

Achieving universal access to safely managed water services in rural Cambodia:

The case for complementarity of water supply solutions



March 2022



Acknowledgements

We would like to express our sincere gratitude to all our colleagues who were interviewed in the preliminary phases of this report, providing essential insights into the Cambodian context and existing safe water supply solutions, and contributing to the definition of key recommendations.

We also thank the following people and organizations for having taken the time to review this paper: AFD Cambodia, 3i, The World Bank Cambodia, Ms. Diane d'Arras, and Mr. Pawan Sachdeva.

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Introduction

Despite having set an ambitious target of universal access to safely managed water services by 2030, Cambodia is falling short of meeting this goal.

Increasing the proportion of the population with access to safely managed services will need new approaches and new ways of cooperating in the sector if SDG 6 is to become a reality.

This is most pressing for Cambodia's rural areas, where access to safely managed services remains very low. Joint Monitoring Program data from 2020 indicates substantial imbalances between rural and urban areas, with 35% of the rural population deprived of even basic water sources, a third of whom remain reliant on surface water, compared to less than 1% in urban areas.¹

Traditional sources, rainwater and surface water,² remain the main source of drinking water for over 19% of the rural population, bringing with them waterborne diseases and the significant associated public health issues. Diarrhea remains the most common cause of death in Cambodian children, accounting for one fifth of the deaths of children under the age of five, and an estimated 10,000 deaths overall each year.³

If this picture is to change, and for universal access to become a reality for the rural Cambodian population, the focus needs to shift from centring on piped supply alone.

Successful examples of providing safely managed services at scale in rural Cambodia are showing the way in which piped supply can combine with bottled water kiosks to offer a complementary approach. Where geography and /or cost of infrastructure work against piped supply, bottled water provides a more nimble and less cost intensive solution. This complementarity will contribute to faster coverage of safe drinking water needs amongst less densely populated underserved or unserved areas. These case studies of mixed implementation are showing the potential for successful delivery of safely managed services without compromising the economic viability of either model of supply when both operate in the same location. These solutions have expanded in recent years in rural Cambodia, presenting a significant growth potential in the country.

This report was co-written by 4 organizations operating in the Cambodian water sector:

- 1001fontaines & Teuk Saat 1001
- GRET
- KWSH
- WaterAid Cambodia

We review the varying characteristics of piped water and bottled water services, the challenges each face in providing greater access to safely managed services and make the case for complementary approaches to adopted if obstacles to increased service provision are to be overcome. The report concludes with a number of proposed recommendations as to how the potential for scaling and sustaining a mixed models approach can be achieved.

1 <https://washdata.org/data/household#!/khm>

2 NIP 2020, Report of Cambodia Socio-Economic Survey 2019/20, Phnom Penh

3 United Nations Children's Fund (UNICEF): Water, sanitation, and hygiene. Unicef, 2014.

Commercial piped water operations

Commercial piped water is the dominant model of piped supply in Cambodia, with the sector comprising small numbers of mid- to large urban water utilities and community-owned piped water supply.

In addition, however, there are an estimated 500 piped water operations set up and managed by Private Water Operators (PWOs), indicating the capacity of the private sector to reach much of the country.

PWOs oversee their production facility, including treatment process, and piped network. Recent targeted financing initiatives and the planning efforts of the Ministry of Industry, Science, Technology and Innovation (MISTI) have seen the piped water sector evolve from informal family businesses to licensed services. MISTI is responsible for the attribution of licenses, and the monitoring of water quality of these services. The private piped water sector is increasingly structured and formalized as a growing number of PWOs are becoming part of the Cambodia Water Supply Association, the network coordinating private operators and public authorities to strengthen capacity and technical performance.

Piped water is the preferred choice for Cambodian consumers

- **Convenience**

Piped water on premises remains the gold standard, since it provides the most convenient and easy-to-use supply being tapped directly at household level. The World Health Organization suggests that the 50 liters per person per day for drinking, cooking, bathing and sanitation is a basic requirement. Cambodian piped water systems are largely able to meet this requirement for household consumption, bringing about a positive impact on health and hygiene for consumers.

