



The SafePani model: Delivering safe drinking water in schools and healthcare centres in Bangladesh



Story of change: Key findings & emerging impacts

Summary

- Availability of safe drinking water services is a major concern for schools and healthcare centres in rural Bangladesh.
- Administrators of rural schools and healthcare centres are responsible for the operation and maintenance of water supply infrastructure but often lack the financial and technical capacity for timely repair and maintenance activities.
- There is no provision for monitoring water quality post installation of infrastructure with health risks from bacteriological contamination (e.g. *E. coli*) and other hazards (salinity, arsenic, manganese).
- The SafePani model aims to reform existing institutional design and move towards a professional water service delivery model, with timely and independently verified performance metrics unlocking results-based funding.
- Pilot work in 171 schools and 33 healthcare centres Khulna district since 2021 has demonstrated that the SafePani model can a) improve water safety, through regular monitoring and remedial actions upon detection of contamination, particularly *E. coli*; b) ensure timely maintenance and repair of waterpoints within 48 hours of reported breakdowns; and c) be cost effective with estimated costs at <Tk 100 (USD 1) per student/patient per year.

Photo by Lutfor Rahman

📍 Khulna, Bangladesh



- In partnership with the Government of Bangladesh and HYSAWA, work is in progress to upscale the SafePani model to all 1700 schools and 300 healthcare centres in Khulna district.

Introduction

Rural water service delivery in Bangladesh involves a decentralised institutional arrangement. Local government institutions are responsible for the installation of water supply systems with centrally allocated funds from the national budget, alongside donor-funded projects.

Infrastructure financing gaps, particularly in hydrogeologically constrained areas where tubewells are unsuitable, have resulted in social and spatial inequalities in water access. A 2022 REACH survey of 1700 schools in Khulna district found tubewells and rainwater harvesting to be the main sources of drinking water, with 15% of schools having no drinking water sources on premises (Figure 1).

Continued reliance on a community-based management model jeopardises operational and financial sustainability of service delivery, with no provision for monitoring water safety post installation of infrastructure.

In rural schools, individual administrators bear these responsibilities. Limited funds, training, time, and autonomy can hinder timely repair and maintenance of waterpoints and pose uncertain water quality risks.

Existing sources of data, from infrequent nationally representative surveys, waterpoint mappings and project-based water quality monitoring, are inadequate for monitoring the SDG indicators of access, quality, quantity, reliability, affordability, and non-discrimination.

To address the expanded focus of SDG 6.1, REACH has been working with UNICEF and the Local Government Division (LGD) of the Government of Bangladesh to design and pilot a revised institutional model for rural water service delivery with a focus on schools and healthcare centres. The 'SafePani' model aims to strategically leverage public and private funds for operation and maintenance of rural water systems, with timely and accurate information systems to support independent monitoring and regulation of water service delivery.

Designing the SafePani model for rural water service delivery

In October 2019, REACH signed a two-year Partnership Cooperation Agreement (PCA) with UNICEF to co-design a new institutional model for rural water service delivery. The model proposes reforms of the 1998 National Water Supply and Sanitation Policy, which is currently being revised by the Government of Bangladesh.

Through UNICEF's longstanding role as a technical support partner in the country's WASH sector, REACH has established strong connections with key government offices, including the Department for Public Health and Engineering (DPHE), the Policy Support Branch of the Local Government Division (LGD), the Directorate of Primary Education (DPE), and the Directorate of Secondary and Higher Education (DSHE).

The SafePani model (Figure 2) emerged from collaboration between REACH, UNICEF and government stakeholders, drawing on the scientific evidence from REACH research in the Coastal Water Security Observatory in Khulna district since 2016 (Hoque, 2021, Roman et al., 2021, Hoque and Hope, 2020, Hoque and Hope, 2018).

The SafePani model proposes reforms in three areas:

- **Institutional reform** involves clarification of roles and responsibilities allocated from national to local levels. Service delivery models can be designed to network infrastructure at the right operational and political level, with a contractual mandate enforced by independent regulation.
- **Information systems** will support regulation by monitoring timely and accurate information of safety, functionality, and affordability of water services.

- **Sustainable finance** will advance how to combine public and private resources with new sources of results-based funding to address the increased costs of delivering higher level services.

The SafePani model was formally launched in February 2020 through a national-level stakeholder workshop with LGD, DPHE, DPE, and DSHE, followed by a district-level workshop chaired by the Deputy Commissioner (DC) of Khulna district and representatives from regional and local government offices.

