



# Enhancing Groundwater Recharge, Livelihoods and Community Sustainability

An Impact Assessment study of the One Billion Drops (OBD) Campaign

LEAD at Krea University

## Acknowledgement

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We hope the findings of this report contribute to informed decision-making and support the continued strengthening and scaling of CSR-led urban water conservation initiatives.

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## Table of Contents:

Acknowledgement	2
Table of Figures	4
Table of Tables	5
Abbreviation	5
Executive Summary	6
Introduction	8
Literature Review	10
Urban Groundwater Stress in Rapidly Growing Cities .....	10
Rainwater Harvesting and Artificial Recharge as Nature-Based Solutions.....	10
Behavioural Change, Community Participation, and Social Dimensions of Water Management .....	11
Governance, Institutional Coordination, and Maintenance Challenges.....	11
Monitoring, Evidence Generation, and Evaluation Gaps.....	11
Existing Research Gaps in Literature and Contribution of This Report .....	12
Methodology	13
Sampling Approach .....	13
Data Approach and Analysis .....	13
Findings	14
Demographic Profile of Respondents .....	14
A. Construction & Park Maintenance Authorities.....	14
• Occupational Profile.....	14
• Work Experience .....	15
• Employment Duration within the Project.....	16
• Training Provided under the OBD Initiative .....	17
B. Residents.....	18
Findings across OECD-DAC Framework .....	19
A. Relevance .....	19
A.1 Awareness of OBD Prior to Survey & Prior Exposure to Water Conservation Concepts.....	20
A.2 Perceived Relevance .....	21
A.3. Drivers of Participation .....	22
B. Coordination .....	23
B.1 Identified Responsibility for Maintenance .....	23
B.2 Frequency of Maintenance and Inspection Activities .....	24
B.3 Type of Maintenance Work .....	26

B.4 Existence and Awareness of Grievance/Reporting Mechanisms .....	27
C. Effectiveness .....	28
D. Efficiency .....	30
D.1 Efficiency Gaps between Construction and Post-Construction Phases.....	30
D.2. Conditions of the Park .....	32
E. Impact .....	33
E.1 Incremental Skill Development through Participation in Construction Activities .....	33
E.2 Livelihood Impacts through Participation in Construction Activities.....	34
E.3 Composite Impact Score Reflecting Social and Behavioural Change of nearby Residents....	35
A. Sustainability.....	36
F.1 Willingness to Contribute to Future Construction and Maintenance.....	36
F.2 Willingness to Train Others and Knowledge Transfer .....	38
F.3 Priorities for Improvement and Long-Term Park Management .....	39
F.4 Scalability: Replication Potential and Community Support .....	40
Recommendations .....	42
1. Scale Intervention at the Catchment and Ward Level .....	42
2. Strengthen Maintenance Systems and Handover Mechanisms .....	42
3. Enhance Community Awareness and Visibility of the Initiative .....	42
4. Institutionalize Scientific Monitoring and Evidence Generation .....	43
5. Integrate the Initiative with Broader Urban Water Policies .....	43
6. Continue Capacity Building and Workforce Development .....	43
Learning and Implications .....	44
Key Priorities and Going Forward .....	45
Limitations of the Study .....	45
Bibliography .....	46
Annexure - 1: Distribution of respondents across the park covered during the survey .....	47
Annexure 2: List of qualitative stakeholders covered during the survey .....	49

## Table of Figures

Figure 1: Year of construction work experience & Involving in park maintenance work	16
Figure 2: Employed days among construction labourers	17
Figure 3: Training skills provided to construction workers	17
Figure 4: Distance of living from Percolation wells	18
Figure 5: Primary source of water among households	19
Figure 6: Sources of awareness	20
Figure 7: Current awareness on percolation wells	20
Figure 8: Factors influencing decisions on groundwater methods	23
Figure 9: Primary responsibility of maintenance	24
Figure 10: Frequency of maintenance activities	25
Figure 11: Frequency of inspection of percolation wells	25
Figure 12: Existing Grievance/ Reporting methods	28
Figure 13: Availability of Construction Materials, Instructions, and Maintenance Updates by Implementation Phase	31
Figure 14: Accessibility to constructed Percolation wells	31
Figure 15: Current conditions of Park	32
FIGURE 16: LEVEL OF SAFETY	32
Figure 17: Skills and Knowledge acquired	34
Figure 18: Livelihood impact on construction labourers	35
Figure 19: Willingness to contribute time & Labour	37
FIGURE 20: WILLINGNESS TO CONTRIBUTE MONEY/MATERIALS	37
Figure 21: Willingness to train others in Construction & Park maintenance activities	38
Figure 22: Improvement on construction projects & top priority for future	39
Figure 23: Replication of project models	40
Figure 24: Community support for expansion	41

## Table of Tables

Table 1: Gender wise classification based on respondents	14
Table 2: Primary Occupation among construction and park maintenance respondents	15
Table 3: Perceived relevance	21
Table 4: Perceived relevance by distance of living	21
Table 5: Type of Maintenance Work	26
Table 6: Challenges faced by maintenance labourers	27
Table 7: Issue Reporting and Response Timeliness among Resident Respondents	28
Table 8: Effectiveness Score	29
Table 9: Impact Score	35

## Abbreviation

<b>OBD</b>	One Billion Drops
<b>CSR</b>	Corporate Social Responsibility
<b>OECD-DAC</b>	Organisation for Economic Co-operation and Development – Development Assistance Committee
<b>CWMI</b>	Composite Water Management Index

## Executive Summary

Urban groundwater stress has emerged as a critical challenge in Bengaluru, driven by rapid urbanization, declining recharge capacity, and increasing dependence on borewells. In this context, the One Billion Drops (OBD) initiative was implemented to enhance groundwater recharge through the installation of percolation wells in public parks, institutional campuses, and other open spaces, while also promoting awareness and collective action around sustainable water management. This impact assessment was undertaken to evaluate the contribution of the OBD initiative to environmental, social, and institutional outcomes, and to inform future scaling and sustainability strategies.

The assessment adopted a mixed-methods design, combining quantitative survey data from 108 respondents with qualitative insights from in-depth interviews and key informant discussions. Guided by the OECD–DAC evaluation framework, the study examined the initiative across dimensions of relevance, effectiveness, efficiency, impact, and sustainability, using a contribution analysis approach to understand how OBD activities have influenced observed outcomes within a complex urban context.

Findings indicate that the One Billion Drops (OBD) initiative is highly relevant to Bengaluru’s water challenges, which was widely recognized by stakeholders to include groundwater depletion, surface runoff losses, and waterlogging as critical concerns. Percolation wells were broadly perceived as an appropriate intervention, particularly in locations where the initiative was visible and directly experienced by communities. Both qualitative and quantitative analysis suggests that the initiative has contributed to improved groundwater recharge and reduced surface waterlogging, especially in parks and institutional campuses. Effectiveness was observed to be strongly dependent on scale, with clustered installations yielding more noticeable outcomes than isolated wells.

Beyond physical outcomes, the initiative generated social and economic impacts. Construction workers reported livelihood benefits and incremental skill development, while residents demonstrated moderate improvements in awareness, participation, and water-use behaviour, indicating progress toward longer-term sustainability. Although the technical design of percolation wells supports durability, sustained impact will depend on effective maintenance, institutional ownership, and strengthened monitoring systems.

Based on these findings, the report recommends scaling interventions at the catchment and ward level, strengthening maintenance and handover systems, enhancing community awareness and visibility, institutionalizing scientific monitoring, integrating recharge efforts with broader urban water policies, and continuing capacity building for construction and maintenance personnel. The assessment outlines that the OBD initiative has made a meaningful contribution to urban groundwater recharge, flood mitigation, livelihood support, and capacity building in Bengaluru. With strategic strengthening and continued CSR engagement, the initiative holds significant potential to serve as a scalable and sustainable model for decentralized urban water management.

## Introduction

Urban water security has emerged as one of the most pressing challenges across cities in India, driven by rapid urbanization, population growth, climate variability, and increasing pressure on finite water resources. In many metropolitan areas, surface water systems alone are insufficient to meet growing demand, leading to widespread reliance on groundwater as a supplementary and, in some cases, primary source of water. This dependence has intensified over time, often in the absence of adequate regulatory oversight or systematic recharge, resulting in declining groundwater levels, deteriorating water quality, and increased vulnerability to seasonal water scarcity.

Bengaluru exemplifies the complexities of urban groundwater stress. While the city receives significant monsoon rainfall, the conversion of open land into built-up areas, extensive paving, and the canalization of stormwater have substantially reduced natural infiltration and groundwater recharge. As a result, large volumes of rainwater are lost as surface runoff, even as borewell extraction continues to increase. This paradox-simultaneous flooding during heavy rainfall and water scarcity during dry periods highlights the structural nature of the city's water challenges and underscores the need for integrated, decentralized solutions.

In recent years, percolation wells and other artificial groundwater recharge structures have gained recognition as effective nature-based solutions for addressing urban water stress. By capturing rainwater and directing it into subsurface aquifers, these structures can enhance groundwater availability, reduce surface waterlogging, and improve the resilience of urban ecosystems. Beyond their hydrological benefits, such interventions also have the potential to influence social and institutional practices by encouraging collective responsibility for water resources, strengthening local stewardship, and fostering collaboration between government agencies, civil society organizations, and communities.

The One Billion Drops (OBD) initiative was launched in this context as a large-scale effort to enhance groundwater recharge in Bengaluru through the installation of percolation wells across public parks, institutional campuses, and other suitable open spaces like police quarters. The initiative represents a collaborative model of urban water management, implemented through partnerships involving non-governmental organizations, municipal authorities, corporate social responsibility (CSR) partners, and local stakeholders. In addition to constructing recharge infrastructure, the initiative seeks to raise awareness about groundwater conservation, improve stormwater management, and promote sustainable water-use practices.

Given the scale and ambition of the OBD initiative, it is essential to understand not only whether the intervention has produced observable outcomes, but also how and under what conditions these outcomes have emerged. Urban groundwater systems are influenced by multiple external factors including rainfall variability, extraction patterns, land-use change, and governance arrangements making it difficult to attribute observed changes solely to a single intervention. Recognizing this complexity, the present impact assessment adopts a contribution analysis approach, which focuses on examining the plausible pathways through which the OBD initiative has contributed to observed changes, rather than establishing direct causal attribution.

This impact assessment is guided by the OECD–DAC evaluation framework, which provides a structured lens to examine the initiative's relevance, effectiveness, efficiency, impact, and sustainability. This framework enables a comprehensive evaluation that goes beyond technical performance to consider stakeholder perceptions, institutional coordination, maintenance arrangements, and long-term viability. In particular, the assessment pays attention to how different stakeholder groups including residents, park maintenance authorities, construction workers, implementing partners, and government officials experience and interact

with the intervention. The findings of this report are intended to serve multiple purposes such as; provide evidence to inform the ongoing improvement and scaling of the One Billion Drops initiative, offer insights for policymakers, practitioners, and CSR actors seeking to implement similar decentralized groundwater recharge interventions in urban settings. And finally the assessment contributes to the broader body of knowledge on urban water management by highlighting the social, institutional, and governance dimensions that shape the effectiveness and sustainability of nature-based solutions.



Mphasis branding at site



Inauguration of percolation well at site

## Literature Review

### Urban Groundwater Stress in Rapidly Growing Cities

Urban groundwater has become a critical yet increasingly stressed resource in cities across the Global South. Rapid urbanization, population growth, climate variability, and inadequate surface water infrastructure have led to heavy dependence on groundwater, often extracted through unregulated borewells (World Bank, 2024). Unlike surface water systems, groundwater depletion occurs invisibly, making overextraction difficult to regulate and politically less salient until acute shortages emerge. In India, urban groundwater stress is particularly severe. The Composite Water Management Index (CWMI) highlights that a majority of Indian states face high to extreme water stress, driven by unsustainable groundwater extraction, inadequate recharge mechanisms, and fragmented institutional governance (NITI Aayog, 2019). Many developing cities such as Bengaluru exemplify this challenge, where limited water supply, rapid spatial expansion, and loss of permeable surfaces have resulted in widespread borewell dependence and declining aquifer levels.

The literature emphasizes that urban groundwater crises are not merely hydrological problems but socio-institutional ones, shaped by land-use change, infrastructure decisions, and governance failures (World Bank, 2024). This framing underscores the need for interventions that operate at multiple levels-technical, behavioural, and institutional rather than relying solely on centralized water supply augmentation.

### Rainwater Harvesting and Artificial Recharge as Nature-Based Solutions

Rainwater harvesting and artificial groundwater recharge structures have long been promoted as viable responses to groundwater depletion, particularly in semi-arid and monsoon-dependent regions. Empirical studies demonstrate that recharge structures such as percolation tanks, recharge wells, and check dams can significantly improve groundwater availability by enhancing infiltration and reducing runoff losses (Abraham & Mohan, 2015).

Percolation tanks and wells are especially relevant in urban and peri-urban contexts, where land constraints limit the feasibility of large reservoirs or surface water bodies. Research from Karnataka and other Indian states shows that point recharge and percolation-based rainwater harvesting systems can lead to measurable increases in groundwater levels and improved borewell yields when designed appropriately and maintained regularly (Kanannavar et al., 2023). Further literature suggests that combined systems-integrating surface collection structures with subsurface recharge-are more effective than isolated installations (Abraham & Mohan, 2015).

Practitioner-oriented literature reinforces these findings, highlighting the dual benefits of percolation systems in both groundwater recharge and stormwater management. By slowing runoff and allowing rainwater to infiltrate locally, recharge structures can reduce urban flooding and waterlogging during high-intensity rainfall events, an increasingly common occurrence under climate change (Rainy Filters, n.d.; Agriculture Institute, n.d.). These characteristics position percolation wells as a form of nature-based solution that addresses both water scarcity and urban flood risk.

## Behavioural Change, Community Participation, and Social Dimensions of Water Management

While technical effectiveness is critical, an expanding body of literature emphasizes that sustainable groundwater management depends equally on social and behavioural factors. WELL Labs (2020) argues that community awareness, participation, and local monitoring are essential for ensuring that recharge interventions translate into long-term stewardship rather than short-lived infrastructure projects. Communities that understand groundwater dynamics are more likely to support maintenance, report system failures, and adopt water-conserving practices.