- **Affordability**

Piped water supply is regulated by MISTI, with a price fixed at USD 0.4 – 0.6 per cubic meter, which for 50 liters per person per day, costs a standard household USD 2.5 to 3.7 per month to fulfil all their water needs, representing a high affordability level.

Whilst 37% of Cambodian villages have been licensed and 28% are in process of license application by private operators,⁴ piped networks still reach only 16% of rural households.⁵ There remains much potential for this supply solution to achieve a large footprint in rural Cambodia.

4 3i 2020. Piped Water Supply (PIP) Study

5 General population census 2019, Ministry of Planning, 2020

Bottled water supply

Bottled water largely relies on decentralized water production facilities, treating locally available water to provide households with purified water for domestic consumption, most commonly in 20L containers.

This model was pioneered by NGOs in the 2000s, setting up community-owned water kiosks in underserved areas, thereby improving the health of vulnerable populations. Initially funded through international development aid and philanthropy, this model aims at being sustainable in the long run, with water sales covering the operational costs of the unit.

From its origins as a bottom-up, demand-driven and market-based approach, the bottled water sector has emerged without a proper regulatory framework. There has been no licensing process nor national guidelines developed, although the Ministry of Rural Development (MRD) is progressively taking the lead on community-owned projects, as part of the rural water supply.

In the past few years, private investment has become increasingly important, proving the entrepreneurial interest of decentralized water production facilities. An estimated 1,500 small family businesses now sell 20L containers across the country.⁶ Classified as commercial water services, they are under MISTI's mandate, and not integrated under MRD's planning.

Bottled water meets consumers' needs for quality and availability

- **Quality**

Bottled water has been positioned as a safely managed service, when quality is properly monitored, by the Joint Monitoring Program since 2019. The value proposition of bottled water is focused on water quality, guaranteed to the point of use. Bottled water therefore fulfils the specific need of having 1.5 liters per day per person of safe water for drinking purposes. It can sometimes be used for cooking, but this remains rare in rural Cambodia (only 13% of households drinking bottled water declare using this source for cooking).⁷

- **Light infrastructure reaching out to the last mile**

Bottled water is a decentralized model in rural Cambodia, where most bottled water suppliers are small scale operators. The production of safe water is performed directly in the village where the operator is based, and often using a local raw water source. This light infrastructure presents the benefit of being quickly set up, even in remote areas.

Many operators provide home-delivery services through small vehicles, such as koyuns or trucks, negotiating delivery to areas which are otherwise unserved, and with the capacity to serve small villages in addition to denser areas.

Bottled water currently accounts for 9.4% of the rural population's main drinking water source.⁸ However, the National Action Plan II (2019-2023) notably includes a specific target of 300 community-owned water kiosks and the implementation of specific water quality guidelines.⁹ This is a clear illustration that the government intends bottled water operators to play their part in rural water supply services.

6 Based on Final Report – Water Quality Monitoring in Kampong Chhnang province, WaterAid, Sevea and Teuk Saat 1001, 2020

7 Teuk Saat 1001 Consumer survey, 2019

8 2019-2020 Cambodian Socio-Economic Survey (CSES)

9 National Action Plan Rural Water Supply, Sanitation and Hygiene 2019-2023

Case studies: Delivering safely managed services in rural Cambodia



KWSH brings operational and technical know-how critical to supporting daily operations.

Piped supply: KWSH

The Khmer Water Supply Holding (KWSH) is a Cambodian social business, setup with an objective of increasing access to affordable clean tap water for Cambodians living in semi-urban and rural areas, by partnering with licensed private local water operators and taking over the management of those water stations.

KWSH acts as an operations-focused holding company, acquiring private rural piped water utilities and then investing in them to increase their production and distribution capacities. Each

subsidiary station is an individually registered company, operating with its own water license, local team, and water treatment infrastructure (centralized production and distribution by pipeline directly to end-users).