In 2021, the SafePani website was created (www.safepani.org) to host key resources including working papers, briefs and reports.

Figure 1: State of drinking water services in schools in Khulna District.

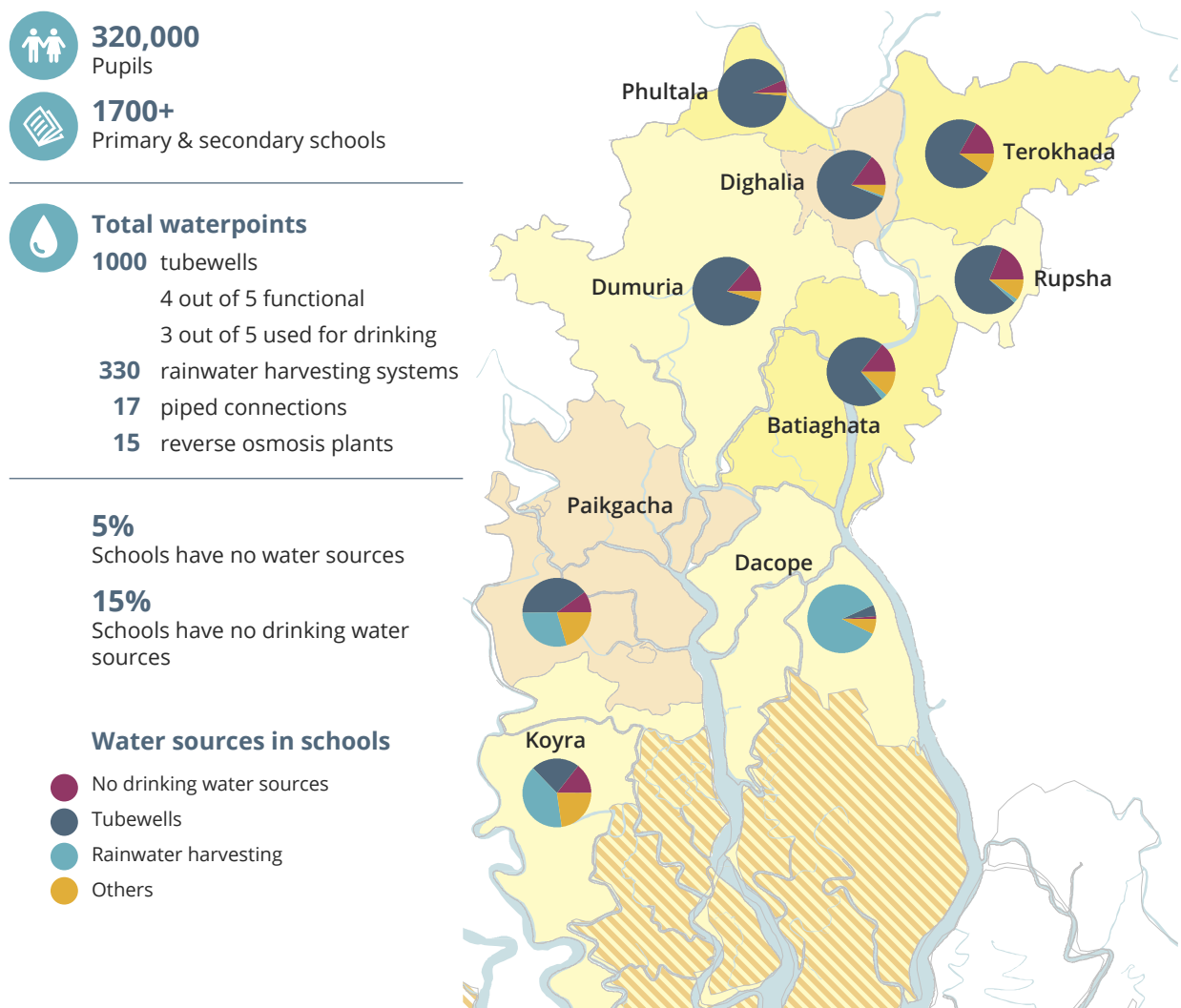
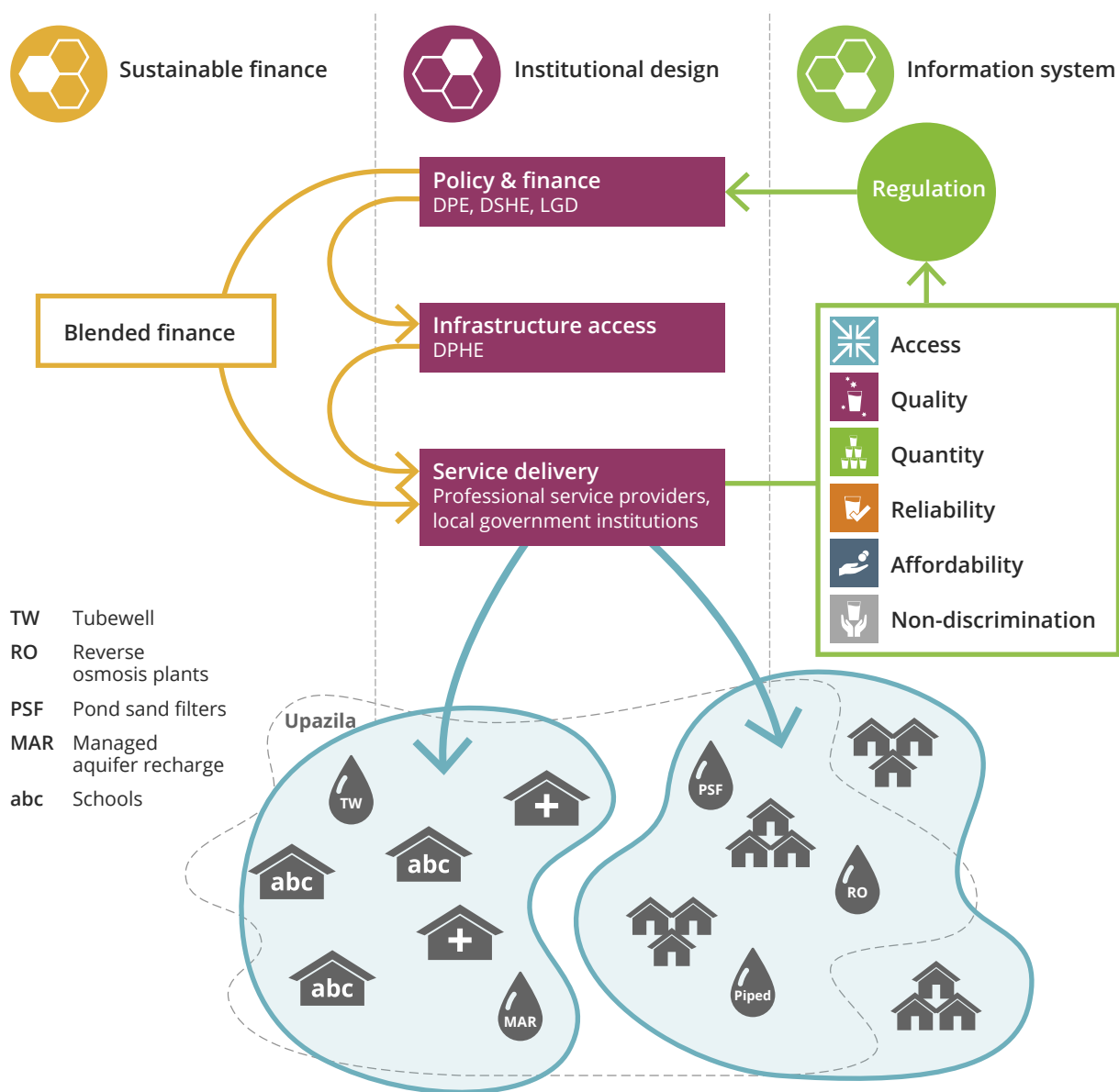