Studies on water governance also highlight that community engagement enhances legitimacy and accountability, particularly in decentralized interventions where government oversight may be limited. Behavioural change related to water use such as reduced extraction, acceptance of recharge structures, and collective responsibility has been identified as a key pathway through which infrastructure interventions achieve sustained impact (Sedai, 2021).

Importantly, the literature notes that social outcomes of water interventions often extend beyond water availability alone. Improved water security has been linked to reduced household stress, improved health outcomes, and increased participation in education and livelihoods, particularly for women (Sedai, 2021). Although recharge structures do not directly supply household water, their contribution to stabilizing local groundwater systems can indirectly support these broader social benefits.

## Governance, Institutional Coordination, and Maintenance Challenges

Despite strong evidence supporting artificial recharge, the literature consistently identifies governance and maintenance as critical weak points. Numerous studies document that recharge structures lose effectiveness over time due to siltation, clogged inlets, lack of routine maintenance, and unclear ownership responsibilities (Ranjan et al., 2025). These challenges are particularly pronounced in urban public spaces, where multiple agencies share overlapping responsibilities.

The CWMI explicitly identifies weak operation and maintenance (O&M) systems and fragmented institutional coordination as major barriers to sustainable water management in India (NITI Aayog, 2019). Without clear handover mechanisms and integration into routine maintenance systems, recharge interventions risk becoming non-functional within a few years of construction.

Global policy literature echoes these concerns, emphasizing that decentralized water interventions must be embedded within broader urban governance frameworks to achieve scale and durability (World Bank, 2024). This includes alignment with stormwater management systems, enforcement of rainwater harvesting regulations, and incorporation of recharge strategies into city-level planning. Isolated projects, even when technically sound, are unlikely to produce lasting impact without such systemic integration.

## Monitoring, Evidence Generation, and Evaluation Gaps

Another recurring gap in the literature relates to impact measurement. While hydrological benefits of recharge structures are often reported, long-term monitoring data particularly in urban settings remains limited. Groundwater recharge is a gradual process influenced by rainfall variability, extraction patterns, and land-use change, making attribution challenging (Ranjan et al., 2025).

As a result, many evaluations rely on perception-based indicators or short-term observations, which, while valuable, cannot fully capture long-term impact. Scholars increasingly advocate for mixed-method approaches that combine quantitative indicators with qualitative insights to understand both physical and social pathways of change (Well Labs, 2020). To address these, contribution analysis, in particular, has been recommended for complex interventions where controlled experimental designs are impractical.

## Existing Research Gaps in Literature and Contribution of This Report

Although the effectiveness of percolation wells and artificial recharge structures is well documented in both academic and practitioner-oriented literature, several critical gaps remain. Most literature highlights that there is limited empirical evidence on how these interventions function in dense urban contexts characterized by high levels of institutional complexity, overlapping governance mandates, and competing land-use priorities. Much of this is derived from rural, peri-urban, or watershed-scale studies, where land availability, hydrological conditions, and governance arrangements differ substantially from those in large metropolitan settings. Second, the existing literature predominantly emphasizes biophysical and hydrological outcomes, such as changes in groundwater levels, infiltration rates, and borewell yields, often treating recharge structures as standalone technical interventions. Far less attention has been paid to how such interventions are perceived and experienced by different stakeholder groups, including residents, park maintenance authorities, construction workers, and local government officials. Dimensions such as perceived relevance, operational efficiency, responsiveness to issues, and long-term sustainability are rarely examined systematically, despite their central role in determining whether recharge structures are maintained, scaled, and institutionalized over time.

Moreover, studies that do address social dimensions often focus narrowly on awareness or participation, without situating these within broader questions of governance, coordination, and accountability. There is limited empirical work examining how institutional arrangements, maintenance responsibilities, communication mechanisms, and handover processes influence the continued functionality of recharge infrastructure in urban public spaces. This gap is particularly significant given repeated findings that operation and maintenance failures, rather than technical design flaws, are a primary cause of declining effectiveness in groundwater recharge initiatives. Few studies employ mixed-method designs that integrate quantitative indicators with qualitative insights to assess contribution pathways rather than direct attribution. Addressing these gaps requires evaluation frameworks that move beyond narrow hydrological metrics to capture institutional, behavioural, and governance-related dimensions of impact. This impact assessment addresses these gaps by applying the OECD–DAC evaluation framework to examine the One Billion Drops initiative across relevance, effectiveness, efficiency, impact, and sustainability dimensions. By combining quantitative perception-based indicators with qualitative stakeholder narratives, the study provides a more holistic understanding of how decentralized recharge interventions contribute to groundwater management, flood mitigation, behavioural change, and institutional coordination in an urban setting.

In doing so, the assessment contributes to the growing body of evidence advocating for integrated, participatory, and governance-sensitive approaches to urban groundwater sustainability

## Methodology

The study adopted a mixed-methods impact assessment design, combining quantitative and qualitative approaches to evaluate the One Billion Drops (OBD) Campaign. This approach enabled the assessment of both measurable outcomes and the contextual, institutional, and behavioural factors influencing change. The assessment was guided by the OECD–DAC evaluation criteria—relevance, effectiveness, efficiency, impact, and sustainability and applied a contribution analysis framework to examine how OBD interventions contributed to observed outcomes, rather than attributing changes solely to the project in isolation.

The contribution analysis approach was particularly relevant given the absence of baseline data and the presence of multiple external factors influencing groundwater availability and urban water management. The methodology therefore focused on understanding plausible pathways of change, stakeholder perceptions, and observable trends linked to the intervention.

### Sampling Approach

A stratified random purposive sampling strategy was employed to ensure representation across key stakeholder groups, geographic zones, and implementation contexts. The study covered 108 respondents across the South and Bommanahalli zones of Bengaluru, selected to reflect surrounding land use, and years of percolation well implementation (2022–2024).

Respondents were selected based on their proximity to intervention sites, frequency of interaction with the percolation wells, and role in park or water management. The final sample comprised 108 respondents, including nearby residents, park maintenance authorities, and construction or operational workers involved in the installation or upkeep of percolation wells. This sampling approach ensured that perspectives were captured from both direct implementers and end users of the intervention.

### Data Approach and Analysis

Quantitative data were collected through a structured survey aligned with the OECD–DAC framework and administered using computer-assisted personal interviewing (CAPI) in the local language. The survey captured respondent demographics, perceptions of project relevance, functionality, effectiveness, and sustainability, as well as observed changes in water stagnation, groundwater availability, and community engagement. Descriptive statistics and cross-tabulations were used to analyse demographic characteristics and perception-based indicators across stakeholder groups. In the absence of baseline data, perception-based before–after comparisons were employed to assess reported changes associated with the intervention. Tables and graphs were used to present key findings across DAC criteria, enabling comparison across roles, proximity to intervention sites, and years of implementation.

An Effectiveness Score was constructed as a composite index combining three dimensions: Waterlogging, Functionality, and Attitude, each measured on a five-point Likert scale. The composite score provided a summary measure of perceived effectiveness and was analysed across stakeholder groups to identify variations in experience and engagement.

Qualitative data were collected through key informant interviews (KIIs) and in-depth interviews (IDIs) with resident and park associations, local government representatives, NGO partner field staff, CSR representatives,

and subject matter experts. These interviews explored perceptions of project relevance, implementation processes, institutional coordination, behavioural change, technical design, and long-term sustainability. The data were analysed using thematic analysis, with codes and themes mapped to the OECD–DAC criteria. Findings were triangulated with quantitative results to strengthen the credibility of the contribution narrative and to contextualize perception-based scores with implementation realities and institutional insights.

These findings were integrated during the analysis phase to identify convergences and divergences across data sources. This mixed-methods triangulation enabled a more robust assessment of the OBD Campaign’s contribution to groundwater recharge, reduction in water stagnation, and community and institutional engagement, while acknowledging the limitations inherent in perception-based and non-experimental designs.

## Findings

### Demographic Profile of Respondents

A total of 108 respondents participated in the study, comprising construction labourers (n = 19), park maintenance authorities (n = 32), and nearby residents (n = 57). Overall, the sample was predominantly male (n = 85; 78.7%), with female respondents accounting for 23 participants (21.3%).

All construction labourers interviewed were male (n = 19) and park maintenance authorities, representation was more balanced, with 20 males and 12 females. Resident respondents included 46 males and 11 females, indicating lower female participation relative to males within the community sample.

While the gender distribution reflects prevailing occupational and participation patterns in urban infrastructure and maintenance roles, the inclusion of female respondents particularly among park maintenance staff and residents provides important perspectives on the usability, safety, and everyday impacts of the intervention.

**TABLE 1: GENDER WISE CLASSIFICATION BASED ON RESPONDENTS**

Gender	Role of Supporting OBD Initiative under United Way			
	Construction Labourers	Park Maintenance	Residents	Total
Male	19	20	46	85
Female	0	12	11	23
<b>Total</b>	<b>19</b>	<b>32</b>	<b>57</b>	<b>108</b>

#### A. Construction & Park Maintenance Authorities

- Occupational Profile

Among construction workers interviewed (n = 19), the majority identified construction labour as their primary occupation (89.5%), with a smaller proportion engaged in masonry work (10.5%). This indicates that most

respondents were directly involved in manual construction activities related to percolation well installation rather than specialized structural roles.

Park maintenance authorities (n = 32) were predominantly engaged in overall park maintenance activities (87.5%), reflecting their central role in routine upkeep of public green spaces. A smaller share of respondents were supervisors or managers (6.3%), vendor support staff (3.1%), or external vendors (3.1%). This distribution suggests that the park maintenance sample largely comprised frontline workers responsible for day-to-day maintenance, rather than administrative personnel.

**TABLE 2: PRIMARY OCCUPATION AMONG CONSTRUCTION AND PARK MAINTENANCE RESPONDENTS**

Respondent Profile	Occupation	Percent
Construction Workers (N:19)	Construction labour	89.47
	Masonry	10.53
Park maintenance (N:32)	Overall Park maintenance	87.5
	Vendor support staff	3.12
	Supervisor/Manager	6.25
	Vendor	3.12

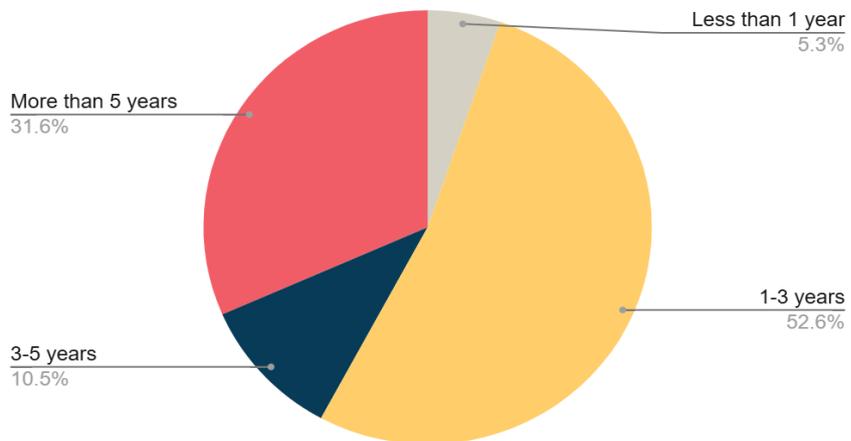
- **Work Experience**

Construction workers reported varying levels of experience in the construction sector. Over half of the respondents (52.6%) had between one and three years of experience, while nearly one-third (31.6%) had more than five years of experience. A smaller proportion reported three to five years of experience (10.5%), and only a limited share had less than one year of experience (5.3%). Overall, this indicates that most construction labourers possessed moderate to substantial experience in construction-related work.

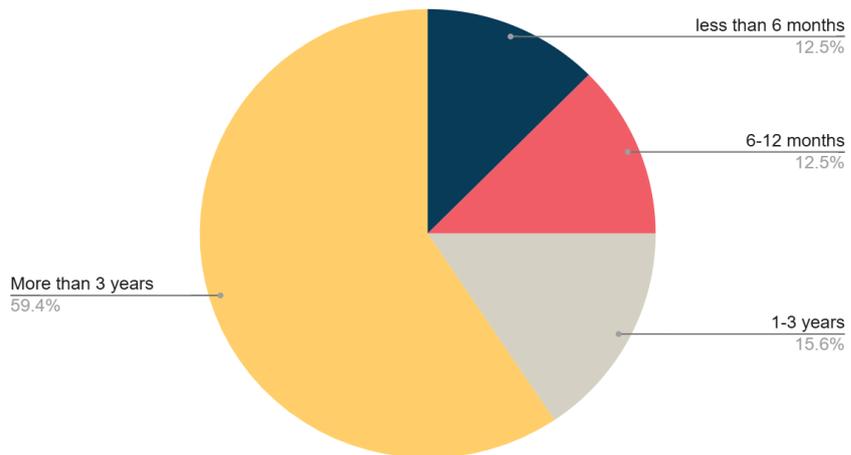
In contrast, park maintenance authorities demonstrated relatively longer tenure in their roles. Nearly 60% (59.4%) reported more than three years of experience in park maintenance, while 15.6% had one to three years of experience. Shorter durations of involvement less than six months (12.5%) and six to twelve months (12.5%) were reported by a smaller subset of respondents. This suggests a comparatively stable workforce with sustained institutional knowledge of park conditions and maintenance practices.

**FIGURE 1: YEAR OF CONSTRUCTION WORK EXPERIENCE & INVOLVING IN PARK MAINTENANCE WORK**

**Years of construction experience (N:19)**



**Years of involving with park maintenance work (N:32)**

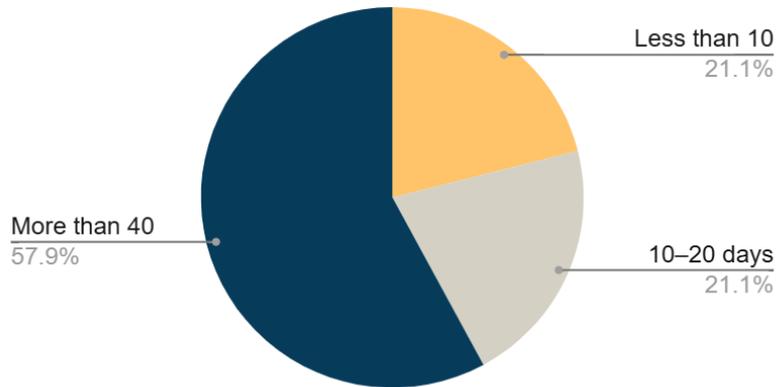


- **Employment Duration within the Project**

With respect to employment duration under the OBD project, construction labourers reported substantial engagement. A majority (57.9%) indicated working for more than 40 days on the project, while 21.1% worked for 10–20 days and another 21.1% for fewer than 10 days. This pattern suggests that a core group of labourers was consistently engaged across multiple construction activities, supporting continuity and skill accumulation during project implementation.

