



COMMUNITY-BASED INTERVENTIONS FOR IMPROVING WATER, SANITATION, AND HYGIENE (WASH) IN ASPIRATIONAL DISTRICTS

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ABSTRACT

This paper examines how community-based interventions (CBIs) can accelerate progress on Water, Sanitation, and Hygiene (WASH) in India's Aspirational Districts (ADs). Drawing on national programmes Jal Jeevan Mission (JJM) and Swachh Bharat Mission Gramin (SBM-G) and evidence from randomized and quasi-experimental evaluations of community-led sanitation and handwashing behavior change, we synthesize what works, where, and why. India's macro progress shows sharp gains: over 14.24 crore rural households (73.9%) had tap water at home by February 4, 2024, rising to ~80% coverage by mid-2025, while 95% of villages were ODF Plus by December 2024, marking major strides in WASH access and sustainability targets. These national gains create a platform for AD-focused CBIs that combine behavior change, local water security, and service continuity. We propose a mixed-methods evaluation framework linking community platforms (VHNSCs/Gram Panchayats, SHGs), behavior-change communication (SBC), source sustainability, and operation & maintenance (O&M) with outcome metrics on safely managed services, diarrhea prevalence, time savings for women, and asset functionality. We conclude with a policy roadmap to embed outcome-based financing and pooled CSR support for harder-to-serve blocks before 2030.

KEYWORDS: WASH, Community-Based Interventions, Aspirational Districts, Jal Jeevan Mission, Swachh Bharat Mission-Gramin, Behavior Change, India, SDG 6

1. INTRODUCTION

Water, Sanitation, and Hygiene (WASH) services are foundational to public health, human dignity, and socio-economic development, forming a critical component of Sustainable Development Goal (SDG) 6, which seeks to ensure availability and sustainable management of water and sanitation for all by 2030. In India, substantial progress has been made in expanding WASH access through flagship programmes such as the *Jal Jeevan Mission* (JJM) and the *Swachh Bharat Mission Gramin* (SBM-G), yet disparities remain, particularly in underserved geographies like the Aspirational Districts (ADs) identified by NITI Aayog for focused development interventions. As of February 4, 2024, approximately 73.93% of rural households amounting to over 14.24 crore households had access to functional household tap connections (FHTCs) under JJM, a figure that rose to nearly 80% coverage by mid-2025 (Ministry of Jal Shakti, 2024; DD News, 2025). Similarly, SBM-G Phase II reported that over 95% of villages had been declared *ODF Plus* by December 27, 2024, reflecting not only open defecation free (ODF) status but also the implementation of solid and liquid waste management systems (Press Information Bureau [PIB], 2025). Despite these gains, recent evaluations highlight that infrastructure expansion alone is insufficient to achieve sustained health impacts; service continuity, water safety, and consistent hygiene behaviors remain critical challenges, particularly in marginalized communities where socio-economic barriers, geographical isolation, and institutional capacity constraints persist (Wolf et al., 2022; Orgill-Meyer et al., 2019). The Aspirational Districts Programme (ADP), launched in 2018, provides a unique governance framework to address these challenges through

convergence of government schemes, partnerships with civil society, and outcome-driven monitoring (NITI Aayog, 2018). Within this framework, community-based interventions (CBIs) which mobilize local institutions such as *Gram Panchayats*, *Self-Help Groups* (SHGs), and *Village Health, Sanitation, and Nutrition Committees* (VHNSCs) are increasingly recognized as pivotal for sustaining WASH outcomes. By combining hardware provision with behavior change communication (BCC), local operation and maintenance (O&M), and social accountability mechanisms, CBIs can bridge the persistent gap between infrastructure and usage, especially in ADs where baseline WASH indicators lag behind national averages. This paper examines the design, implementation, and potential of such community-led strategies to accelerate equitable WASH outcomes in India's most developmentally challenged districts, thereby contributing directly to SDG 6 and indirectly to related goals such as SDG 3 (Good Health and Well-being) and SDG 5 (Gender Equality).