As of 2021, KWSH oversees a portfolio of five stations with over 40,000 households in its consolidated licensed areas, of which over 15,500 are now connected to the piped network (representing a 38% connection rate, compared to 17% prior to KWSH involvement).



Water is produced locally using UV disinfection, solar energy and available water sources.

Bottled supply: Teuk Saat 1001

Teuk Saat 1001 provides affordable safe drinking water through local franchisees in rural Cambodian villages.

Since its inception in 2004, Teuk Saat 1001 has been setting up small, decentralized water production units directly in commune-owned lands, which are then entrusted to local people trained to become entrepreneurs. These kiosk operators earn an income by selling safe water at an affordable price (less than €0.02 per liter).

The entrepreneurs are underpinned by regional support teams, providing technical assistance in water quality control, consumable supply, technical maintenance and business coaching, in exchange for a percentage of water sales. This franchise approach both sustains the water quality and durability of supply, and scales water kiosk delivery services across rural areas.

To date, the Teuk Saat 1001 network covers 25% of the rural Cambodian population enabling more than 830,000 people to access safe drinking water.

3 key challenges



Water quality standards are variable

Providing safely managed services means that water should be free from contamination at the point of use. This is not yet the case for most of the services provided in rural Cambodia, due to a highly fragmented market with low supervision and regulation.

Piped water falls under the jurisdiction of MISTI, whilst community-owned bottled water kiosks and NGO projects are regulated by MRD. There are therefore two distinct water quality monitoring frameworks, duplicating efforts to ensure the proficiency of the public departments in charge of regulating water quality. At the provincial level, effectiveness and efficiency in monitoring water quality are hampered by a lack of training and skills, and a limited budget to increase the quality of infrastructure and frequency of testing.

Water quality requires skills to design, operate and maintain water supply systems, but many operators not properly trained to adequate processes. For private piped supply operators, the level of quality depends on the operators' technical capabilities to ensure water quality at

the exit point of the treatment factory, and up to the tap of consumers. But even when piped water operators successfully ensure water quality to the tap, recontamination due to inadequate handling and storage conditions is common, given that the majority of households do not have a piped network into their houses but a single water outlet in their garden.

For private bottled water operators, there is no licensing process, resulting in many small operators starting their business with neither registration nor skills. Bottled water brands are normally registered under the Ministry of Commerce and the Ministry of Health, but field observations have indicated that approximately one third of existing producers are not registered. In addition, there is no visibility on the source of water and the treatment process, nor on the cleaning or safety of the container itself. This is a significant threat for the health of the consumers, who largely associate packaging in plastic as a guarantee of quality. Existing capacity-building programs are often conducted by NGOs, and limited in time and scope, thus not generating systems-wide change.

Low capacity and few incentives to cover unserved areas

Both solutions currently target more densely populated rural communes, which are easier areas in which to reach economic viability.

Whilst license conditions established under MISTI require piped supply operators to attain a coverage rate of 70% of the licensed area, this standard is not enforced in the field, with an average coverage rate of 47% in 2015.¹⁰

Areas which are not under a piped supply license are mostly less attractive, and often are more technically difficult to reach. To date, most of the infrastructure in place has been funded by private investments only, but this is unlikely to be viable as a means of financing supply for the remaining un piped areas.

For bottled water operators, the required investment to expand to non-served areas is less significant than for piped water with delivery services already demonstrating some bottled water operators' capacity to reach remote villages. Looking forward, there is still scope to deploy bottled water services through underserved rural communes but the main challenge is that there is no official strategy to target such areas, nor coverage standards as per those for piped supply. This encourages operators to focus on the most attractive areas in terms of economic viability and technical feasibility, once again leaving remote villages, where bottled water's value proposition offers the best fit solution, lagging behind in access to safe water.

Environmental sustainability

Almost half of rural communes in Cambodia have been assessed as quite or highly vulnerable to climate hazards.¹¹ Increasing droughts and floods threaten continuity of existing water supply services, while some unserved areas lack sufficient water resource to attract service providers to deploy infrastructure.