**FIGURE 2: EMPLOYED DAYS AMONG CONSTRUCTION LABOURERS**

**Number of employed days for construction laborers (N:19)**



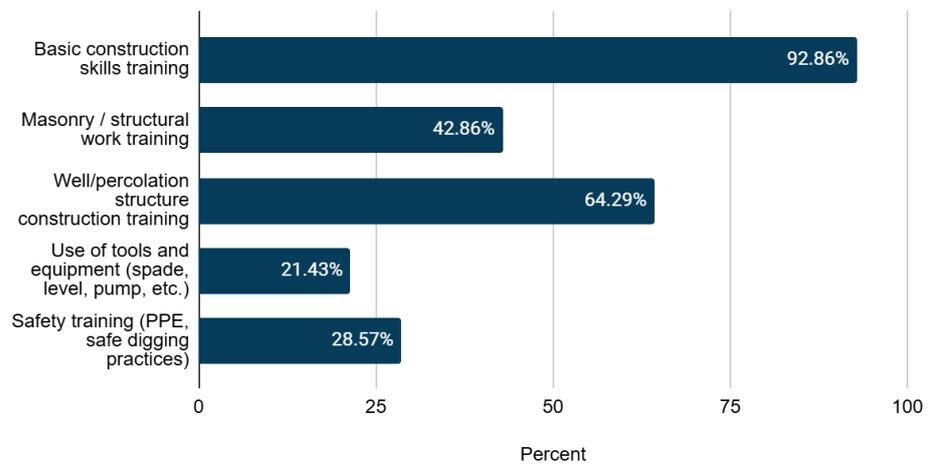
- Training Provided under the OBD Initiative

Construction labourers reported receiving multiple forms of training as part of the project. The most commonly reported training was basic construction skills training, followed closely by training specific to percolation well and recharge structure construction. Safety-related training, including the use of personal protective equipment (PPE) and safe digging practices, was also reported by a subset of respondents. Fewer respondents reported receiving training on masonry or structural work and on the use of tools and equipment, indicating that training was primarily focused on core construction and safety competencies relevant to the intervention.

**FIGURE 3: TRAINING SKILLS PROVIDED TO CONSTRUCTION WORKERS <sup>1</sup>**

**Training provided to construction labourers**

Percent of Cases (N:14)



<sup>1</sup> Percent of cases is reported to account for multiple responses selected by individual respondents.

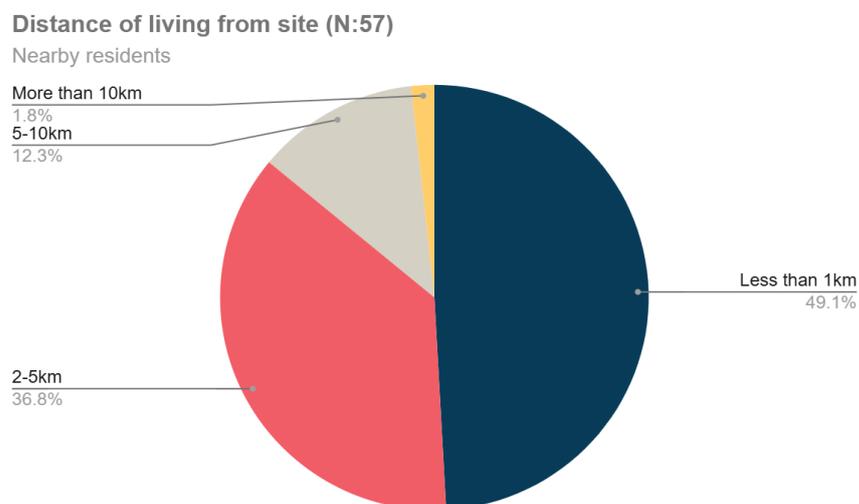
In addition to formal training provided through the project, respondents reported engaging in various forms of informal or self-directed upskilling. On-the-job experience while working emerged as the most common mode of skill acquisition, followed by learning through peers or community members. Some respondents also reported learning through informal guidance from local leaders, watching instructional videos, reading materials, or observing NGO staff and experts. However, a few respondents reported that they did not participate in formal training. Even in the absence of structured support from United Way Bengaluru, these respondents indicated that they developed skills through on-the-job experience, self-learning, peer networks, and informal guidance, highlighting the presence of strong informal learning pathways.

These findings indicate that skill development among construction labourers is shaped by a combination of formal project-based training and experiential, peer-driven learning, reflecting the adaptive and practice-based nature of skill acquisition in the informal construction sector.

## B. Residents

Among resident respondents (n = 57), nearly half lived in close proximity to the intervention sites. Approximately 49.1% resided within 1 km of a percolation well, while 36.8% lived between 2–5 km from the site. A smaller proportion lived 5–10 km away (12.3%), and only 1.8% reported residing more than 10 km from the intervention location<sup>2</sup>.

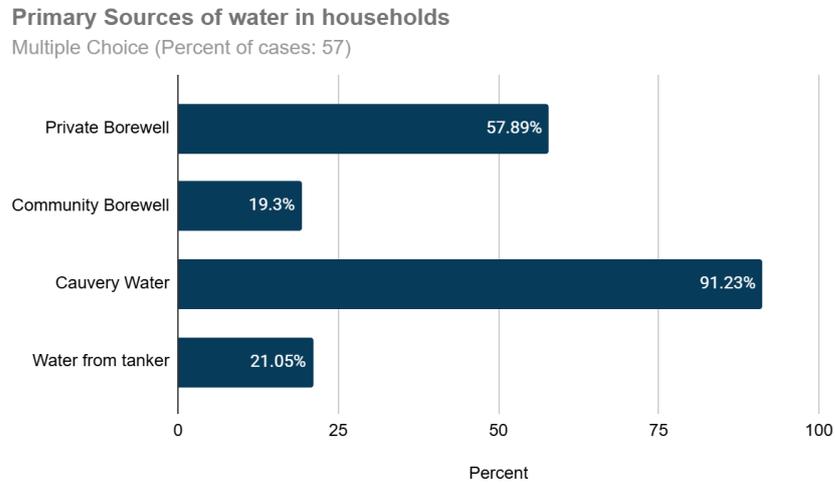
**FIGURE 4: DISTANCE OF LIVING FROM PERCOLATION WELLS**



In terms of household water sources, municipal Cauvery water to the households was the most commonly reported primary source (91.23%). This was followed by private borewells (57.89%) and community borewells (19.3%). While a smaller share of residents depended on water tankers (21.05%).

<sup>2</sup> Resident respondents were identified based on their proximity to and engagement with the intervention sites. The distance distribution aims to illustrate that residents at varying distances were able to observe and benefit from the intervention.

**FIGURE 5: PRIMARY SOURCE OF WATER AMONG HOUSEHOLDS**



Most residents were not formally part of any community or association group, with 94.7% indicating no association membership. Only 5.3% reported being part of an association, all of whom identified their membership as belonging to a residents' welfare association. And regarding housing type, nearly half of the respondents lived in independent houses (49.1%), followed by rental housing (42.1%). A smaller proportion resided in apartments or flats (7.0%), and a very limited share lived in slum or temporary settlements (1.8%).

Building on this demographic profile, the following section presents an assessment of the One Billion Drops initiative by United Way using the OECD-DAC evaluation framework, drawing on both quantitative survey data and qualitative stakeholder insights.

## Findings across OECD-DAC Framework

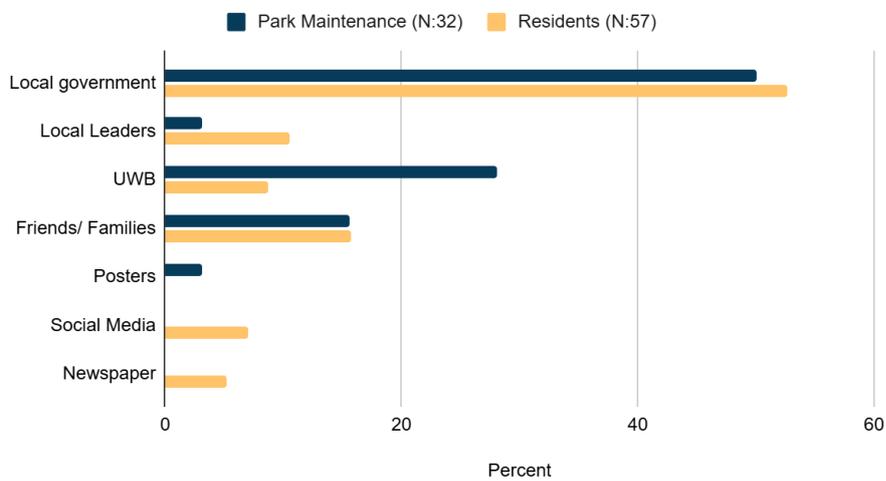
### A. Relevance

The One Billion Drops initiative was widely perceived as highly relevant to Bengaluru's current and future water challenges. Across all stakeholder groups based on the qualitative inputs, respondents identified groundwater depletion, increasing borewell dependence, and loss of rainwater through surface runoff as critical urban issues requiring immediate attention. Percolation wells were viewed as an appropriate intervention within a dense, highly urbanized context where traditional water-conservation structures such as ponds or check dams are often infeasible. The focus on government-owned lands, public parks, and institutional campuses aligned well with the need to repurpose open spaces and maximize catchment-level groundwater recharge.

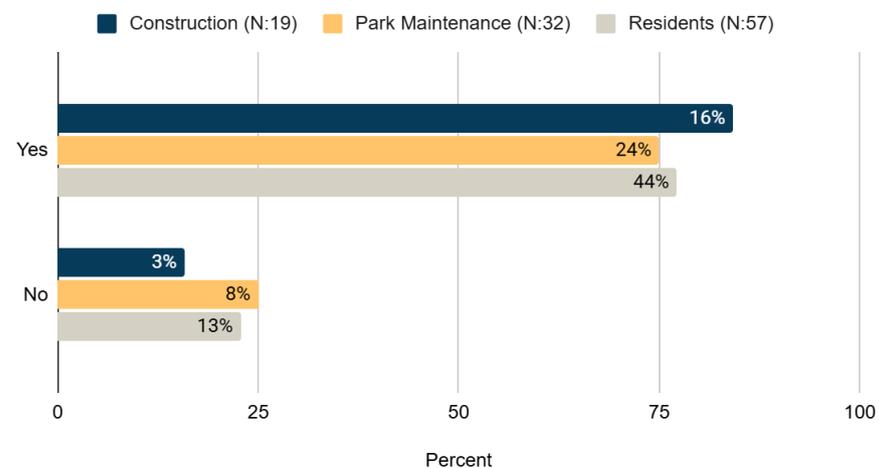
## A.1 Awareness of OBD Prior to Survey & Prior Exposure to Water Conservation Concepts

To expand this further, the quantitative inputs lay deeper ground. Awareness of OBD was primarily driven by formal institutional channels, with local government and park maintenance authorities emerging as the most prominent sources of information, particularly among park maintenance respondents. Residents also reported learning about OBD through government sources, though informal channels such as friends, family members, social media, and newspapers played a comparatively larger role for this group, suggesting diffusion of information beyond direct project outreach. The presence of multiple awareness channels indicates that the campaign messaging resonated with existing community and institutional networks, reinforcing its contextual relevance.

**FIGURE 6: SOURCES OF AWARENESS**



**FIGURE 7: CURRENT AWARENESS ON PERCOLATION WELLS**



In addition, a substantial proportion of respondents across all stakeholder groups reported prior exposure to percolation wells or water conservation methods before the OBD intervention. Awareness levels were highest among residents, followed by park maintenance staff and construction workers, reflecting varying degrees of engagement with water-related infrastructure and practices. This pre-existing familiarity with water conservation concepts suggests that the OBD campaign was implemented in an environment where baseline understanding of groundwater recharge and conservation already existed, allowing the intervention to build upon, rather than introduce, foundational knowledge. A strong alignment between the OBD campaign objectives and local awareness levels enhances the relevance and acceptability of percolation well-based solutions within the community.

## A.2 Perceived Relevance

Among residents surveyed (n = 57), the mean perceived relevance of the OBD project was 3.25 (SD = 1.02) on a five-point scale, indicating a moderate level of perceived relevance, with notable variation across respondents. While residents generally perceived the OBD intervention as relevant to addressing ground water-related challenges, the variability in responses suggests uneven visibility and differential experience of benefits across sites. The table below reports this by capturing the descriptive statistics (mean and standard deviation) to summarize the central tendency and variability of perceived relevance.

**TABLE 3: PERCEIVED RELEVANCE**

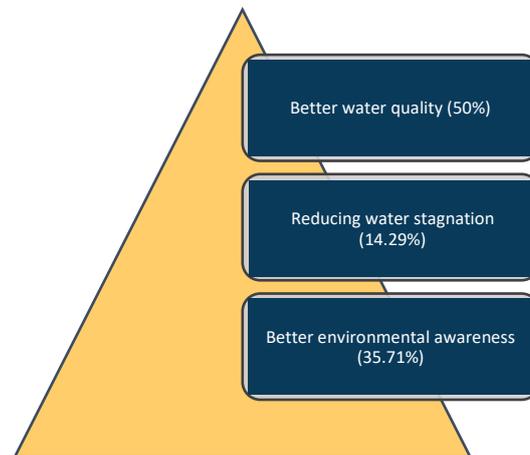
Perceived relevance among residents	Mean	SD	N
	3.245	1.022	57

Analysis by proximity to the intervention site reveals a clear association between physical closeness to percolation wells and perceived relevance. Residents living within 1 km of the intervention reported the highest mean relevance score (3.46, SD = 1.07, n = 28), followed by those residing 2–5 km away (3.19, SD = 0.99, n = 21). In contrast, residents living 5–10 km from the site reported lower relevance (2.57, SD = 0.79, n = 7), indicating a weaker perceived connection to the intervention. This clear proximity-based gradient indicates that the perceived relevance of the OBD intervention is strongly location-dependent, with residents living closer to percolation wells reporting substantially higher relevance—highlighting that direct, localized exposure is a key driver of perceived value and engagement with groundwater-recharge interventions.

