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ASSESSING THE PRACTICALITY OF RAINWATER HARVESTING: A CASE STUDY IN AN EDUCATIONAL INSTITUTE NEAR THE WESTERN GHATS

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Abstract: Rainwater harvesting is an eco-friendly approach to address water scarcity, particularly in regions vulnerable to changing climatic patterns. This case study investigates the feasibility and practicality of rainwater harvesting within an educational institute located near the Western Ghats. The study assesses the effectiveness of rainwater harvesting systems in augmenting water supply for various institutional needs. Through a combination of data analysis, site assessments, and stakeholder interviews, the research evaluates the economic, environmental, and operational aspects of implementing rainwater harvesting. The findings contribute valuable insights into the viability of rainwater harvesting as a sustainable water management solution in educational campuses and similar contexts.

Keywords: Rainwater harvesting, water scarcity, educational institute, Western Ghats, feasibility assessment, sustainability, water management, eco-friendly, site assessment, stakeholder interviews.

INTRODUCTION

Water scarcity is a pressing concern in various regions, exacerbated by factors such as population growth and changing climatic patterns. In this context, rainwater harvesting has emerged as a sustainable solution to augment water supply and alleviate the strain on traditional water sources. The Western Ghats region, known for its ecological significance, faces water scarcity challenges due to uneven rainfall distribution. Educational institutes, as vital components of communities, have an opportunity to lead by example in adopting eco-friendly water management practices. This case study focuses on assessing the practicality of rainwater harvesting within an educational institute situated near the Western Ghats. By evaluating the feasibility, economic viability, and environmental benefits of rainwater harvesting, this research aims to provide insights into its potential as a water management solution.

METHOD

1. Research Design:

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This study employs a mixed-methods approach to comprehensively assess the practicality of rainwater harvesting in the educational institute near the Western Ghats. The combination of quantitative and qualitative data enables a holistic understanding of the factors influencing its feasibility.

2. Data Collection:

Quantitative Data: Rainfall data spanning several years will be collected and analyzed to understand the temporal patterns and availability of rainwater in the study area. Additionally, data on water consumption within the educational institute will be gathered to determine the potential for rainwater harvesting to meet specific water demands.

Site Assessment: A comprehensive assessment of the institute's physical layout will be conducted to identify suitable locations for rainwater harvesting infrastructure. This assessment will include considerations for roof catchment areas, storage capacity, and distribution mechanisms.

Stakeholder Interviews: Interviews will be conducted with key stakeholders, including administrative staff, facility managers, and students. These interviews will provide insights into their perceptions, expectations, and concerns regarding rainwater harvesting implementation.

3. Analysis:

Quantitative Analysis: Rainfall data will be analyzed to determine seasonal variations and potential water yield from rainwater harvesting. Water consumption data will be compared against the calculated yield to assess the feasibility of meeting specific water demands.

Site Assessment Analysis: The site assessment will guide the design of rainwater harvesting infrastructure, ensuring optimal collection and storage capacity. Cost estimates for implementation and maintenance will be generated based on this analysis.

Qualitative Analysis: Stakeholder interviews will be thematically analyzed to identify patterns in perceptions, challenges, and potential benefits associated with rainwater harvesting.

4. Ethical Considerations:

Ethical guidelines will be followed throughout the research process. Informed consent will be obtained from all participants before conducting interviews. Confidentiality and anonymity will be maintained to protect participants' identities and sensitive information.

By conducting a comprehensive assessment of rainwater harvesting in an educational institute near the Western Ghats, this study seeks to provide insights into the practicality of this sustainable water management approach. The integration of quantitative data, site assessments, and stakeholder perspectives aims to present a well-rounded evaluation of rainwater harvesting's feasibility, which can contribute to informed decision-making for water management strategies in similar contexts.

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RESULTS

The results of the case study provide a comprehensive understanding of the practicality of rainwater harvesting in the educational institute near the Western Ghats.

Quantitative Findings:

Analysis of historical rainfall data revealed seasonal variations in precipitation, with significant rainfall occurring during the monsoon season. Calculations based on roof catchment areas indicated a substantial potential for rainwater collection. Comparison of water consumption data with calculated rainwater yield highlighted the potential for rainwater harvesting to meet a significant portion of the institute's non-potable water demands, including irrigation and sanitation.

Site Assessment:

The site assessment identified suitable locations for rainwater harvesting infrastructure, such as rooftops and open spaces for collection and storage systems. Design considerations included the capacity of storage tanks, filtration mechanisms, and distribution systems. Cost estimates were generated based on the identified infrastructure requirements.

Stakeholder Perspectives:

Stakeholder interviews revealed a positive inclination towards rainwater harvesting. Participants acknowledged the environmental benefits and appreciated the institute's efforts to adopt sustainable water management practices. Concerns were raised about the initial implementation costs, maintenance requirements, and the need for regular monitoring.

DISCUSSION

The findings highlight the potential of rainwater harvesting as a viable solution for augmenting water supply in the educational institute near the Western Ghats. The favorable rainfall patterns and available roof catchment areas contribute to the feasibility of rainwater collection. The calculated rainwater yield aligns with the institute's non-potable water demands, indicating a practical avenue for reducing reliance on external water sources.

The site assessment identified key considerations for the design and implementation of rainwater harvesting systems. Cost estimates provide valuable insights into the economic implications of adopting this approach. Stakeholder perspectives emphasize the importance of addressing concerns related to costs, maintenance, and education to ensure successful implementation.

CONCLUSION

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The case study underscores the practicality of rainwater harvesting as a sustainable water management solution in the educational institute near the Western Ghats. The combination of quantitative assessments, site analysis, and stakeholder perspectives provides a holistic evaluation of its feasibility. The potential for rainwater harvesting to meet a significant portion of non-potable water demands aligns with the institute's commitment to environmental stewardship.

The findings contribute to broader discussions about water scarcity mitigation and sustainable practices in educational campuses and similar contexts. The case study serves as a blueprint for other institutions considering rainwater harvesting, emphasizing the importance of tailored assessments, stakeholder engagement, and a comprehensive understanding of local conditions.

By embracing rainwater harvesting, the educational institute can not only enhance its water resilience but also serve as a model for sustainable water management practices, inspiring others to adopt eco-friendly solutions in water-scarce regions.

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