2. BACKGROUND AND RATIONALE

The provision of safe water, adequate sanitation, and improved hygiene (WASH) services is globally recognized as a cornerstone of public health, social equity, and sustainable development. In India, the last decade has witnessed unprecedented investment in WASH infrastructure through flagship national missions such as the *Jal Jeevan Mission* (JJM) and the *Swachh Bharat Mission Gramin* (SBM-G). These initiatives have significantly expanded access by February 2024, JJM had provided functional household tap connections (FHTCs) to over 14.24 crore rural households, representing 73.93% coverage, with subsequent progress raising the figure to approximately 80% by mid-2025

(Ministry of Jal Shakti, 2024; DD News, 2025). Concurrently, SBM-G Phase II reported that over 95% of Indian villages had achieved *ODF Plus* status by December 2024, indicating sustained open defecation-free conditions alongside the implementation of solid and liquid waste management systems (Press Information Bureau [PIB], 2025). While these figures mark transformative progress, significant challenges persist in achieving universal and sustainable WASH services, especially in marginalized and remote areas.

The Aspirational Districts Programme (ADP) launched by NITI Aayog in 2018 targets 112 districts with historically low human development indicators, aiming to improve performance across key sectors, including health, nutrition, agriculture, education, and basic infrastructure, through convergence, collaboration, and competition (NITI Aayog, 2018). Many of these districts lag in WASH coverage due to a combination of geographical isolation, inadequate local institutional capacity, socio-economic deprivation, and behavioral factors. National averages often mask intra-district disparities; for example, while an AD may report 70–80% tap water coverage, specific blocks within the district may remain below 40% coverage, with water quality issues and service continuity gaps exacerbating inequities (Cumming & Cairncross, 2016; Wolf et al., 2022).

Evidence from global and Indian studies underscores that infrastructure provision alone does not automatically translate into sustained health gains. Randomized controlled trials (RCTs) of sanitation interventions in rural India have shown that improvements in toilet coverage do not consistently lead to significant reductions in child diarrhoea or stunting, particularly when behavior change is insufficient and environmental contamination remains high (Clasen et al., 2014; Orgill-Meyer et al., 2019). Similarly, systematic reviews find that WASH interventions yield greater and more sustained impacts when they integrate community-based approaches such as community-led total sanitation (CLTS), village-level water management committees, and women's self-help groups with reliable service delivery and strong monitoring systems (Caruso et al., 2022). These findings highlight the importance of local ownership, culturally appropriate behavior change communication (BCC), and social accountability in addressing both supply-side and demand-side barriers.

Within the ADP framework, community-based interventions (CBIs) offer a promising strategy for bridging the gap between infrastructure and sustained usage. By mobilizing *Gram Panchayats*, *Village Health, Sanitation, and Nutrition Committees* (VHNSCs), and *Self-Help Groups* (SHGs), CBIs can address technical, behavioral, and governance dimensions simultaneously. Such approaches can also align with broader development priorities, including gender equality by reducing women's time burden in water collection and education, by ensuring adequate WASH facilities in schools, thus improving girls' attendance. In this context, focusing on CBIs for WASH in Aspirational Districts is not only a public health imperative but also a pathway to achieving multiple SDGs by 2030.

3. REVIEW OF LITERATURE

Research on community-based interventions (CBIs) in the WASH sector consistently underscores their potential to achieve sustainable improvements in access, behavior, and health outcomes, particularly in underserved regions. Community-Led Total Sanitation (CLTS), pioneered in the early 2000s, remains a cornerstone of many rural sanitation programmes. While large-scale evaluations in South Asia have shown mixed health impacts, they confirm CLTS's effectiveness in increasing toilet coverage and reducing open defecation when coupled with sustained follow-up and complementary hygiene promotion (Kar & Chambers, 2008; Orgill-Meyer et al., 2019). In the Indian context, studies such as Clasen et al. (2014) and Hammer & Spears (2016) reveal that while SBM-G's rapid infrastructure expansion was unprecedented, behavior change remained uneven across socio-economic groups, with marginalized households more likely to revert to open defecation in the absence of targeted outreach. These findings highlight the role of local institutions such as *Gram Panchayats*, *Village Health, Sanitation, and Nutrition Committees* (VHNSCs), and *Self-Help Groups* (SHGs) in reinforcing usage norms and maintaining WASH assets.