**TABLE 4: PERCEIVED RELEVANCE BY DISTANCE OF LIVING**

Area of Living	Mean	SD	N
Less than 1km	3.464286	1.070899	28
2-5 kms	3.190476	0.987674	21
5-10 kms away from Site	2.571429	0.7867958	7
More than 10 km from Site	3		1

When asked about the specific reasons for considering the OBD project relevant, residents most frequently cited improvements in water quality (50%) as the primary benefit of the intervention. This was followed by enhanced environmental awareness (35.71%), indicating that the campaign contributed to broader understanding and consciousness around water conservation. A smaller proportion of residents (14.29%) identified reduction in water stagnation as a key reason for relevance.

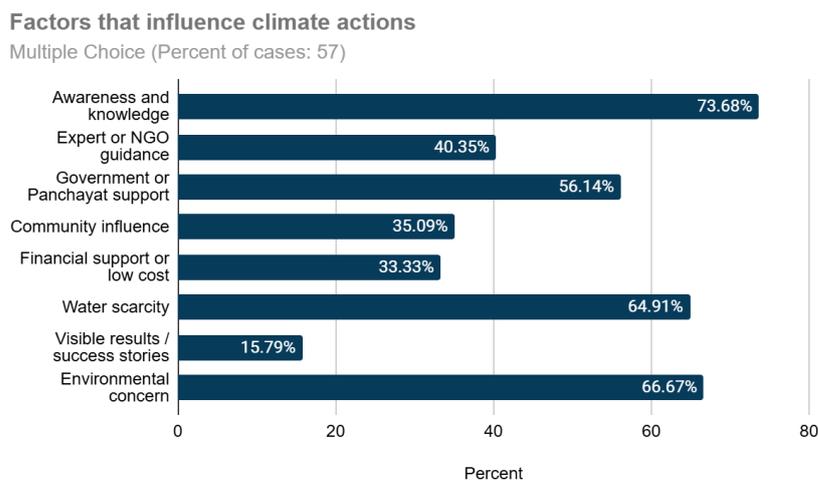


These suggest that residents primarily associate the relevance of OBD with household- and environment-level benefits, while infrastructure-related outcomes such as drainage and stagnation reduction, though important, are less immediately perceived. These results indicate that the OBD campaign aligns well with local priorities and community benefits, particularly among residents living in closer proximity to intervention sites, reinforcing its contextual relevance under the OECD-DAC framework.

### A.3. Drivers of Participation

Qualitative insights indicate a moderate to high level of prior awareness of the One Billion Drops (OBD) campaign among key stakeholder groups, underscoring the relevance of the intervention within the local urban water management context. Building stronger evidence, quantitative results shows that the participation in groundwater and climate-related actions under the OBD initiative is driven by a combination of awareness, perceived need, and institutional and social influences. The most frequently cited factor influencing participation was awareness and knowledge (73.68%), highlighting the importance of information dissemination and understanding of water conservation concepts in motivating community action such as awareness programs in schools and colleges. Closely following this, environmental concern (66.67%) and water scarcity or the need for water security (64.91%) emerged as significant drivers, suggesting that both long-term environmental values and immediate resource pressures shape engagement decisions.

**FIGURE 8: FACTORS INFLUENCING DECISIONS ON GROUNDWATER METHODS**



Institutional and social factors also played a notable role. Government or Panchayat support accounted for 56.14% of responses, underscoring the influence of formal governance structures in legitimising and enabling participation. Expert or NGO guidance (40.35%) further reinforced the role of technical credibility and external facilitation in encouraging adoption of groundwater interventions. Community influence or social encouragement (35.09%) indicates that peer networks and collective norms contribute to participation, though to a lesser extent than formal institutions. Financial considerations, including financial support or low cost suggests that while affordability matters, it is not the primary determinant of engagement. Finally, visible results or success stories (15.79%) were least frequently mentioned, indicating that participation is currently more strongly driven by awareness and perceived necessity than by demonstrable outcomes.

These findings suggest that the relevance and uptake of the OBD intervention are shaped primarily by knowledge-based and need-driven motivations, supported by institutional trust and environmental values. Strengthening awareness efforts and linking water scarcity narratives with visible local outcomes may further enhance community participation and sustained engagement.

## B. Coordination

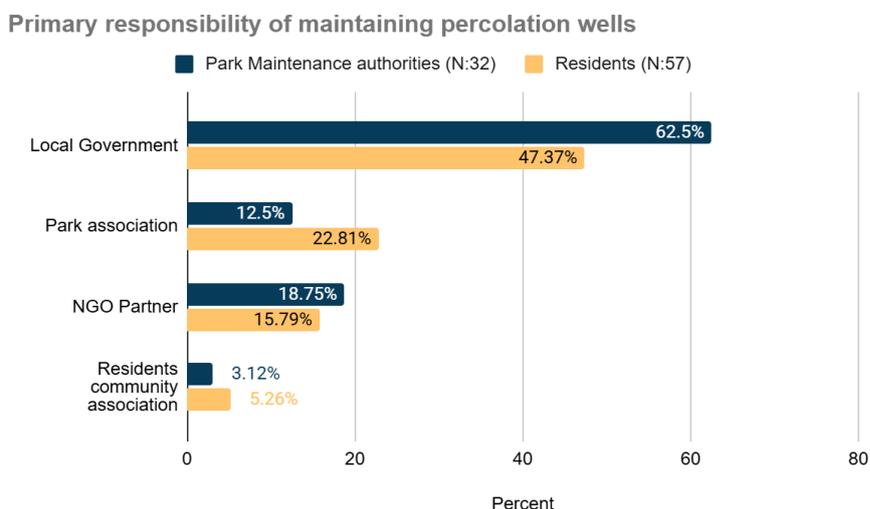
The initiative demonstrated a high degree of coordination between implementing partners, CSR funders, and government institutions. United Way Bengaluru’s role as a technical and relational intermediary was consistently highlighted as central to facilitating approvals, managing stakeholder expectations, and aligning implementation with institutional procedures.

### B.1 Identified Responsibility for Maintenance

The responsibility for the maintenance of percolation wells under the OBD initiative is predominantly attributed to formal institutions, particularly local government bodies. Effective coordination was particularly evident in large campuses and government-managed spaces, where ongoing engagement with horticulture departments, police authorities, and BBMP officials enabled smoother implementation and post-construction oversight. Periodic reporting, MOU-based agreements, and site-level consultations further supported

coherence across actors. Quantitative insights provide similar inputs. A majority of respondents across both park maintenance authorities and residents identified local government as the primary entity responsible for maintaining percolation wells, reflecting strong expectations of state-led ownership and oversight. This perception was more pronounced among park maintenance authorities, suggesting greater alignment with formal governance structures among institutional stakeholders.

**FIGURE 9: PRIMARY RESPONSIBILITY OF MAINTENANCE**



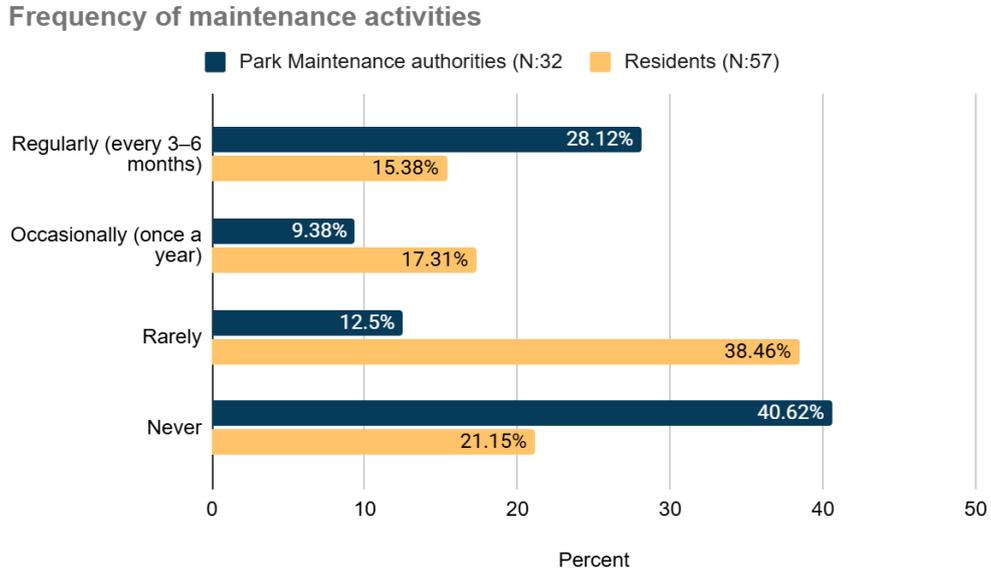
In addition to local government, park associations and NGO partners were also identified as responsible actors, though to a lesser extent. Residents were more likely than park maintenance authorities to attribute maintenance responsibility to park associations, indicating expectations of community-level or semi-formal management structures. NGO partners were viewed as playing a supportive role in maintenance, reflecting their involvement in implementation and technical facilitation rather than long-term ownership. Very few respondents identified resident community associations as the primary custodians of percolation wells, pointing to limited perceived community ownership of maintenance responsibilities.

These insights suggest that while coordination mechanisms exist, maintenance responsibility is largely perceived as externally driven, with limited internalisation at the community level. This has implications for the long-term sustainability of the intervention, highlighting the need for clearer role delineation, strengthened coordination between local government, park authorities, and community groups, and greater efforts to build community ownership and shared accountability for upkeep of the infrastructure.

## B.2 Frequency of Maintenance and Inspection Activities

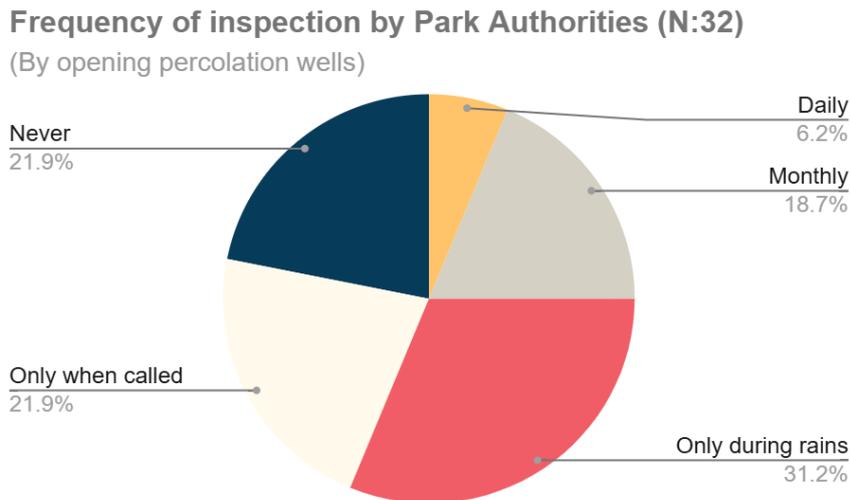
Maintenance of percolation wells under the OBD initiative is infrequent and largely reactive, with notable variation between park maintenance authorities and residents. Among park maintenance authorities, a portion reported conducting maintenance regularly (every 3–6 months), suggesting the presence of some planned upkeep practices. However, a substantial share indicated that maintenance is carried out only occasionally or not at all, pointing to gaps in routine maintenance protocols. Residents, on the other hand, were more likely to report that maintenance activities occur rarely or never, reflecting limited visibility of maintenance efforts at the community level and reinforcing perceptions of weak operational follow-through.

**FIGURE 10: FREQUENCY OF MAINTENANCE ACTIVITIES**



Inspection practices by park authorities further highlight the reactive nature of maintenance. Among park maintenance respondents, inspections were most commonly reported as occurring only during the rainy season (31.2%), indicating a seasonal, problem-driven approach rather than systematic monitoring. An additional 21.9% reported inspections occurring only when called, while another 21.9% indicated that inspections never take place. Regular inspection schedules were relatively uncommon, with 18.7% reporting monthly inspections and only 6.2% indicating daily inspections.

**FIGURE 11: FREQUENCY OF INSPECTION OF PERCOLATION WELLS**



While institutional responsibility for maintenance is recognised, regular and preventive maintenance systems are not consistently institutionalised. The predominance of seasonal and ad hoc inspections raises concerns

regarding the long-term functionality and sustainability of percolation wells. Strengthening coordination mechanisms, clarifying maintenance schedules, and establishing routine inspection protocols could improve infrastructure longevity and reinforce the sustainability of the OBD intervention.

### B.3 Type of Maintenance Work

While understanding the maintenance patterns, the United way team demonstrates a clear division of roles in the maintenance of percolation wells, with construction labourers and park maintenance authorities undertaking distinct types of activities. Among construction labourers, maintenance work was predominantly construction-oriented, with digging of wells reported by a large majority (84.21%), followed by masonry or structural work (10.53%). Only a small proportion (5.26%) reported involvement in technical handling, indicating that construction labourers are primarily engaged during the installation or major repair phases rather than in routine upkeep.

**TABLE 5: TYPE OF MAINTENANCE WORK**

<b>Type of Maintenance Work</b>			
<b>Construction labourers (n:19)</b>	<b>Percent</b>	<b>Park maintenance authorities (n:29)</b>	<b>Percent</b>
Digging wells	84.21	Cleaning the well surroundings	21.14
		Desilting wells	4.88
Technical Handling	5.26	Clearing blockages or debris	13.01
		Checking water flow/standing water	13.01
Masonry/structural work	10.53	Reporting issues	10.57
		Gardening/greenery upkeep	17.07
		Waste removal	19.51

In contrast, park maintenance authorities reported involvement mainly in operational and routine maintenance activities. The most commonly cited tasks included cleaning the well surroundings (21.14%), waste removal (19.51%), and gardening or greenery upkeep (17.07%), reflecting their role in maintaining the immediate park environment. Functional oversight activities such as clearing blockages or debris (13.01%), checking water flow or standing water (13.01%), and reporting issues (10.57%) were also reported, though desilting of wells was relatively limited (4.88%).

This suggests that while construction labourers are engaged in one-time or periodic structural interventions, park maintenance authorities shoulder responsibility for day-to-day upkeep and monitoring. However, the relatively low reporting of technically critical activities such as desilting and water flow assessment points to potential gaps in preventive maintenance. Strengthening technical capacity and clarifying coordination between construction teams and park authorities could enhance the long-term functionality and sustainability of percolation wells under the OBD initiative.