Figure 2: The proposed SafePani model for rural water service delivery in Bangladesh.



- TW Tubewell
- RO Reverse osmosis plants
- PSF Pond sand filters
- MAR Managed aquifer recharge
- abc Schools

Piloting the SafePani model in Khulna district

In May 2021, REACH announced a call for expressions of interest for a two-year pilot implementation of the SafePani model in Khulna district. HYSAWA (a Bangladesh-registered non-profit organisation, www.hysawa.org) was selected from a pool of five other applicants with good track record in the WASH sector.

Through the REACH partnership funding scheme, HYSAWA has been contracted to test and build capacity for a professional water service delivery model for rural Bangladesh.

An inception workshop was held in Istanbul, Turkey, with high-level government stakeholders in November 2021 to define the roles and responsibilities of HYSAWA and the National Steering Committee. The pilot phase initially started with four unions (Tier 4 administrative boundary) in December 2021 and later extended to four other unions in Khulna district.

Across these eight unions, HYSAWA is responsible for professional water service delivery in 136 primary schools, 35 secondary schools, 33 community clinics and 4 community schemes (including 3 piped systems and 1 managed aquifer recharge site).

The National Steering Committee, chaired by the Additional Secretary of LGD, and a District Working Group, chaired by the Khulna DC, was formed to discuss progress and next steps through quarterly meetings (see Figure 3).

A Khulna-based SafePani team, comprising a Project Manager, two Engineers, a Water Quality Manager, a Lab Technician, a Performance Manager, a Government Liaison Officer and eight Community Liaison Officers, manage the delivery of professional water services in the pilot unions. A fit-for-purpose water quality laboratory has also been established to analyse physical and microbial parameters.

The SafePani pilot phase comprises three main packages of work.

- a. Rehabilitation and maintenance of all water supply infrastructure, with any reported breakdowns being repaired within 48 hours;
- b. Water safety assessment involving sanitary inspection, baseline tests for arsenic, manganese and chloride, and seasonal tests for *E. coli*, and prompt disinfection of sources upon detection of faecal contamination; and
- c. Development and maintenance of a data storage platform highlighting key performance metrics related to water quality, service reliability, volumetric use, and costs.

Figure 3: Third National Steering Committee Meeting in Khulna in September 2022.



These activities have directly improved water services for 29,000 students, 900 daily outpatients, and 1500 teaching and healthcare staff. Moreover, the rehabilitation of one solar-powered piped scheme that has been non-functional for four years (see Figure 5) and repair work in two other piped schemes have benefited more than 10,000 people.

An online database is being developed to keep track of performance metrics, along with a mobile app to allow waterpoint managers to report breakdown and maintenance events.

With the REACH programme concluding in 2024, the aim is to shift from a donor-funded pilot project to a contracted service delivery mechanism at scale. SafePani 2030 aims to upscale the professional water service delivery model to all 1700 schools and 300 healthcare centres in Khulna district between 2024 and 2030. Scaling the SafePani model to district level will directly benefit more than 320,000 children and thousands of daily outpatients at an estimated cost of USD 350,000 per year, equating to less than USD 1 per student / patient (Ibrahim et al, 2023a, b).

With continued support from high-level government stakeholders, work is in progress to develop a contracting arrangement with financial contributions from the government matched with results-based funding from potential donors. Building on the [Uptime Framework](#) operational in 12 countries across Africa, Asia and Latin America, the professional service delivery contract can include key metrics such as the number of waterpoints working reliably, the volume of water produced, and water quality parameters.

Transition to SafePani 2030

Results from the pilot phase demonstrate that the SafePani model can:

- Improve water safety through clear roles and responsibilities for regular monitoring and remedial actions upon detection of contamination, particularly *E. coli*;
- Ensure timely maintenance and repair of waterpoints within 48 hours of reported breakdowns.

Figure 4: SafePani timeline.

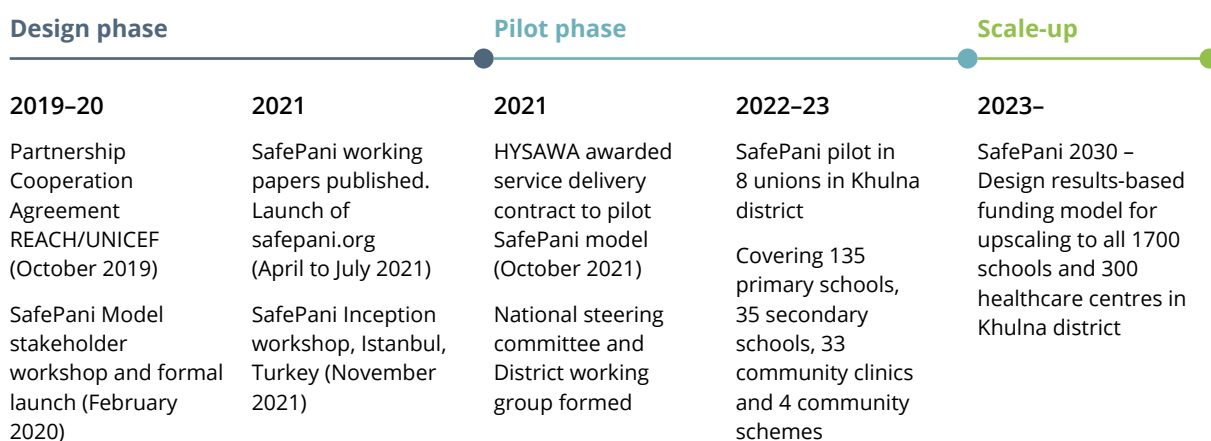


Figure 5: Chairman of Dumuria upazila, Khulna district, inaugurating the rehabilitation of a solar-powered piped water scheme led by the SafePani team in April 2022.