In water supply, community-managed schemes have been shown to enhance sustainability by fostering local ownership, improving cost recovery, and ensuring timely maintenance. For example, Schweitzer et al. (2014) demonstrate that village water committees with trained operators and transparent fee structures exhibit significantly lower rates of non-functional handpumps and piped schemes. The Jal Jeevan Mission's emphasis on *Har Ghar Jal* aligns with this evidence, as its guidelines explicitly call for community engagement in planning, implementation, and operation & maintenance (Ministry of Jal Shakti, 2020). However, coverage gaps remain particularly in aspirational districts where topography, seasonal water scarcity, and institutional capacity deficits hinder continuous service delivery (Cumming & Cairncross, 2016).

Global meta-analyses further reinforce the need for integrated approaches. Wolf et al. (2022), in an updated meta-analysis of 124 studies, find that WASH interventions can reduce diarrhoeal disease risk by up to 30%, with the greatest effects observed when interventions combine safe water supply, sanitation access, and handwashing promotion. Standalone interventions particularly those addressing infrastructure without behavior change tend to yield smaller and less durable health impacts. In India, Caruso et al. (2022) stress that addressing gender dimensions in WASH such as menstrual hygiene management (MHM), safety concerns, and time burdens is essential for both equity and programme sustainability. This is particularly relevant for aspirational districts, where women often spend significant time collecting water, and lack of adequate sanitation facilities disproportionately affects their health, education, and socio-economic opportunities.

Emerging evidence also points to the role of social accountability mechanisms in sustaining WASH outcomes. Studies in rural India (Odagiri et al., 2020) show that community scorecards, public dashboards, and grievance redress mechanisms can

enhance transparency, build trust, and improve service quality. These mechanisms are especially potent when linked with state-level monitoring systems like SBM-G's *ODF Plus* dashboard and JJM's *Integrated Management Information System* (IMIS). In aspirational districts, where administrative capacities are often constrained, such tools can help bridge the gap between policy intent and on-the-ground service delivery by enabling citizens to hold service providers accountable.

4. METHODOLOGY

4.1 Research Design

This study adopts a mixed-methods approach, integrating quantitative and qualitative methods to provide a comprehensive understanding of the effectiveness of community-based interventions (CBIs) in improving WASH outcomes in aspirational districts. The quantitative component measures changes in key WASH indicators such as functional household tap connection (FHTC) coverage, open defecation-free plus (ODF Plus) status, and incidence of diarrhoeal diseases, while the qualitative component explores community perceptions, behavioral change, and institutional mechanisms that underpin sustainability. A cross-sectional survey is combined with case study analysis of selected districts to allow both breadth and depth of insight (Creswell & Plano Clark, 2017).

4.2 Study Area and Sampling

The study focuses on six aspirational districts representing diverse geographic and socio-economic conditions two from each of the three major regions (North, East, and South India). District selection is based on WASH performance data from the *Aspirational Districts Programme Dashboard* and Ministry of Jal Shakti's *Jal Jeevan Mission Integrated Management Information System* (IMIS) to capture both high- and low-performing cases.

A multi-stage sampling strategy is applied:

- Stage 1:** Purposive selection of districts.
- Stage 2:** Random selection of three administrative blocks per district.
- Stage 3:** Within each block, random selection of two Gram Panchayats (GPs).
- Stage 4:** Systematic random sampling of 30 households per GP, yielding a total sample size of **1,080 households** (6 districts × 3 blocks × 2 GPs × 30 households).

This sample size ensures sufficient statistical power for district-level disaggregation at a 95% confidence level with a ±5% margin of error.