These findings highlight distinct but interrelated challenges faced by construction workers and park maintenance authorities in implementing and sustaining percolation wells under the OBD initiative.

**TABLE 6: CHALLENGES FACED BY MAINTENANCE LABOURERS**

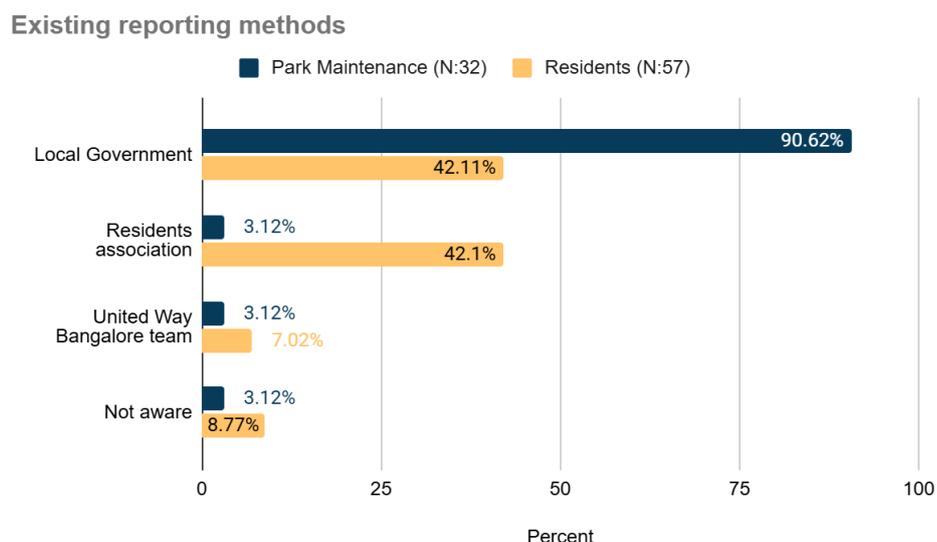
Challenges Faced by Construction Work (N:19)	Percent	Challenges Faced by Park Maintenance Authorities (N:32)	Percent
Lack of proper tools/equipment	15.79	Lack of tools/equipment	17.57
		Lack of manpower	13.51
Water seepage during digging	52.63	Lack of technical knowledge	8.78
		Heavy waste accumulation	15.54
Inadequate manpower Safety issues	10.53	Rapid silt accumulation in wells	5.41
		Lack of community cooperation	11.49
None of the above	21.05	Lack of clear instructions	8.78
		Safety concerns	14.86
		Weather-related challenges	4.05

Construction workers primarily reported water seepage during digging 52.63% as the main challenge, reflecting site-specific technical difficulties, followed by lack of proper tools or equipment (15.79%) and manpower or safety issues (10.53%). In contrast, park maintenance authorities faced more systemic maintenance challenges, with lack of tools or equipment (17.57%), heavy waste accumulation (15.54%), and safety concerns (14.86%) being most common. Additional issues included manpower constraints (13.51%) and limited community cooperation (11.49%). These findings suggest that while construction-related challenges are largely technical and site-specific, maintenance challenges are more systemic, encompassing resource constraints, coordination gaps, and community engagement issues. Addressing these challenges through improved technical guidance, clearer maintenance protocols, adequate resourcing, and stronger community cooperation mechanisms will be critical for enhancing the long-term effectiveness and sustainability of the OBD intervention.

#### B.4 Existence and Awareness of Grievance/Reporting Mechanisms

While formal reporting channels exist, their use and awareness vary across stakeholder groups. Both park maintenance authorities and residents primarily identified the local government as the main avenue for reporting issues related to parks, percolation wells, or waterlogging, indicating reliance on formal governance structures for grievance redressal. Awareness of alternative channels, such as resident associations or the United Way Bengaluru team, was comparatively limited, and a small proportion of respondents reported being unaware of any reporting mechanism, pointing to gaps in communication.

**FIGURE 12: EXISTING GRIEVANCE/ REPORTING METHODS**



However, coordination gaps were noted in community-facing contexts, particularly around post-construction maintenance responsibilities and public communication. While institutional stakeholders were generally clear on ownership and reporting channels, community members often lacked clarity on whom to approach for long-term upkeep or issue resolution.

Among residents, the majority 59.65% reported never having raised an issue, while 38.6% had reported issues at least once, suggesting limited engagement with grievance mechanisms. For those who did report issues, responsiveness was mixed: 45.45% indicated that action was taken within a few days, while 36.36% experienced significant delays. Immediate responses were relatively rare 9.09%, and a small proportion 4.55% reported that no action was taken. However, these indicate that although grievance mechanisms are present and moderately functional, greater awareness, clearer reporting pathways, and improved response timelines are needed to strengthen accountability and coordination under the OBD initiative.

**TABLE 7: ISSUE REPORTING AND RESPONSE TIMELINESS AMONG RESIDENT RESPONDENTS**

Have you ever reported an issue related to the park/well/waterlogging?	Percent N: 32	If you reported an issue, how quickly was action taken?	Percent N:22
Yes, many times	7.02	Immediately	9.09
Yes, once or twice	31.58	Within a few days	45.45
No, never	59.65	Within a week	4.55
Did not know where to report	1.75	Very delayed	36.36
		No action taken	4.55

## C. Effectiveness

The One Billion Drops (OBD) Campaign aims to enhance groundwater recharge by reducing surface runoff and mitigating waterlogging. This study assesses the programme’s overall effectiveness by examining reductions in water stagnation, the functional performance of percolation wells, and shifts in community attitudes toward water conservation. Initial survey findings indicated relatively low perceived relevance related to reducing water stagnation, suggesting limited awareness or uneven visibility of early outcomes. However, among respondents with greater exposure to the intervention, the initiative was widely perceived as effective in achieving its core objectives of improving groundwater recharge through reduced surface runoff.

Institutional stakeholders reported tangible outcomes such as improved borewell yield, extended water availability into dry months, increased soil moisture, and healthier vegetation in parks and campuses. In several locations, percolation wells were also credited with reducing waterlogging during heavy rainfall, particularly on walking tracks and low-lying areas. These outcomes strengthened stakeholder confidence in the technical design and implementation approach.

*“Earlier, water availability would drop sharply by January, with supply reducing from four hours to two hours, and sometimes to just half an hour. Since the installation of the percolation wells, water availability has improved, with supply increasing by about half an hour. Groundwater recharge has become more noticeable, and plants now remain healthy for longer into the winter months. Previously, waterlogging during heavy rains would flood the walking tracks, but the creation of percolation pits and channels has helped divert and absorb rainwater, reducing waterlogging and increasing soil moisture.” - KII, BBMP Horticulture Department*

At the same time, respondents consistently emphasized that effectiveness is closely linked to scale. Isolated or limited installations were viewed as insufficient to generate visible change, whereas clustered, park-level, or watershed-based deployment was perceived as necessary to produce meaningful outcomes. Effectiveness was therefore understood as cumulative and system-dependent rather than immediate or localized.

**TABLE 8: EFFECTIVENESS SCORE**

Effectiveness Score (Overall)					
	Obs	Mean	SD	Min	Max
Waterlogging Score	93	4.096774	1.51847	1	5
Functionality Score	108	3.592593	1.401181	1	5
Attitude Score	108	3.685185	1.165294	1	5
Effectiveness Score (A+B+C)	108	3.808642	0.7856498	1.666667	5

These qualitative findings are substantiated by the quantitative effectiveness Score, a composite index constructed from three dimensions: Waterlogging, Functionality, and Attitude, each measured on a five-point scale. The overall mean Effectiveness Score was 3.8 (SD = 0.78), indicating moderate to high perceived effectiveness across respondents. The Waterlogging Score recorded a high mean of 4.09, reflecting strong perceived improvements in drainage and flood mitigation, consistent with qualitative accounts. The Functionality Score averaged 3.6, suggesting that while most percolation wells are operational, maintenance

and usability challenges persist. The Attitude Score averaged 3.68, indicating generally positive perceptions and acceptance of the intervention which plays a vital enabling factor for sustained effectiveness.

The convergence of qualitative and quantitative evidence suggests that the OBD intervention has been effective in achieving its immediate intended outcomes particularly in reducing surface waterlogging and supporting groundwater recharge while also highlighting that scale, maintenance arrangements, and surface-level design features are critical determinants of sustained effectiveness.

## D. Efficiency

From an efficiency perspective, respondents viewed the project as well-managed and cost-conscious, particularly given the complexity of operating in urban public spaces. The use of standardized designs, experienced vendors, and phased work orders contributed to quality control and reduced the risk of rework. Scientific planning methods such as GIS mapping, contour analysis, and infiltration testing were seen as improving efficiency by ensuring wells were constructed in locations with high recharge potential. Adaptive responses to site constraints, such as constructing additional wells when depth targets could not be achieved due to rocky strata, further supported efficient use of resources.

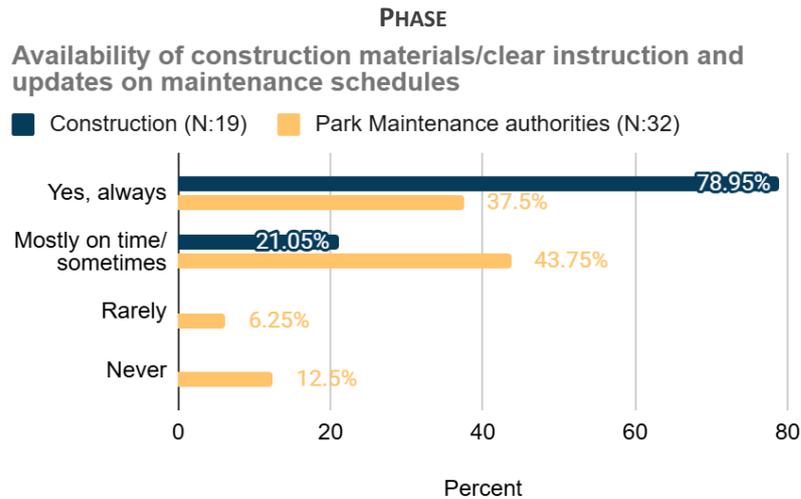
*“According to my knowledge, the United Way team has made 12 feet by 4 feet. That is good, but in some very large farms or big parks, the size could be made a bit larger. If we make large wells, there should be protection around them so nothing happens to anyone, because visitors and children come here; without our knowledge, they might go there to play and there's a possibility of falling. I feel a bit more attention should be given to safety.” - KII, Lalbagh Botanical Garden, Bangalore*

Delays related to weather conditions, festival seasons, or administrative approvals were acknowledged but generally viewed as manageable and appropriately planned for through internal buffers and flexible timelines.

### D.1 Efficiency Gaps between Construction and Post-Construction Phases

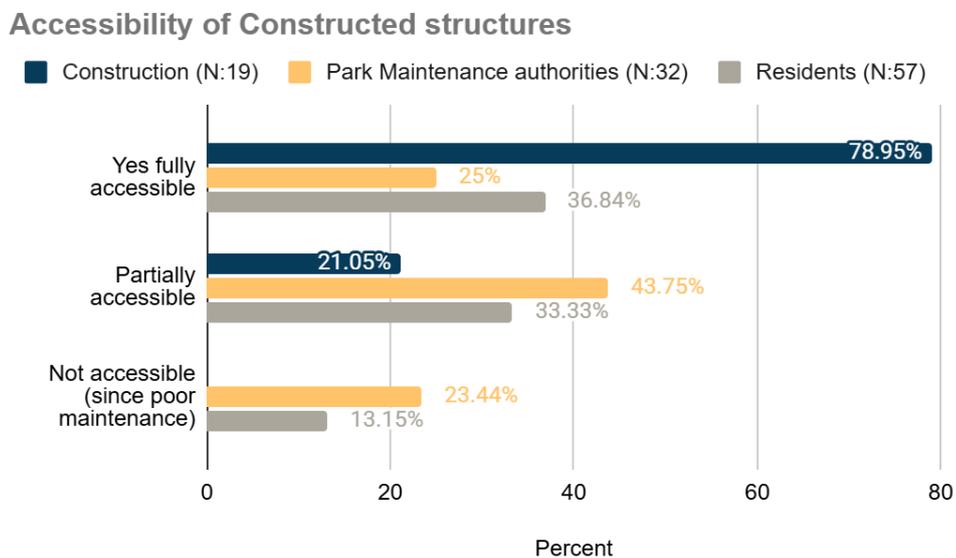
To build these stronger, quantitative findings indicate that efficiency was significantly higher during the construction phase than during routine maintenance. Among construction respondents, a large majority (approximately 78%) reported that required materials and instructions were always available, while the remaining (about 22%) indicated they were available mostly on time or sometimes, with no respondents reporting rare or no availability. In contrast, park maintenance authorities reported more variable experiences: only around 38% indicated that materials, instructions, and updates were always available, while approximately 45% reported receiving them mostly on time or sometimes. A smaller but notable proportion reported constraints, with about 5% indicating availability was rare, and nearly 12% reporting that such support was never available. These findings suggest that while construction processes under OBD were efficiently managed, efficiency declined during the post-construction phase, highlighting gaps in communication, handover, and ongoing operational support may affect long-term sustainability.

**FIGURE 13: AVAILABILITY OF CONSTRUCTION MATERIALS, INSTRUCTIONS, AND MAINTENANCE UPDATES BY IMPLEMENTATION**



Perceptions of accessibility of the constructed percolation structures varied across stakeholder groups, reflecting differences in engagement and interaction with the assets. A large majority of construction respondents (around 78%) reported that the structures were fully accessible, indicating that access considerations were largely addressed during the construction phase.