Outputs

Reports / working papers

Ibrahim, M., Islam, K., Hossain, K., Podder, N. K., Khan, T. M. S., Arefin, K. Y., Islam, S., Miah, F. H., Kabir, M. R., Chowdhury, N. A., Ahammed, M.U., Alam, M.M., Osman, N., Islam, R., Rahman, L., McNicholl, D, Hope, R., Charles, K. & Hoque, S.F. (2023). [Cost estimates for safe drinking water in schools and healthcare centres in Khulna District, Bangladesh](#). REACH Briefing Note.

Ibrahim, M., Islam, K., Hossain, K., Podder, N. K., Khan, T. M. S., Arefin, K. Y., Islam, S., Miah, F. H., Kabir, M. R., Chowdhury, N. A., Ahammed, M.U., Alam, M.M., Osman, N., Islam, R., Rahaman, F., McNicholl, D, Hope, R., Hoque, S.F. and Charles, K. (2023). [SafePani: Improving drinking water safety for schools & healthcare centres in Khulna district](#). REACH Briefing Note.

Fischer, A., Hope, R., Thomson, P., Hoque, S.F., Alam, M.M., Charles, K., Achi, N.E., Nowicki, S., Hakim, S.A.I., Islam, M.S., Salehin, M., Bradley, D., Ibrahim, M. & Chowdhury, M.E.H. (2021). [Policy reform to deliver safely managed drinking water services for schools in rural Bangladesh](#). REACH Working Paper 11.



Hope, R., Fischer, A., Hoque, S.F., Alam, M.M., Charles, K., Ibrahim, M., Chowdhury, E.H., Salehin, M., Mahmud, Z.H., Akhter, T., Thomson, P., Johnson, D., Hakim, S.A., Islam, M.S., Hall, J.W., Roman, O., Achi, N.E. & Bradley, D. (2021). [Policy reform for safe drinking water service delivery in Bangladesh](#). REACH Working Paper 9.

Hoque, S.F., Hope, R., Alam, M.M., Charles, K., Salehin, M., Mahmud, Z.H., Akter, T., Fischer, A., Johnson, D., Thomson, P., Zakaria, A., Hall, J.W., Garcia, O.R., Achi, N.E. & Jumlad, M. (2021). [Drinking water services in coastal Bangladesh](#). REACH Working Paper 10.

REACH Programme (2021). [Drinking water quality in Bangladesh 2021 updates – Key findings from the Bangladesh multiple Indicator cluster survey \(MICS\) 2019: Water quality thematic report](#). REACH Briefing Note.

Journal articles

Hoque, S.F. (2021). Socio-spatial and seasonal dynamics of small, private water service providers in Khulna district, Bangladesh. *International Journal of Water Resources Development*, **39** (1): 89–112. doi: [10.1080/07900627.2021.1951179](https://doi.org/10.1080/07900627.2021.1951179)

Hoque, S.F., & Hope, R. (2018). The water diary method – proof-of-concept and policy implications for monitoring water use behaviour in rural Kenya. *Water Policy*, **20** (4): 725–743. doi: [10.2166/wp.2018.179](https://doi.org/10.2166/wp.2018.179)

Hoque, S.F., & Hope, R. (2020). Examining the economics of affordability through water diaries in coastal Bangladesh. *Water Economics and Policy*, **06** (03): 1950011. doi: [10.1142/s2382624x19500115](https://doi.org/10.1142/s2382624x19500115)

Roman, O., Hoque, S.F., Ford, L., Salehin, M., Alam, M.M., Hope, R. & Hall, J.W. (2021). Optimizing rural drinking water supply infrastructure to account for spatial variations in groundwater quality and household welfare in coastal Bangladesh. *Water Resources Research*, **57** (8): e2021WR029621. doi: [10.1029/2021WR029621](https://doi.org/10.1029/2021WR029621)

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Story of change themes



Groundwater



Land



Coasts



Gender



Schools



Services



Health



Climate



Cities



Basins

REACH is a global research programme to improve water security for the poor by delivering world-class science that transforms policy and practice. The REACH programme runs from 2015–2024 and is led by Oxford University with international consortium of partners and funded with UK Aid from the UK Government's Foreign, Commonwealth & Development Office. Project code 201880.