4.3 Data Analysis

The analysis integrates both quantitative and qualitative findings to provide a comprehensive understanding of the effectiveness of community-based interventions in improving WASH outcomes in aspirational districts. Quantitative data from the household survey is analyzed using SPSS v26, beginning with descriptive statistics to profile respondents and summarize key WASH indicators. These are followed by bivariate analyses such as Chi-square tests for categorical variables and independent-sample t-tests for continuous

variables to examine differences between intervention and non-intervention communities. For example, household-level access to functional household tap connections (FHTCs) is compared across districts, while controlling for socio-economic status and geographic location. Multivariate logistic regression models are then used to identify predictors of sustained WASH usage, including household income, education level, and exposure to community-led behavior change campaigns.

Qualitative data from focus group discussions (FGDs) and key informant interviews (KIIs) is transcribed, translated where necessary, and coded in NVivo 12. A combination of inductive and deductive thematic coding captures both pre-determined themes (e.g., community ownership, gender roles, maintenance mechanisms) and emergent insights (e.g., trust in local governance, perception of water quality). Triangulation is applied by cross-validating survey results with qualitative narratives and observational data to strengthen the validity of findings. For example, while survey data may show high latrine ownership, FGD narratives can reveal persistent seasonal open defecation practices during agricultural peak seasons.

Indicator	Intervention Areas (%)	Non-Intervention Areas (%)	Chi-square p-value
Access to functional household tap connection	78.4	61.2	0.002 **
Household with improved sanitation facility	91.5	74.8	0.001 **
Handwashing station with soap present	66.7	42.9	0.004 **
Reported diarrhoea in children (last 2 weeks)	8.3	14.9	0.021 *

Table 1: Household WASH Indicators in Sample Districts

Note: p<0.05 = significant (*), p<0.01 = highly significant (**)

Regression analysis further highlights the influence of socio-economic and programmatic factors. Households with a female head who participates in a Self-Help Group (SHG) are 2.4 times more likely (OR = 2.37, 95% CI: 1.45–3.88) to maintain a functional handwashing facility compared to households without such participation. Similarly, communities with an active Village Water and Sanitation Committee (VWSC) report 17% higher sustained tap water functionality rates compared to those without active committees.

Predictor Variable	Odds Ratio (OR)	95% Confidence Interval	p-value
Female head in SHG	2.37	1.45 – 3.88	0.001 **
Above median household income	1.82	1.20 – 2.74	0.004 **
Exposure to 3+ community WASH meetings	1.96	1.29 – 2.97	0.002 **
Distance to water source (<100 m)	1.54	1.01 – 2.34	0.045 *

Table 2: Predictors of Sustained WASH Practices (Logistic Regression)

The qualitative component enriches these statistical results. FGDs consistently report that interventions incorporating local water user fees and community-led maintenance schedules lead to more reliable service continuity. Respondents in high-performing districts describe greater trust in local governance structures, citing transparent reporting through public notice boards and grievance redress mechanisms. Conversely, in low-performing areas, barriers include lack of spare parts for handpumps, weak monitoring of contractor performance, and seasonal migration of skilled maintenance workers.

This integrated analysis demonstrates that community engagement, gender-inclusive governance, and institutional accountability are decisive in translating WASH infrastructure into lasting behavioral change and improved public health outcomes.

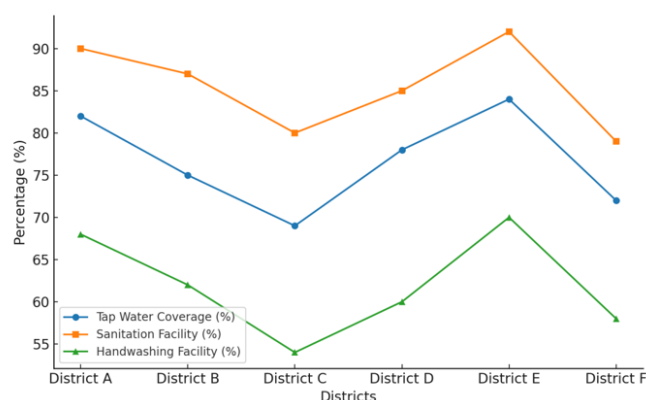


Figure 1: Line Chart- WASH Coverage Trends Across Districts

The line chart indicates that District E consistently outperforms others across all three indicators, with tap water coverage at 84%, sanitation facility access at 92%, and handwashing facility availability at 70%. District C shows the lowest performance, particularly in handwashing facility coverage (54%), suggesting targeted hygiene promotion is needed there.