**FIGURE 14: ACCESSIBILITY TO CONSTRUCTED PERCOLATION WELLS**



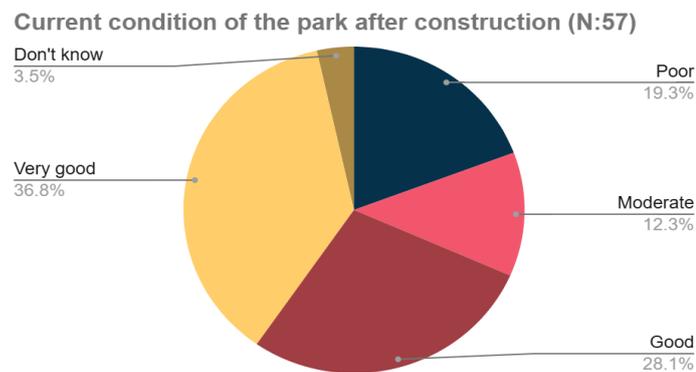
However, only about 25% of park maintenance authorities and approximately 35% of residents reported full accessibility, with a greater proportion indicating that the structures were partially accessible (around 42% among park maintenance authorities and 32% among residents). Concerns regarding maintenance and access were also evident, as about 20% of residents reported that structures were poorly maintained, while nearly 18% of park maintenance authorities indicated that some structures were not accessible. A small proportion of residents and park staff reported being unsure about accessibility, suggesting limited visibility or engagement with the structures. This shows how accessibility appears to have been adequately considered at the construction stage; these findings indicate emerging operational and maintenance-related barriers that

may limit effective access over time, underscoring the need for regular upkeep and clearer access protocols to sustain functionality and efficiency.

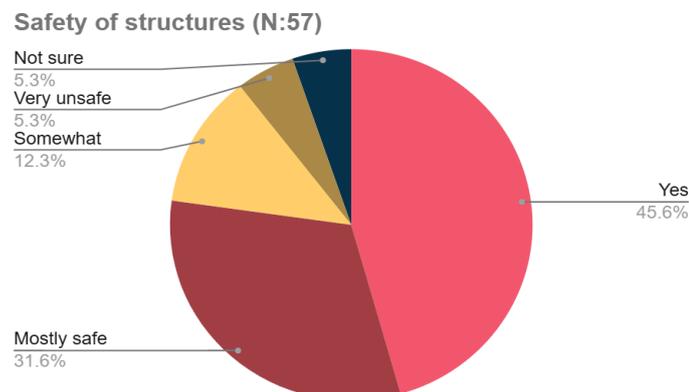
## D.2. Conditions of the Park

Findings indicate that the construction of percolation structures under the OBD initiative has largely contributed to improved park conditions, though the quality of upkeep varies across sites. A substantial proportion of respondents rated the post-construction condition of parks as very good and well-maintained (36.8%) or good and generally usable (28.1%), suggesting that the intervention has been effectively integrated into park infrastructure and has not disrupted regular park use. However, 19.3% of respondents described park conditions as poor or limited in maintenance, while 12.3% rated them as moderate, indicating that maintenance consistency remains uneven and that some sites may be experiencing early signs of asset deterioration. A small proportion 3.5% reported being unsure, reflecting limited visibility or engagement with maintenance activities at certain locations.

**FIGURE 15: CURRENT CONDITIONS OF PARK**



**FIGURE 16: LEVEL OF SAFETY**



Perceptions of structural safety were largely positive, reinforcing the effectiveness of design and construction standards. Nearly half of respondents (45.6%) reported that the percolation structures were completely safe, while an additional 31.6% considered them mostly safe, indicating broad confidence in the physical integrity

of the assets. Nevertheless, safety concerns were not entirely absent: 12.3% perceived the structures as somewhat unsafe, and 5.3% each reported them as very unsafe or were not sure about their safety. These concerns, though limited in scale, point to the importance of ongoing inspection, timely maintenance, and clear communication to users, particularly in high-footfall areas and during the monsoon season.

This enforces how the OBD intervention has been effective in improving park conditions and maintaining structural safety, its long-term sustainability will depend on consistent post-construction maintenance and monitoring. Addressing the variability in maintenance quality and proactively responding to emerging safety concerns will be critical to ensuring that the benefits of the intervention are sustained and that user confidence in park infrastructure remains high.

## E. Impact

Qualitative stakeholders identified multiple positive contributions attributable to the initiative, extending beyond groundwater recharge alone. Reported impacts included:

- Increased resilience of public green spaces during dry periods
- Reduced pressure on borewells and tanker water
- Improved management of stormwater during heavy rainfall
- Enhanced biodiversity and tree health in large parks and campuses

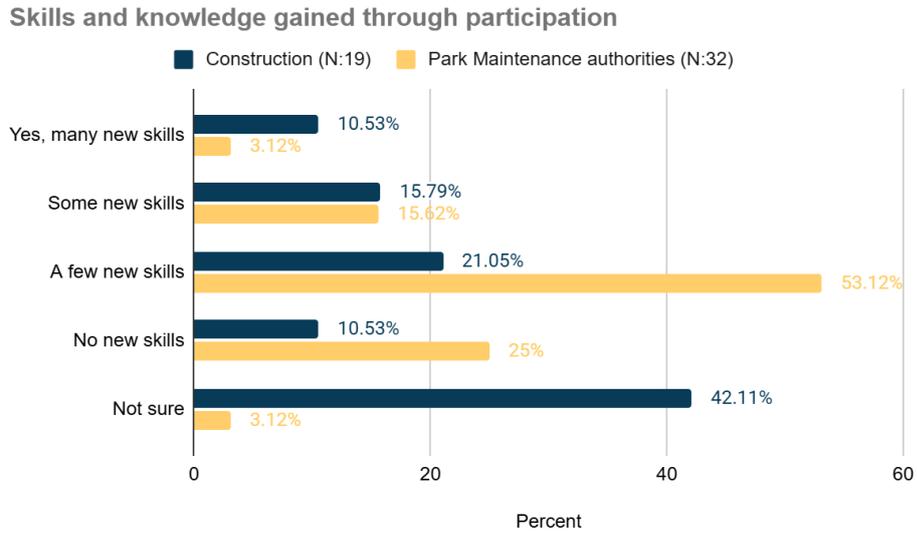
In addition, social co-benefits were noted, particularly the creation of livelihood opportunities for traditional well-digging communities and increased institutional awareness of water stewardship.

Qualitative respondents also emphasized that many impacts, especially changes in groundwater levels are long-term and not immediately measurable. There was strong consensus on the need for systematic scientific monitoring to validate and quantify impacts over time, including baseline-to-endline groundwater assessments.

### E.1 Incremental Skill Development through Participation in Construction Activities

However, based on the findings of this report, the OBD intervention has contributed to the development of skills and practical knowledge among both construction labourers and park maintenance authorities, indicating longer-term human capacity impacts beyond physical infrastructure creation. Among construction workers, participation in the construction of percolation wells exposed workers to specialised techniques related to groundwater recharge, site preparation, and safety considerations, contributing to skill acquisition over time. While a proportion of construction respondents reported gaining some or many new skills, a relatively large share indicated being unsure, reflecting the presence of experienced workers for whom the work aligned closely with existing skill sets. This suggests that skill development among construction labourers has been incremental and experiential, strengthening existing competencies rather than introducing entirely new ones.

**FIGURE 17: SKILLS AND KNOWLEDGE ACQUIRED**

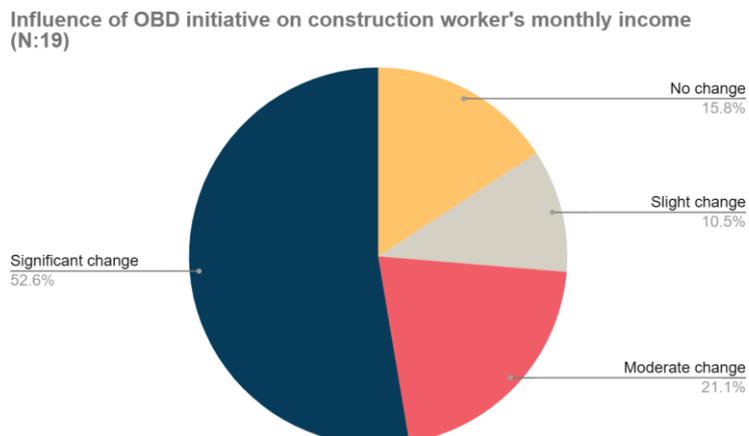


In contrast, park maintenance authorities reported clearer skill development outcomes, with a majority indicating the acquisition of a few or some new skills related to routine inspection, basic maintenance of percolation wells, waste management, and identification of blockages or water stagnation issues. This reflects the expanding role of park maintenance staff from general park upkeep to the management of specialised water infrastructure. Importantly, respondents noted that as systems and processes around percolation wells became established, newly inducted maintenance staff were able to learn and adopt these skills more quickly, benefiting from on-the-job learning and informal knowledge transfer. Strengthening local maintenance capabilities and creating a foundation for sustained skill development as new personnel join and engage with groundwater management practices.

## E.2 Livelihood Impacts through Participation in Construction Activities

Based on the findings of this assessment, the OBD intervention has also contributed to livelihood-related outcomes among construction labourers, extending its impact beyond physical infrastructure creation. Engagement in the construction of percolation wells provided sustained short term employment opportunities, which translated into reported increases in monthly income for a majority of construction workers.

**FIGURE 18: LIVELIHOOD IMPACT ON CONSTRUCTION LABOURERS**



Over half of the respondents indicated a significant increase in income, while a further proportion reported moderate improvements, suggesting that participation in the initiative contributed positively to income stability and earning capacity over the project period. At the same time, a smaller share of construction workers reported only slight or no change in income, reflecting variation in duration of engagement, prior income levels, and the extent to which OBD-related work supplemented existing livelihood activities. These findings indicate that while income gains were not uniform across all respondents, the intervention played a meaningful role in enhancing economic security for a substantial proportion of participating workers. This evidence suggests that the OBD initiative generated tangible livelihood benefits alongside its environmental objectives, reinforcing its contribution to inclusive and socially embedded urban water management.

### E.3 Composite Impact Score Reflecting Social and Behavioural Change of nearby Residents

To assess broader, medium-term impacts of the OBD intervention beyond immediate physical outcomes, an Impact Score was constructed by combining indicators related to current awareness of environmental issues, community participation, strengthened cooperation, and behaviour towards water use. These dimensions were selected to capture the social and behavioural changes that the OBD campaign seeks to influence, recognising that sustainable groundwater management depends not only on infrastructure but also on collective action, cooperation among stakeholders, and environmentally responsible behaviour at the community level.

TABLE 9: IMPACT SCORE

Impact score	Obs	Mean	SD	Min	Max
	57	2.631579	0.5389003	1.5	4

The composite Impact Score, calculated for resident respondents (n = 57), yielded a mean score of 2.63 (SD = 0.54) on a four-point scale, indicating a moderate level of perceived impact. The relatively low standard deviation suggests limited variation across respondents, pointing to a broadly shared perception of incremental but not transformative change. The observed range of scores (minimum 1.5, maximum 4) indicates that while some residents experienced stronger social and behavioural impacts, others perceived more modest effects. These findings suggest that the OBD intervention has begun to influence community awareness, cooperation, and water-use behaviour; however, deeper and more sustained engagement may be required to translate these early social impacts into stronger, long-term behavioural change and collective stewardship of groundwater resources.

#### A. Sustainability

Sustainability emerged as both a strength and a concern. On the one hand, the technical design of percolation wells was viewed as durable, low-maintenance, and capable of functioning for decades if basic upkeep is ensured. Institutional ownership by government departments and large campuses further supports long-term continuity. On the other hand, qualitative respondents identified maintenance and awareness as key risks to sustainability. Limited formal maintenance periods, unclear handover processes, and inconsistent integration into routine park or campus maintenance could undermine long-term performance if not addressed.

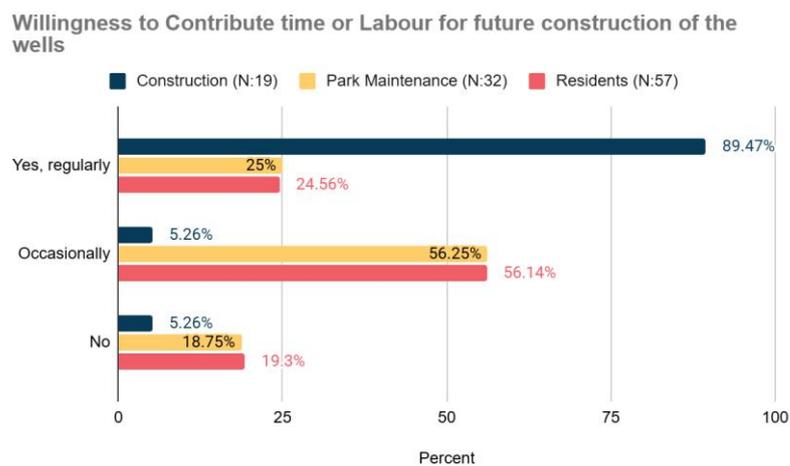
Many community members and institutional stakeholders expressed willingness to contribute to monitoring and minor maintenance, but stressed that sustained government ownership and policy integration such as enforcing functional rainwater harvesting and redesigning stormwater drains are essential for lasting impact.

## F.1 Willingness to Contribute to Future Construction and Maintenance

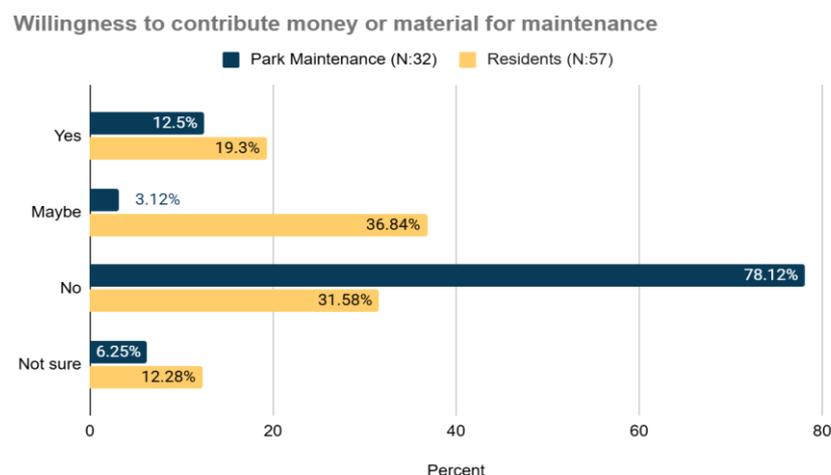
The sustainability of the OBD intervention was assessed by examining stakeholders' willingness to contribute time, labour, money, or material resources toward the future construction and maintenance of percolation wells. Findings reveal varying levels of commitment across stakeholder groups, reflecting differences in roles, capacities, and perceived responsibility for sustaining the intervention.