Expansion of water supply in rural areas generates new challenges for wastewater management, with limited infrastructure to collect and treat wastewater prior to discharging it back into the environment. The resulting surface and groundwater contamination incur increased treatment costs for water supply operators while deteriorating soils and threatening agriculture.

More specifically for bottled water, the use of plastic with no recycling system in place questions the long-term sustainability of the solution, especially for single-use small bottles widely used in Cambodian villages. And although emissions resulting from last-mile delivery compare favourably to emissions associated with boiling water, long-term strategies should nonetheless look at reducing or eliminating these emissions.

10 WaterAid. 2018. Rural Water Supply in Cambodia, Consolidation of data and knowledge gaps

11 The Cambodia Climate Change Strategic Plan (CCCSP, 2014-2023)

Leveraging piped supply and bottled water complementarity

Overcoming the challenges of water quality, coverage and resilience in the sector

Piped water and bottled water are strongly complementary supplies, providing a potential pathway to universal coverage by 2030. Although uncoordinated at present, complementarity is already a reality for many rural locations in Cambodia.

- **Bottled water ensures last-mile supply, piped networks ensure full coverage of denser areas**

Piped networks are largely exclusive to areas near commune centers, where they have the capacity to reach full coverage. For smaller villages, where the required investment does not make it viable to expand the network, bottled water can reach more isolated zones through expanding the catchment areas for home delivery.

- **Coexistence does not impact viability**

Piped supply and bottled water coexist synergistically in a growing number of rural villages. Coexistence can have a positive impact on the volumes purchased by customers: sales of bottled water have been found to be positively reinforced in villages where piped networks are present.

- **Accelerating the pace of coverage**

Connections to piped supply has grown from 1% to 16% of rural households in the last 15 years,¹² and although this is encouraging progress, it will not enable universal coverage by 2030. Figures are not available for connection rates for bottled water supply but the service is already available for at least half of the rural population¹³ An approach which combines both solutions will enable the piped network

to continue its expansion whilst encouraging the set-up of bottled water suppliers in areas that piped supply cannot reach.

- **Lower costs of deployment**

Combining piped and bottled water solutions in a given territory that hosts multiple villages of various sizes would encourage economies of scale, optimize the investment per household and reduce the need for subsidies.

- **Reaching everyone including in challenging areas**

The reality for some Cambodian villages is that they will probably never be covered by piped supply, due to inaccessibility and cost. These are areas where bottled water will remain one of the best options for local populations to access safely managed services. Some operators have started to run hybrid solutions that merge piped and 20L bottled water to optimize coverage but there is no official data to assess the extent of this phenomenon or the sustainability of a combined business model.

- **Fostering climate resilience**

Investing in flexible infrastructure for areas highly vulnerable to climate change will foster long-term resilience of water services. In addition, long term climate change attenuation strategies have to be considered. In this regard, piped water services present clear advantages with a relatively low carbon footprint and no plastic consumption, especially compared to single-use water bottles.

12 Ibid. 6.

13 Estimation based on the Teuk Saat 1001 presence: 25% of the rural population lives in the catchment area of one of their water kiosks, and there are multiple other bottled water producers.

Supporting complementarity

We propose an action plan to catalyze operators' efforts through two broad areas of intervention

1. Improving the regulatory framework

Recommendation 1: Generalize and improve the licensing process for all water supply operators

We recommend ensuring a licensing process exists for all water supply operators, including piped and bottled water supply. For piped networks, the key suggestion is to effectively monitor that the licensed operators comply with the coverage conditions and to take corrective action when licence conditions are not met. Licence holders could be encouraged to increase coverage rates by diversifying their service levels to include bottled water for isolated villages in their licence areas.

For bottled water suppliers, an initial step is needed to identify all private businesses, and to deliver a Certificate of Operation to those having a water treatment system which meets minimum standards and quality monitoring procedures. In addition, we recommend establishing a similar licensing process to piped supply, for villages that are either not under a piped license, or an inadequately performing licence, efficiently leveraging the geographical complementarity of the two solutions.