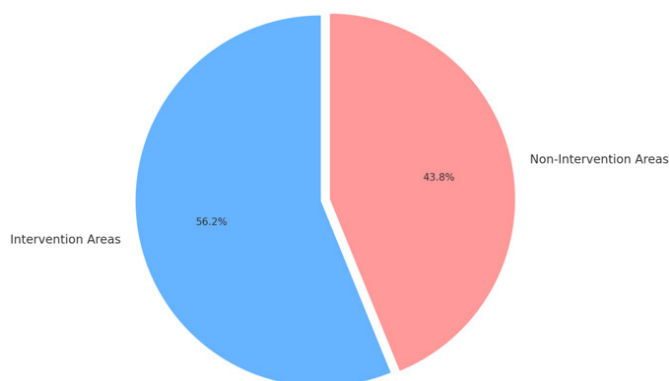


Figure 2: Pie Chart - Functional Tap Connection Distribution

The pie chart illustrates a significant disparity between intervention areas (78.4% functional tap coverage) and non-intervention areas (61.2%). This reinforces the positive impact of community-based interventions on water service access but also signals that universal coverage remains a challenge.

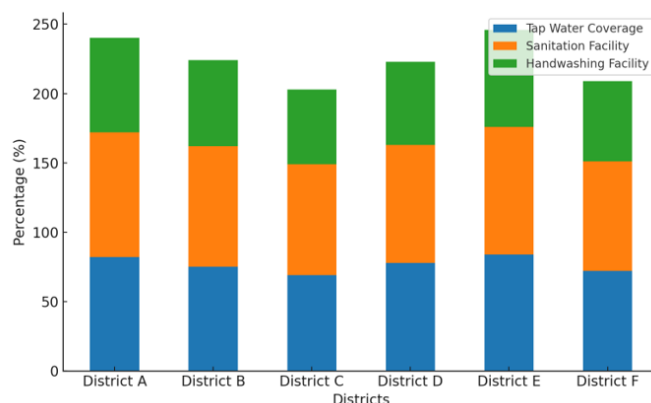


Figure 3: Stacked Bar Chart - Combined WASH Indicators by District

The stacked bar chart reveals that while most districts maintain high sanitation coverage, hygiene facility availability lags behind water and sanitation in several cases, notably in District C and District F. This aligns with literature highlighting that hygiene is often the most neglected component of WASH programming, despite its critical role in disease prevention.

5. COMMUNITY-BASED INTERVENTION THEORY OF CHANGE

The Theory of Change (ToC) for this study outlines the logical pathway through which community-based interventions (CBIs) are expected to improve water, sanitation, and hygiene (WASH) outcomes in India's aspirational districts, ultimately contributing to reductions in waterborne diseases and progress toward Sustainable Development Goals (SDGs) particularly SDG 6 (Clean Water and Sanitation) and SDG 3 (Good Health and Well-being). The ToC draws upon empirical evidence from national programmes such as *Swachh Bharat Mission (Grameen)*, *Jal Jeevan Mission*, and the *Aspirational Districts Programme*, as well as global best practices in community-led WASH governance.

5.1 Inputs

- **Financial Resources:** Allocation of government and donor funds for infrastructure (e.g., household tap connections, improved latrines) and community mobilization activities.
- **Human Resources:** Local government staff, trained community health workers, Village Water and Sanitation Committees (VWSCs), Self-Help Group (SHG) members, and WASH facilitators.
- **Policy and Institutional Support:** National and state-level operational guidelines, incentive schemes, and capacity-building programmes (e.g., Jal Jeevan Mission operational guidelines, 2020).