With respect to contributing time or labour for future construction, construction workers demonstrated a very high level of willingness, with nearly 89.5% indicating that they would contribute regularly, reflecting strong technical ownership and continued engagement with groundwater-related work. In contrast, park maintenance authorities and residents expressed willingness primarily on an occasional basis, with 56.3% of park maintenance authorities and 56.1% of residents reporting occasional willingness to contribute labour or time. Regular contribution was reported by 25% of park maintenance authorities and 24.6% of residents, while a smaller proportion in both groups indicated unwillingness (18.8% and 19.3%, respectively). This suggests that while non-construction stakeholders are open to supporting future efforts, their engagement is more conditional and likely dependent on time availability and formal responsibility structures.

**FIGURE 19: WILLINGNESS TO CONTRIBUTE TIME & LABOUR**



**FIGURE 20: WILLINGNESS TO CONTRIBUTE MONEY/MATERIALS**



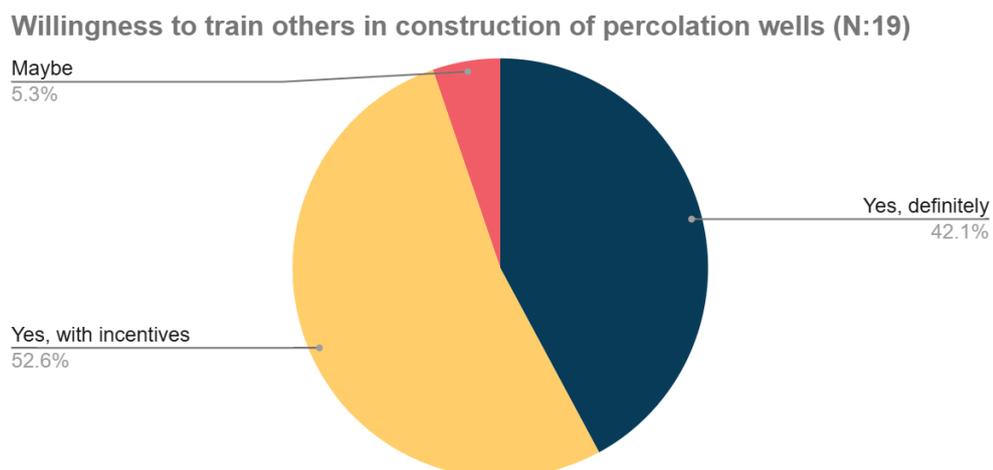
Willingness to contribute money or materials for maintenance was notably lower, particularly among park maintenance authorities. A large majority of park maintenance respondents (approximately 78%) reported that they were not willing to contribute financially or materially, reflecting institutional constraints and the expectation that maintenance funding should be supported through formal budgets rather than personal or discretionary contributions. Among residents, willingness was more mixed: around 30% expressed unwillingness to contribute financially, while approximately 38% indicated that they might contribute, and about 20% reported a clear willingness to do so. A small proportion of respondents in both groups remained unsure, indicating limited clarity around maintenance costs and contribution mechanisms.

While technical and operational ownership among construction workers appears strong, sustained functionality of percolation wells will likely depend on clear institutional financing mechanisms, defined maintenance responsibilities, and structured community engagement, rather than voluntary financial contributions alone. Strengthening formal maintenance arrangements and clarifying roles could help translate the demonstrated willingness to contribute time and effort into durable sustainability outcomes.

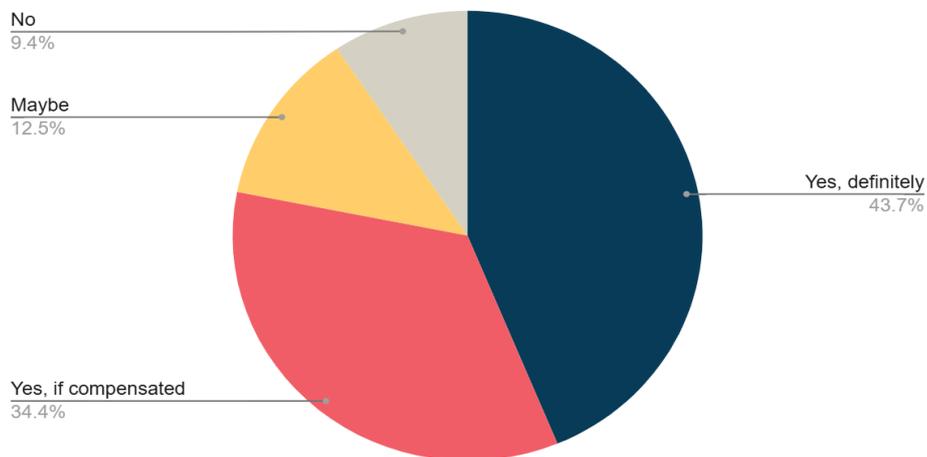
## F.2 Willingness to Train Others and Knowledge Transfer

The findings indicate strong potential for knowledge transfer and local capacity building, which are critical to the long-term sustainability of the OBD intervention. Among construction workers (n = 19), a majority expressed willingness to train others in the construction of percolation wells, with 42.1% indicating they would definitely train others and an additional 52.6% willing to do so if appropriate support or incentives were provided. Only a small proportion (5.3%) expressed uncertainty, suggesting that technical knowledge related to percolation well construction is largely internalised and transferable within this group.

**FIGURE 21: WILLINGNESS TO TRAIN OTHERS IN CONSTRUCTION & PARK MAINTENANCE ACTIVITIES**



**Willingness to train other community members in maintenance activities (N:32)**



Similarly, park maintenance authorities (n = 32) demonstrated a strong inclination toward peer learning and community capacity development in maintenance activities. Nearly 43.7% reported that they would definitely train other community members in maintenance tasks, while 34.4% indicated willingness if compensated, reflecting practical considerations related to workload and resource constraints. A smaller share (12.5%) expressed tentative willingness, and only 9.4% were unwilling to train others.

Findings suggest that both construction and maintenance stakeholders possess not only the skills but also the readiness to act as local resource persons, provided enabling conditions such as formal recognition, compensation, or institutional support are in place. Leveraging this willingness through structured training-of-trainers models and community-based maintenance programs could significantly strengthen the sustainability and scalability of the OBD initiative by embedding technical knowledge within local systems.

### F.3 Priorities for Improvement and Long-Term Park Management

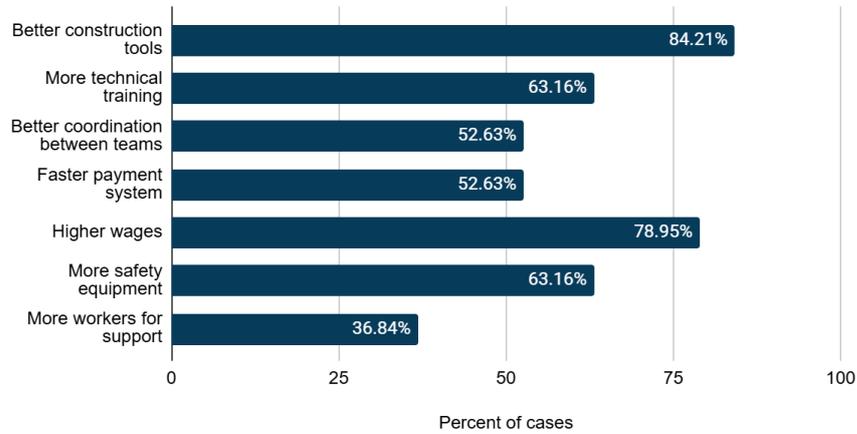
Stakeholders identified several areas for strengthening the sustainability of future percolation well construction and long-term park management, highlighting both operational improvements and institutional priorities.

With respect to future construction projects, the most frequently cited need was better construction tools (84.21%), followed closely by higher wages (78.95%), indicating that adequate resourcing and fair compensation are seen as essential for maintaining quality and motivation. More technical training (63.16%) and improved safety equipment (63.16%) were also highlighted, reflecting the technical and risk-intensive nature of groundwater-related construction work. Additionally, respondents pointed to the importance of better coordination between teams (52.63%) and faster pavement or surface restoration systems (52.63%), underscoring the need to minimise disruption and improve implementation efficiency. A smaller proportion (36.84%) identified the need for additional workers, suggesting that workforce adequacy is a concern in some contexts.

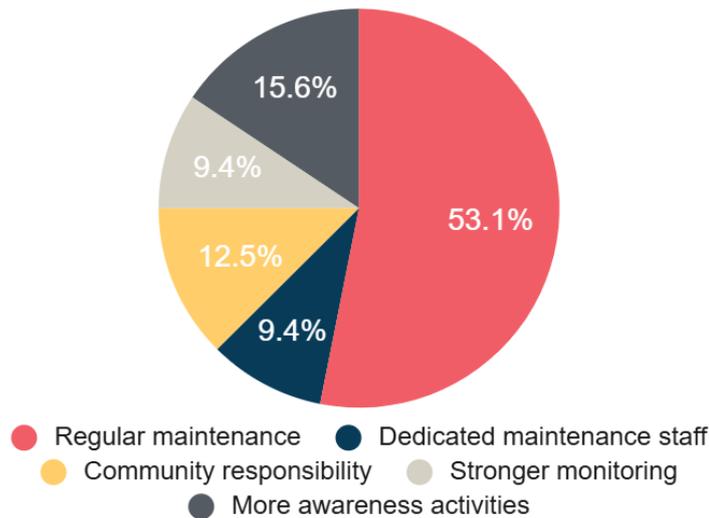
**FIGURE 22: IMPROVEMENT ON CONSTRUCTION PROJECTS & TOP PRIORITY FOR FUTURE**

**Improvements for future projects**

Multiple Choice (Percent of cases: 19)



**Top priority to sustain parks in long term**



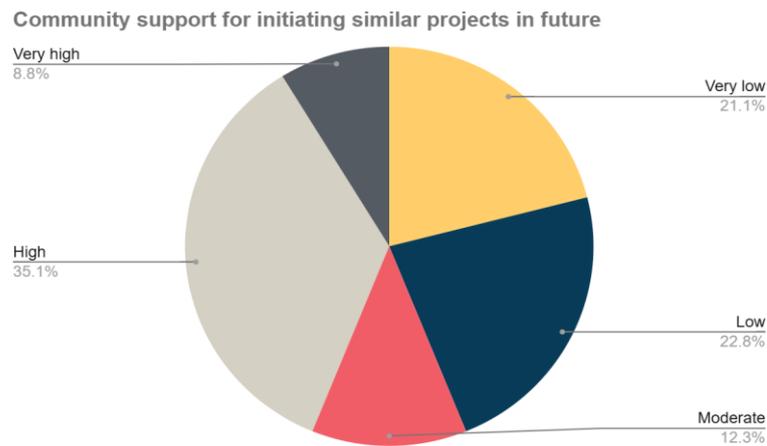
In terms of sustaining parks and percolation structures over the long term, regular maintenance emerged as the single most important priority, cited by a majority of respondents (53.1%). This highlights widespread recognition that the benefits of the OBD intervention can only be sustained through consistent upkeep. Other priorities included community responsibility (12.5%), indicating an expectation for shared ownership, and dedicated maintenance staff (9.4%), reflecting the need for clearly assigned roles. Stronger monitoring mechanisms (9.4%) and increased awareness activities (15.6%) were also identified as important, pointing to the role of oversight and continued engagement in sustaining outcomes.

While technical foundations for sustainability are in place, long-term success of the OBD intervention will depend on adequate resourcing, skilled manpower, institutionalised maintenance systems, and continued community engagement. Addressing these priorities can help transition the intervention from a project-based initiative to a sustainably managed urban water infrastructure system.

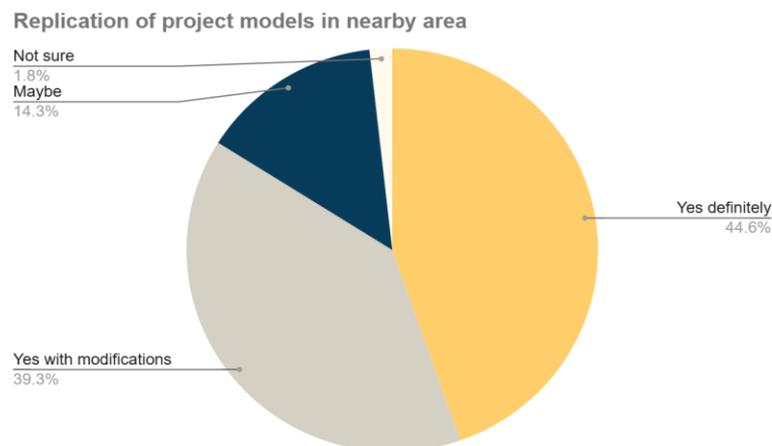
#### F.4 Scalability: Replication Potential and Community Support

Findings indicate strong perceived potential for replication of the OBD project model in nearby areas, alongside moderate to high levels of community support for initiating similar interventions in the future. Nearly 44.6% of respondents reported that the project model could definitely be replicated, while an additional 39.3% felt that replication was feasible with modifications, suggesting broad confidence in the model's relevance and adaptability to different local contexts. A smaller proportion (14.3%) expressed tentative support, and only 1.8% were unsure, indicating minimal resistance to scaling the approach.

**FIGURE 23: REPLICATION OF PROJECT MODELS**



**FIGURE 24: COMMUNITY SUPPORT FOR EXPANSION**



Community support for initiating similar projects, however, displayed greater variation. While 35.1% of respondents reported high levels of support and 8.8% indicated very high support, a comparable share reported low (22.8%) or very low (21.1%) support. A further 12.3% described support as moderate, reflecting uneven readiness across communities. This divergence suggests that while the technical and conceptual model

of OBD is widely accepted, the degree of community mobilisation and collective action required for new initiatives may vary depending on local engagement, awareness levels, and perceived benefits.

These suggest that the OBD model has strong scalability potential, particularly if replication efforts incorporate context-specific modifications and proactive community engagement strategies. Strengthening awareness, clarifying benefits, and addressing local concerns will be critical to converting general acceptance of the model into sustained community support for future groundwater recharge initiatives.

## Recommendations

Based on the findings of the impact assessment and guided by the OECD-DAC evaluation framework, the following recommendations are proposed to strengthen the effectiveness, impact, and sustainability of the One Billion Drops (OBD) initiative.