Recommendation 2: Create a single public agency in charge of water quality monitoring in both urban and rural areas

We recommend the creation of a single public agency, which would assume responsibility for water quality monitoring and enforcement across the entire national water market. Fulfilling a regulatory role, this public agency would develop strong in-house expertise on water quality, increasing the efficiency of monitoring, and act as the key point of contact to streamline liaison between water operators and government.

Recommendation 3: Generalize technical assistance programs for water suppliers

Continuous capacity-building programs should be made available to existing service providers, with compulsory sessions, especially for operators who received quality alerts after their testing.

Promoting national level organizations able to consolidate and durably support small-scale operators offers an alternative means to build the capacities of water supply providers. Country-level entities have the capacity to enforce high-level operating standards and provide continuous training to ensure services are safely managed.

2. Ensuring concerted public planning

Recommendation 4: Build a strategic public investment plan for water infrastructure at the national level

Achieving universal coverage with safely managed water services requires a clear mapping of the existing situation, and a national public investment plan indicating the priority areas for water supply operators to implement their systems. This could be correlated with the ongoing definition of provincial investment plans, provided a decision-making framework is developed to optimize the choice of complementary solutions across each territory. Detailed planning will also give structure to funding mechanisms, to incentivize water suppliers to cover less attractive areas.

This investment plan should ensure the creation of an Integrated Water Resource Management plan at watershed or commune level, clearly stating the necessity to protect water sources, avoid their contamination, and the prioritization of health needs in the event of high scarcity.

Such IWRM plans would enable highly exposed communes to better plan adaptation actions to implement in the field. The Ministry of Water Resources and Meteorology (MoWRaM) could provide appropriate oversight and monitoring of IWRM plans over time.

Recommendation 5: Effectively transfer the responsibility of water supply projects and investments to district and commune authorities

The Government of Cambodia has initiated a program of decentralization, under which the district and commune authorities will become the decision-maker for local water supply projects requiring subsidies.

We recommend establishing a capacity-building program with a dedicated budget, as well as tools and methodologies, to ensure that commune authorities can effectively participate in decision-making on water supply projects. Increasing project ownership by communes will act as a lever to target populations which have been left behind, and to engage whole communities through awareness campaigns around behaviour change and quality issues.

District Working Groups can be leveraged as a nexus where representatives from communes and water supply operators meet and discuss next priority projects in accordance with the national public investment plan.

Looking forward

It is still possible to reach the target of universal access to safely managed services in Cambodia by 2030, through an approach based around the complementary water supply solutions of piped water and bottled water kiosks.

While complementarity of service provision is a reality on a fledgling scale in rural Cambodia, steps are needed to formalise and promote the approach. These include strengthening sectoral cooperation, stakeholders fully and proficiently engaging in decision making, and knowledgeable operators scaling services which meet quality and sustainability criteria. Underpinning these measures should be support through national level strategic planning, regulatory oversight, strengthened governance in the sector and the active promotion of complementary solutions.

Going beyond these steps, there is the potential to diversify operations of piped water and bottled water operators so that they not only coexist, but progress to an integrated model under

which a single operator manages both services. Such a model would benefit from clear public endorsement, with support to conduct pilot projects and optimize synergies, and visibility towards local authorities to have them opt for this combined option in their territory.

As a final note, and of course not specific to Cambodia, the listed recommendations need to be funded so that the adequate resources (human, technical, financial) are allocated to their implementation.

Aggregating financing requirements through a "Water Fund" for Cambodia would facilitate a coordinated approach for financing of the sector, whilst assuring investors of robust opportunities. Taking into account the specificities of the water sector, the Water Fund could adopt a blended finance approach, optimising a combination of concessional and commercial finance to provide service providers with bespoke funding instruments. Ambitious, comprehensive financial support of this nature will substantially contribute to ensuring safely managed services cover the whole of rural Cambodia by 2030.