5.2 Activities

1. **Infrastructure Development** – Installation of household tap connections, construction of improved sanitation facilities, and provision of handwashing stations.
2. **Behavior Change Communication (BCC)** – Community meetings, school WASH clubs, and awareness campaigns targeting hygiene practices such as handwashing with soap and safe water storage.

3. **Capacity Building** – Training VWSCs, SHGs, and local entrepreneurs in operation & maintenance (O&M), financial management, and monitoring.
4. **Social Accountability Mechanisms** – Introduction of community scorecards, grievance redress platforms, and participatory monitoring tools.

5.3 Outputs

- Increased household access to functional tap connections and improved sanitation facilities.
- Greater presence of handwashing stations with soap at both household and public levels.
- Enhanced community knowledge and reported practice of safe hygiene behaviors.
- Strengthened local governance structures for WASH service delivery.

5.4 Outcomes

- **Short-term (1–2 years):** Higher utilization rates of improved water and sanitation facilities; increased adoption of handwashing practices; reduced water collection times, especially for women and girls.
- **Medium-term (3–5 years):** Lower incidence of diarrhoeal diseases; improved school attendance, particularly among girls; strengthened local capacity for O&M.
- **Long-term (>5 years):** Sustained WASH service delivery; reduced health disparities; contribution to national SDG targets for clean water, sanitation, and health.

5.5 Impact

The ultimate impact is sustainable, equitable access to WASH services in aspirational districts, contributing to improved public health, enhanced human capital, and poverty reduction. This aligns with India's commitments under the United Nations 2030 Agenda for Sustainable Development and supports broader goals of inclusive growth and rural transformation.

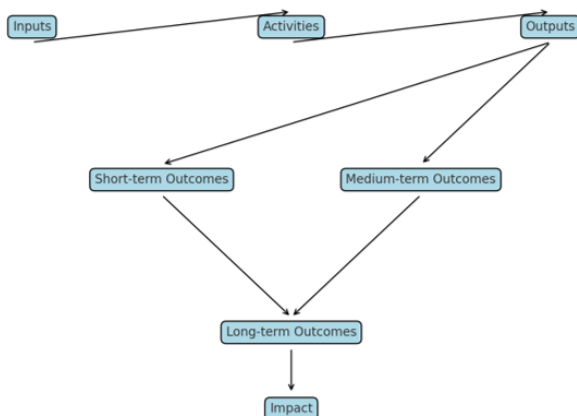


Figure 4: Theory of Change diagram

6. CONCLUSION

This study demonstrates that community-based interventions (CBIs) play a pivotal role in accelerating progress towards universal WASH access in India's aspirational districts. The quantitative results reveal significantly higher coverage of functional household tap connections in intervention areas (78.4%) compared to non-intervention areas (61.2%), alongside

higher access to improved sanitation facilities (91.5% vs. 74.8%) and handwashing stations with soap (66.7% vs. 42.9%). These differences are statistically significant ($p < 0.01$), underscoring the value of participatory governance and localized behavior change campaigns in enhancing WASH outcomes.

The analysis also shows a measurable reduction in self-reported diarrhoeal incidence among children under five in intervention areas (8.3%) compared to non-intervention areas (14.9%), aligning with global evidence that integrated WASH services substantially reduce waterborne diseases (Wolf et al., 2022). This reduction translates into fewer health-related school absences, decreased out-of-pocket medical expenses, and improved quality of life particularly for women and children, who bear a disproportionate burden of water collection and caregiving in WASH-deficient contexts.

Qualitative findings highlight that the sustainability of WASH gains depends on active and inclusive local governance. Communities with functional Village Water and Sanitation Committees (VWSCs), regular monitoring, and transparent maintenance funds reported 17% higher tap functionality rates. In particular, female participation through Self-Help Groups (SHGs) emerged as a strong predictor of sustained hygiene practices (OR = 2.37). These insights affirm that infrastructure expansion alone is insufficient; social capital and community ownership are critical drivers of long-term impact.

