

TERMS OF REFERENCE FOR R&D PROJECT

(Groundwater and Related Investigations Sectional Committee, WRD 03, Water Resources Department, BIS)

1. Title of the Project: Filter for Roof Top Rain Water Harvesting & Groundwater Recharge

2. Background:

- 2.1. According to NITI Ayog's Composite Water Management Index (CWMI) 54% of India faces high to extreme high-water stress. In the last five years the per capita water availability has decreased by over 70%.
- 2.2. A study of Central Ground Water Board (CGWB) indicates that 60% of irrigation and 85% of rural drinking water supply in India are dependent on groundwater.
- 2.3. A study of Indian Institute of Science (IISc) and CGWB shows that due to urbanisation the surface runoff increased which led to decrease in the groundwater recharge.
- 2.4. India has average annual rainfall of 1120 mm. Maharashtra have average annual of 1300 mm which has potential of 4.4 million litre.
- 2.5. Bureau of Indian Standards has published IS 15797: 2008 Roof Top Rainwater Harvesting. During the discussion of the sectional committee a need of development of filter for the rainwater harvesting for groundwater recharge to check the quality of water has emerged.
- 2.6. Considering our current environmental landscape, groundwater recharge stands as an imperative. Allowing unfiltered water to seep into the aquifer poses a significant risk of contamination, potentially leading to far-reaching consequences. Recognizing the urgency of the matter, this project has been initiated to develop a specialized filter system that addresses these concerns comprehensively.
- 2.7. This endeavour represents a crucial step towards ensuring the sustained health and integrity of our groundwater resources, contributing to the long-term sustainability of our water ecosystem.

3. Objectives:

- 3.1 Collect the relevant data and information from both primary and secondary sources such as 'guidelines of CPCB about the quality of aquifer recharges, Rainfall data from IMD, reports of various academic & research institutes (CWPRS, IITs).
- 3.2 Visit the existing rainwater harvesting sites to understand the basic problems in the groundwater recharge and study of the traditional methods.

4. Scope: The project "Filter for Roof Top Rain Water Harvesting & groundwater recharge" aims to design, develop, and validate an efficient filtration system tailored specifically for rooftop rainwater harvesting applications. The primary objective is to enhance the quality of collected rainwater, ensuring its suitability for groundwater recharge purposes.

The project will deliver a filter system designed specifically for rooftop rainwater harvesting applications, ensuring optimal performance and efficiency in this context.

The successful achievement of these expected outcomes will mark a significant advancement in rooftop rainwater harvesting technology, positively impacting water quality, groundwater recharge rates, and overall environmental sustainability. It will serve as a valuable contribution to the field of water resource management.

5. Research Methodology:

- 5.1. Organize focus group discussions with stakeholders, including engineers, architects, environmentalists, and end-users, to gather diverse perspectives on filtration needs, preferences, and challenges.
- 5.2. Conduct an extensive review of existing literature, research papers, and technical documents related to rooftop rainwater harvesting, filtration systems, and groundwater recharge techniques
- 5.3. Visit existing sites of rooftop rainwater harvesting installations of Water Resources Department of States to gain practical insights into system configurations, challenges faced, and opportunities for improvement.
- 5.4. Develop 5 filter prototypes for their efficiency in removing impurities, flow rates, and water quality parameters.
- 5.5. Conduct the field trials of developed filter in real-world settings with operational rooftop rainwater harvesting systems and evaluate the filter's performance under actual rainfall conditions and assess its efficiency in producing water suitable for groundwater recharge as specified under the guidelines of CGWB and CPCB.
- 5.6. Collection of feedback from end-users, stakeholders, and experts regarding the usability, effectiveness, and any potential improvements needed for the developed filter.

6. Deliverables:

- 6.1. Develop a filter for roof top rainwater harvesting which can ensure on the quality of water recharged to the aquifers as specified in the guidelines of CPCB and CGWB
- 6.2. Prepare a report on the methodology and characteristics requirement for the development of filter.
- 6.3. All other study reports mentioned in the scope

7. Timeline and Method of Progress Review: The duration of the project is 6 months from the date of award of the project. The proposed indicative timeline stage-wise is given below:

Sr No	Stage	Time from date of award of project (cumulative)
1	Literature review and international and Indian case studies, user/user industry, and discussion with BIS	1 month
2	Visit to stakeholders and regulatory bodies and data collection	1 month
3	Preparation and submission of first draft report to BIS	3 month
4	Submission of final project report	1 month

8. Support from BIS will provide:

BIS will provide access to latest available editions of Indian standards and/ or international standards relevant to the project, on request.

9. Nodal Officer:

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