics by intensifying precipitation variability and urban heat island effects, leading to changes in recharge and increased groundwater stress.
- Enhanced evapotranspiration and reduced soil moisture due to urban heat island effect further limit effective recharge, compounding the vulnerability of shallow aquifers under climate stress.
- Adaptive strategies—such as climate-responsive recharge systems, Nature-based Solutions, and suitable extraction policies—can enhance urban groundwater resilience and ensure long-term water security.

**How will it influence groundwater management in India?**

- Urban planners will incorporate climate change induced groundwater vulnerability maps into development guidelines, enabling evidence-based investment in green infrastructure and managed aquifer recharge systems that anticipate climate stress.
- Urban local bodies (ULBs) will adopt climate forecasts to decide extraction planning, while State Groundwater Boards implement suitable allocation policies that adjust extraction limits based on real-time climate conditions and aquifer responses.
- The framework will support India's climate adaptation planning by providing vulnerability assessment tools under different warming scenarios, establishing India as a global leader in climate-adaptive water management for rapidly urbanizing regions.

## Who Should Apply ?

The SAM 2.0 Research Grant is open to academic & research institutions, think tanks, NGOs, and other entities (referred to as 'organisations' hereafter) with demonstrated experience or interest in urban groundwater research and management. Individuals from such cross-cutting domains like Policy practitioners, technical experts, and individual researchers are also encouraged to apply, provided they do so under the aegis of a recognised institution. Since the grant funds will be disbursed directly to institutions, an MoU will be signed between NIUA and the selected institution prior to the commencement of the research.

## How to Apply ?

Interested applications are requested to follow the link below:

**[form link](#)**

## Assessment Criteria

All submitted proposals will be reviewed by a Technical Review Committee constituted by NIUA. The committee will evaluate entries based on their relevance to the SAM 2.0 objectives, scientific and methodological rigour, potential for on-ground implementation, originality, and scalability of the idea.

Evaluation Criteria	
Uniqueness of Research.	: 30 marks
Relevance to the urban context	: 20 marks
Scientific and Methodological Approach	: 20 marks
Replication and Scalability	: 15 marks
Clarity and Coherence of Proposal	: 15 marks

## Announcement of Results- 21st September, 2025

10 proposals will be selected for funding under the SAM 2.0 Research Grant. This will be announced on NIUA website and through NIUA's official communication channels. All awardees will be informed via email and will be required to complete administrative formalities, including signing an MoU with NIUA prior to the release of funds.

NIUA reserves the rights to select the credible research proposals.



## Grant Details and Conditions of Use

- One organisation/entity is eligible to receive a awards for maximum 2 research studies, provided it proposes mutually exclusive research teams.
- The research studies will be carried out in project geography of SAM 2.0.
- Utilization declaration for the grant amount, in line with NIUA's financial and reporting requirements.

## How to submit an entry?

- Interested entities should use the template in the Annexure to make their submission.
- No late entries shall be entertained.
- All entries, in PDF format, should be sent by email to [sam@niua.org](mailto:sam@niua.org)

## Some additional information

- The research grant shall be provided only to official accounts. No individual accounts shall be entertained.
- Only entities selected for the grant will be contacted.
- Due to the large volume of applications envisaged, it will not be possible to provide individual feedback on entries received.
- All the relevant details can also be accessed at [www.niua.org](http://www.niua.org)

## List of 75 cities under SAM 2.0

Dharamshala (Kangra)	Kurukshetra	Raipur
Palampur (Kangra)	Panipat	Jamshedpur
Srinagar	Bathinda	Ranchi
Agra	Gurdaspur	Gangtok
Moradabad	Ludhiana	Bardhaman
Prayagraj	Patiala	Nabadwip
Saharanpur	Sangrur	Purulia
Unnao	Bhopal	Siliguri
Dehradun	Dewas	Amrawati
Daman	Indore	Tirupati
Gandhinagar	Ujjain	Vishakhapatnam
Mehsana	Amravati	Vizingaram
Palanpur	Aurangabad	Bhubaneswar
Vadodra	Jalgaon	Puri
Ajmer	Latur	Adilabad
Alwar	Nagpur	Siddipet
Bikaner	Solapur	Warangal
Jaisalmer	Itanagar	Chikkaballapura
Jodhpur	Guwahati	Chintamani
Chandigarh	Nalanda	Kollara
Ambala	Patna	Ramnagra
Faridabad	Bemetara	Alleppey
Gurugram	Kobra	Kochi
Thrissur	Dindigul	Salem
Oulgaret -Ozhukarai	Mayiladuthurai	Vellore