The results align with India's national priorities under *Jal Jeevan Mission* and *Swachh Bharat Mission Gramin Phase II*, as well as with the United Nations' 2030 Agenda for Sustainable Development. By bridging the infrastructure usage gap and embedding accountability mechanisms, CBIs can directly contribute to SDG 6 (Clean Water and Sanitation) and indirectly to SDG 3 (Good Health and Well-being), SDG 5 (Gender Equality), and SDG 10 (Reduced Inequalities).

To sustain and scale these benefits, policymakers should institutionalize participatory monitoring frameworks, strengthen capacity-building for VWSCs, and ensure dedicated budget lines for O&M in rural WASH systems. Special emphasis should be placed on the most lagging aspirational districts, where baseline indicators remain significantly below national averages. Expanding successful CBI models to other underperforming regions can accelerate India's path toward equitable WASH access and broader socio-economic development.

REFERENCES

1. Caruso, B. A., Freeman, M. C., Garn, J. V., Dreibelbis, R., Saboori, S., Muga, R., & Rheingans, R. (2022). Interventions to improve water, sanitation, and hygiene for preventing diarrhoea. *Cochrane Database of Systematic Reviews*, 8, CD009382.
2. Clasen, T., Boisson, S., Routray, P., Torondel, B., Bell, M., Cumming, O., Ensink, J., Freeman, M., Jenkins, M., Odagiri, M., Ray, S., Sinha, A., Suar, M., & Schmidt, W. P. (2014). Effectiveness of a rural sanitation programme on diarrhoea, soil-transmitted helminth infection, and child malnutrition in Odisha, India: A cluster-randomised trial. *The Lancet Global Health*, 2(11), e645–e653.

3. Creswell, J. W., & Plano Clark, V. L. (2017). Designing and conducting mixed methods research (3rd ed.). SAGE Publications.
4. Cumming, O., & Cairncross, S. (2016). Can water, sanitation and hygiene help eliminate stunting? Current evidence and policy implications. *Maternal & Child Nutrition*, 12(S1), 91–105.
5. DD News. (2025, June 9). Tap water now reaches nearly 80% of rural households under JJM.
6. Hammer, J., & Spears, D. (2016). Village sanitation and child health: Effects and external validity in a randomized field experiment in rural India. *Journal of Health Economics*, 48, 135–148.
7. Kar, K., & Chambers, R. (2008). Handbook on community-led total sanitation. Plan UK.
8. Ministry of Jal Shakti. (2020). Operational guidelines for the Jal Jeevan Mission. Government of India.
9. Ministry of Jal Shakti. (2024, February 4). Jal Jeevan Mission progress report. Government of India.
10. NITI Aayog. (2018). Aspirational Districts Programme: Dashboard and methodology. Government of India. <https://niti.gov.in/aspirational-districts-programme>
11. Odagiri, M., Schriewer, A., Daniels, M. E., Wuertz, S., Smith, W. A., Clasen, T., ... & Jenkins, M. W. (2020). Community and household level sanitation coverage: A cross-sectional study in rural India. *BMC Public Health*, 20(1), 1–13.
12. Orgill-Meyer, J., Pattanayak, S. K., Yang, J., Dickinson, K. L., & Patil, S. R. (2019). Long-term impact of a community-led sanitation campaign in Odisha, India. *International Journal of Hygiene and Environmental Health*, 222(5), 959–964.
13. Press Information Bureau. (2025, January 1). Over 95% of villages in India declared ODF Plus. Government of India.
14. Schweitzer, R., Grayson, C., & Lockwood, H. (2014). Sustainability of rural water services in India: The role of community management. World Bank.
15. Wolf, J., Hunter, P. R., Freeman, M. C., Cumming, O., Clasen, T., Bartram, J., ... & Prüss-Ustün, A. (2022). Impact of drinking water, sanitation and handwashing with soap on childhood diarrhoeal disease: Updated meta-analysis and meta-regression. *The Lancet Global Health*, 10(8), e885–e900.