### 1. Scale Intervention at the Catchment and Ward Level

The assessment indicates that the perceived and observed effectiveness of percolation wells is strongly dependent on scale. Isolated installations were widely viewed as insufficient to generate visible outcomes, while clustered or watershed-level deployment yielded stronger results in groundwater recharge and flood mitigation.

Findings from both the qualitative interviews and quantitative effectiveness scores indicate that the perceived and observed effectiveness of percolation wells is strongly dependent on scale. Respondents consistently noted that isolated or limited installations do not generate visible outcomes, whereas clustered deployments within parks, campuses, and drainage catchments lead to more noticeable improvements in groundwater recharge and flood mitigation. In the short term, future implementation should prioritize clustering wells within the same park or contiguous public spaces to enhance cumulative recharge effects. In the longer term, planning and implementation should shift toward ward- or catchment-level strategies that integrate multiple sites within a shared hydrological context, enabling the intervention to influence broader runoff and recharge patterns across urban landscapes.

### 2. Strengthen Maintenance Systems and Handover Mechanisms

While the majority of percolation wells were reported as functional, maintenance-related challenges emerged as a key risk to sustained effectiveness. Quantitative functionality scores and qualitative feedback from park authorities and residents highlighted issues such as siltation, blocked inlets, debris accumulation, and safety concerns following heavy rainfall. In the short term, clearer maintenance handover protocols and stronger coordination with park maintenance authorities are needed to ensure routine upkeep after the initial maintenance period. Over the longer term, integrating percolation well maintenance into standard park and campus maintenance contracts and establishing clear institutional accountability will be essential to sustaining functionality and preventing gradual performance decline.

### 3. Enhance Community Awareness and Visibility of the Initiative

The assessment revealed uneven awareness of the OBD initiative, particularly among residents living farther from intervention sites. Perceived relevance demonstrates that residents living closer to intervention sites report higher relevance scores, indicating that proximity and visibility play a critical role in shaping perceptions of value. Qualitative findings further revealed limited awareness of the initiative beyond immediate beneficiaries, partly due to minimal signage and structured outreach. Certain recommendations such as improving on-site signage explaining the purpose, benefits, and scale of the intervention, conduct localized awareness sessions through Resident Welfare Associations, schools, and community groups and use parks and public spaces as demonstration sites for groundwater conservation education can foster broader awareness, strengthen ownership and support behavioural shifts towards groundwater conservation.

## 4. Institutionalize Scientific Monitoring and Evidence Generation

Although stakeholders reported tangible improvements in groundwater availability and flood mitigation, the assessment highlights the need for systematic evidence to validate long-term impact. Groundwater recharge is inherently gradual, and the absence of longitudinal data limits the ability to quantify outcomes beyond perception-based indicators. Identifying a sample of sites for baseline groundwater and soil-moisture measurements would establish a foundation for monitoring. Upon which, institutionalizing periodic monitoring in collaboration with technical or research institutions would strengthen accountability, inform adaptive design, and support evidence-based scaling of the initiative.

## 5. Integrate the Initiative with Broader Urban Water Policies

Findings from multiple stakeholder groups indicate that percolation wells alone cannot address Bengaluru's groundwater challenges without complementary policy measures. Respondents pointed to weak enforcement of rainwater harvesting norms, increasing concretization of stormwater drains, and continued reliance on borewells as systemic constraints. By building closer alignment with existing government programs and departments responsible for stormwater management and rainwater harvesting would improve coherence. Over the longer term, embedding percolation well approaches within urban water and drainage policies would amplify impact and contribute to a more resilient and integrated water-management system.

## 6. Continue Capacity Building and Workforce Development

The demographic and training profiles indicate that construction labourers and park maintenance staff play a critical role in the successful implementation and upkeep of percolation wells. Training provided under the initiative contributed to effective construction and adherence to safety practices, while on-the-job learning further strengthened skills. Continuing project-specific training and orientation for both construction and maintenance personnel will support consistent quality. And in the long term, standardizing training modules and documenting best practices can build institutional capacity, enhance workforce competence, and support the sustainability of similar urban water-conservation interventions.

While the recommendations highlight the opportunity for CSR-supported interventions such as the One Billion Drops initiative to move from site-level infrastructure delivery toward more integrated, scalable, and sustainable urban water solutions. Continued CSR engagement can play a catalytic role in enabling scale, strengthening maintenance systems, supporting evidence generation, and fostering partnerships with government and communities to achieve long-term groundwater resilience.

## Learning and Implications

The impact assessment of the **One Billion Drops (OBD)** initiative demonstrates that the programme is a timely, contextually relevant, and technically sound response to Bengaluru's escalating urban water challenges. Across stakeholder groups, the intervention was widely perceived as addressing critical issues of groundwater depletion, surface runoff, and growing dependence on borewells, particularly within dense urban environments where conventional water conservation structures are infeasible. The focus on public parks, government lands, and institutional campuses emerged as a strategic strength, enabling recharge at scale while protecting open spaces essential for long-term urban resilience.

Evidence from both qualitative and quantitative findings indicates that the OBD initiative has been effective in achieving its immediate objectives, particularly in reducing surface waterlogging and supporting groundwater recharge. High perceived improvements in drainage and flood mitigation, corroborated by institutional stakeholder experiences, underscore the technical appropriateness of percolation well-based interventions. However, effectiveness was consistently understood as scale-dependent, with clustered and catchment-level installations yielding more visible outcomes than isolated structures. This highlights the importance of cumulative, system-level planning for urban groundwater interventions.

From an efficiency perspective, the initiative performed strongly during the construction phase, supported by standardized designs, experienced vendors, and scientific site selection methods. Adaptive implementation practices further contributed to efficient resource use despite urban constraints. At the same time, efficiency declined during the post-construction phase, with gaps observed in maintenance handover, availability of materials, and accessibility of structures. These findings suggest that while project execution was well managed, greater attention is required to strengthen operational systems that sustain efficiency beyond installation.

The impact of the OBD initiative extends beyond physical infrastructure, encompassing environmental, social, and livelihood dimensions. Reported impacts include improved resilience of public green spaces, reduced pressure on tanker water and borewells, better stormwater management, and enhanced biodiversity. Importantly, the initiative also generated livelihood benefits for traditional well-digging communities and contributed to incremental skill development among both construction workers and park maintenance staff. While social and behavioural impacts among residents are currently moderate, early signs of increased awareness, cooperation, and pro-conservation attitudes suggest a foundation for deeper long-term change.

Sustainability emerged as both a key strength and a critical risk area. The technical design of percolation wells is durable and inherently low-maintenance, and institutional ownership by government departments and large campuses provides a strong basis for continuity. However, sustainability is constrained by inconsistent maintenance practices, limited community ownership, and unclear long-term responsibility frameworks. While stakeholders expressed willingness to contribute time, skills, and knowledge, financial responsibility for maintenance is largely expected to rest with formal institutions. Strengthening institutionalised maintenance systems, knowledge transfer mechanisms, and policy integration will therefore be essential to sustaining benefits over time.

Overall, the assessment demonstrates that the One Billion Drops initiative has laid a **strong foundation for scalable, inclusive, and nature-based urban water management**. Its future success will depend on transitioning from site-level implementation to catchment-level planning, strengthening post-construction governance and maintenance systems, institutionalising scientific monitoring, and embedding the approach within broader urban water policies. With continued CSR engagement and strategic partnerships with government, communities, and technical institutions, OBD has the potential to evolve from a successful intervention into a replicable model for long-term groundwater resilience in Indian cities.

## Key Priorities and Going Forward

Building on these findings, future phases of the initiative should prioritize scaling interventions at the catchment or ward level to maximize cumulative recharge and stormwater management benefits. Strengthening post-construction maintenance systems through clearer handover protocols, defined institutional responsibilities, and integration into routine park and campus maintenance processes will be critical for sustaining performance.

In parallel, institutionalising scientific monitoring through baseline and periodic groundwater and soil-moisture assessments at select sites will strengthen evidence generation and support adaptive management. Community awareness and engagement can be further enhanced by improving on-site visibility, using parks as demonstration spaces, and working with resident associations and local institutions to foster shared stewardship. Continued capacity building for construction and maintenance personnel, alongside stronger alignment with municipal water and stormwater policies, will be essential for long-term sustainability. Strategic CSR partnerships can play a catalytic role in supporting scale, strengthening systems, and embedding the OBD model within Bengaluru's broader urban water management framework.

## Limitations of the Study

While this impact assessment provides valuable insights into the outcomes and implementation of the One Billion Drops initiative, certain contextual considerations should be kept in mind when interpreting the findings. Stakeholder engagement was undertaken across multiple groups, though participation from government officials and resident associations was more limited due to competing priorities, resulting in a narrower view of policy-level planning and collective maintenance dynamics. Despite efforts toward gender-inclusive participation, women were underrepresented, reflecting broader patterns in public infrastructure engagement and indicating the need for deeper exploration of women's perspectives in future studies. These aim to present the reliance on perception-based data in the absence of baseline and longitudinal hydrological measurements highlights the importance of continued monitoring to strengthen long-term impact attribution.

## Snapshots from field



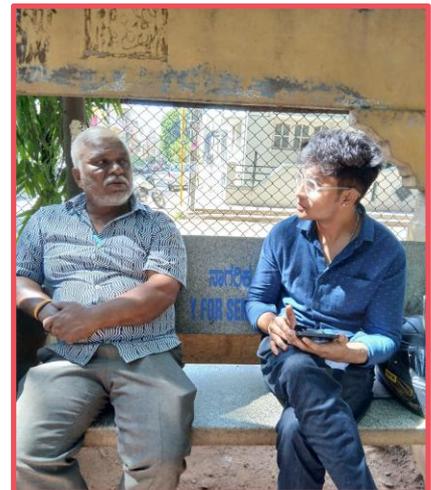
Construction of percolation wells



Launch in Lal Bagh Park, Bangalore



Percolation wells with Warli Art



Field data collection conducted by LEAD at Krea University

## Bibliography

Abraham, M., & Mohan, S. (2015). Effectiveness of artificial recharge structures in enhancing groundwater storage: A case study. *Indian Journal of Science and Technology*, 8(20).

<https://doi.org/10.17485/ijst/2015/v8i20/81596>

Agriculture Institute. (n.d.). *Using percolation tanks for groundwater recharge*.

<https://agriculture.institute/water-harvesting-conservation-utilisation/using-percolation-tanks-groundwater-recharge/>

Earth.org. (n.d.). *Global water crisis: Why the world urgently needs water-wise solutions*.

<https://earth.org/global-water-crisis-why-the-world-urgently-needs-water-wise-solutions/>

Kanannavar, P. S., Premanand, B. D., Madolli, M., Gaddanakeri, S. A., & Vijaykumar, C. (2023). Rainwater harvesting through point recharge method for efficient recharge of tube wells for sustainable management of groundwater resources in Karnataka. *International Journal of Environment and Climate Change*, 13(5), 46–52. <https://doi.org/10.9734/IJECC/2023/v13i51744>

NITI Aayog. (2019). *Composite Water Management Index (CWMI)*. Government of India.

Rainy Filters. (n.d.). *Groundwater recharge*. <https://www.rainyfilters.com/about-us/blogs/ground-water-recharge>

Ranjan, A., Sharma, H., Dutta, A., & Prasad, G. (2025). Artificial groundwater recharge in watershed projects: Technologies and effectiveness. *International Journal for Research in Applied Science & Engineering Technology*, 13(7). <https://doi.org/10.22214/ijraset.2025.73144>

Sedai, A. K. (2021). *Who benefits from piped water in the house? Empirical evidence from a gendered analysis in India* (ADB Working Paper No. 1273). Asian Development Bank Institute.

Well Labs. (2020). *How communities can monitor their water future*. <https://welllabs.org/how-communities-can-monitor-water-future/>

World Bank. (2024). *Water overview*. <https://www.worldbank.org/en/topic/water/overview>

## Annexure - 1: Distribution of respondents across the park covered during the survey

Park Name	Number of Wells	Role of respondents		
		Residents	Maintenance	Construction
16th Main Park J.P Nagar	6	2		
Ayyappa Temple back side Park	28	2		
Ayyappa Temple Park 1	84	2	2	
Banana Park	6	3		
Bengaluru one Park	45	2	1	
Bhagath Singh Park	12	2	1	
Bommanahalli Horticulture Farmhouse	60		2	
Chakra Park	14	2		
Forest Park	72	3	1	
Dollars Colony Park	15	2	1	
Ganesh Park	52	3	1	
Govt Hospital park Singasandra	39	2	1	
Hopcoms Park J.P Nagar	8	1	1	
Jodi Park	20	3	1	
Koramangala Post Office Ground	21	3		
Lawrence School Park	28	3	1	
Mico Layout Park (N S Palya Park )	18	1	1	
Lakshmidevi park	30		2	
Nandanavana Park	24	2	1	
Niligiri park/Krishana park	32	3	1	
Poornapragna 49th Cross Park	38	1	1	
Police station back back side park	15	2	1	
Patyangiri Park	12	2	1	
Poornapragna Amruth Park	16	1	1	
Poornapragna park no 16	18	2		
Poornapragna park	14		1	
Thungabadra Park	16	1	1	

Shantiniketan Tank Park	22		2	
Swachagraha Kalika Kendra	230	3	1	19
Ugrappa Park/Swabimana park	150	2	1	
Vrukasha vana Park	36	2	1	
Veera Yodhara Vana Park	117		3	
<b>Total</b>	<b>1298</b>	<b>57</b>	<b>32</b>	<b>19</b>

## Annexure 2: List of qualitative stakeholders covered during the survey

Qualitative tool used	Role	Stakeholder group	Communication type
Key Informant Interview (KII)	Police Officer, KSRP 9th Battalion	Government officials/ subject experts	In-person
	Deputy Director Lal Bagh Botanical Garden	Government officials/ subject experts	In-person
	Superintendent BBMP Horticulture Department	Government officials/ subject experts	In-person
In-depth Interview (IDI)	Private Employee in Bangalore	Resident Association Member	Online (telephonic)
	Private Employee in Bangalore	Resident Association Member	Online (telephonic)
	Program Implementation, United Way	United Way Bangalore (Implementation Partner)	Online
	Field Coordinator, United Way	United Way Bangalore (Implementation Partner)	Online
	Head-CSR	Mphasis Foundation, Bangalore	Online
	Assistant Manager, CSR	Mphasis Foundation, Bangalore	Online



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