GOAL | PROGRAMME INNOVATION LAB

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GOAL PROGRAMME INNOVATION FUND

Innovating for a World Beyond Humanitarian Crisis

Mechanical pre-payment device for hand pumps in Uganda

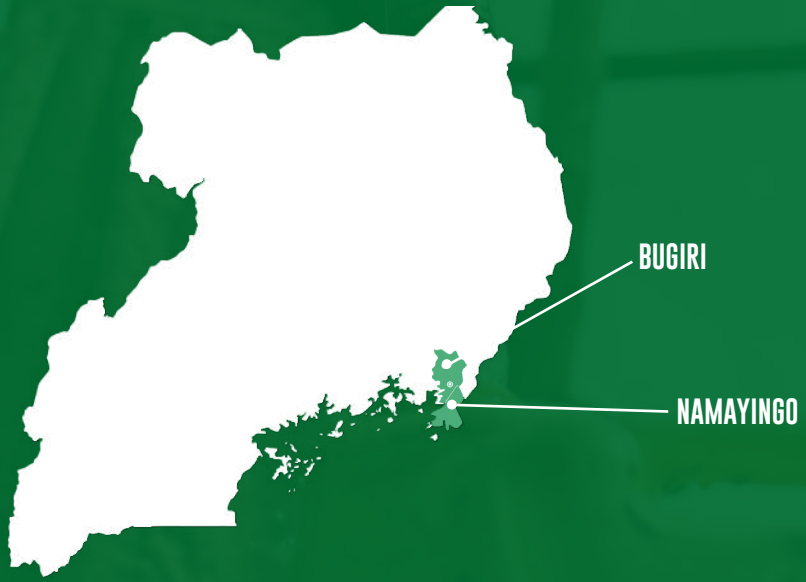
State of innovation

- Ideation and piloting ✓
- Validation
- Scaling

Over a fifty thousand (50,000) hand pumps are installed in Uganda, mostly in rural areas. Water supply using hand pumps is therefore the most common source of water for the majority of Uganda's 45 million population. It costs the government and donors between €6,000 – 8,000 to provide a hand pump to the users. ***Between 250 and 500 people will depend on a single hand pump. Of all installed hand pumps, an estimated 1/3rd is nonfunctional at any given time (RWSN, 2009, Baumann, 2009).*** Given the considerable investment of hand pump construction, combined with the ambition of SDG 6 (clean water and sanitation for all), it is a pressing issue on the sector to overcome this problem.

In a system analysis performed by GOAL Uganda to define the system constraints in hand pump maintenance, it was concluded that money collection, in combination with a lack of viable enforcement and lack of preventative maintenance, were the major constraints to the Operation and Maintenance (O&M) system. As a response to this, GOAL Uganda started a pilot in 2018 using hand pumps fitted with electronic prepaid water meters (PPMs).

Over the last five years, more and more WASH actors and the government have shifted attention to take a different look at the challenge of rural hand pump operation and maintenance (O&M). Government policy on the management of rural water supplies has focussed on the community-based maintenance system (CBMS) where communities themselves are required to voluntarily collect maintenance fees and ensure the hand pump remains functioning. The CBMS has been found to have majorly failed to improve hand pump functionality mainly because of the failure to collect funds required for maintenance. Actors in the WASH sector and the government therefore sought to replace the CBMS. WASH actors have turned to the private sector to develop an alternative to the CBMS approach which has been the default solution for the past three decades but has continually failed to meet expectations. Several promising models have been developed across several sub-Saharan African countries but as yet, none is able to reach a sustainable scale and continue to rely on subsidies to keep them going. So far, none of these models is using prepayment on handpumps and as a result revenue generation remains a key challenge.



This innovation will be developed over time. Initially, the Token tap prepaid meter will be piloted in GOAL's WASH operational districts of **Bugiri and Namayingo in Southeastern Uganda.**

What is the innovation about?

The Practica Foundation has developed and field tested a simple and robust mechanical prepaid meter that is suitable for piped systems in rural areas. By reducing complexity, the operational cost of the device is reduced to a minimum. The proposed innovation is to adapt the mechanical prepaid water meter developed by Practica and apply it to a hand pump, thereby removing the single most persistent constraint preventing ongoing operation and maintenance of rural water points across Africa. This will open-up the possibility of private sector engagement without needing subsidies.

GOAL Uganda plans to implement an initial pilot with up to 10 units to prove the technology (yr1-2) and then to gradually scale the service to approximately 50 units or more with funding from Irish Aid 2023 – 2027 (yrs. 2-5). At the same time, GOAL Uganda will focus on upscaling with other donors and ensuring the local availability of the hardware to create maximum long-lasting impact.

Why is it an innovation?

The sale of water has traditionally relied on billing where payments are postpaid based on quantities of water consumed by users in each period. This system of user fees collection is mostly used in urban areas in Uganda where piped water supplies are provided. Recently to reduce costs of management, urban water supplies are trying to implement a system of prepayment for water. Prepaid meters on pressurised systems that are already in use.

In the rural water supply context where water is pumped from a borehole, prepayment has been largely not considered as an option. The 2019-2022 hand pump prepayment meter supplied by Practica demonstrated that prepayment for hand pumps is possible with some modifications to the hand pump. The proposed system requires a method of measuring and dispensing an exact quantity of water, a method of payment and of control of water flow and means of keeping the information on quantities dispensed in order to ensure overall accountability for water dispensed against income.

The developed token tap (or water time meter) should then blend with the configuration of the hand pump and be easily usable and reparable.

What is expected benefit of this innovation?

An estimated 184 million people rely on handpumps for access to domestic water. To date almost one million handpumps have been installed across sub-Saharan Africa, and every year over 60,000 new pumps are installed.

If only 1% of the currently installed handpumps would be fitted with a prepaid handpump adaptor the total market size would be 10,000 adaptors per year, improving the water security of nearly 2 million people.

Viewed from a health perspective, the capacity of the water meter to generate funds for continuous maintenance of the water source and thus to provide safe and clean water to households potentially has a huge impact on the health of individuals, families and communities and will likely have a huge impact on their socio-economic wellbeing.

Credits: Azure AD

Potential to Scale

There have been pre-payment meter pilots in Uganda conducted both by GOAL and other WASH organisations and the Government of Uganda, Ministry of Water and Environment. There is evidence that prepayment systems are the future of collection of water user fee in water supplies.

GOAL has held demonstrations of prepaid meters which have generated significant interest from both WASH sector actors and donors in the water sector. Previous pilot prepaid meters for hand pumps have been largely unaffordable and unscalable because of their huge price which in some cases cost as much as €6,000 which is the same amount of money required to construct a hand pump.

In addition, these meters have suffered from a host of maintenance issues as a result of the nature of ground water which resulted in their frequent failure. The token tap under development is predicted not to suffer these mechanical problems in addition to having the predicted cost at less than €900 which could be lower if mass produced.

*In Uganda, each village is served by one or more hand pumps, each serving a population of between **250 and 500 people.** In our areas of operation in Bugiri and Namayingo districts, there are more than 1,500 hand pumps serving a population of **nearly a million people.***

PROGRAMME
INNOVATION LAB

Innovating to Overcome Humanitarian Crisis

The GOAL Programme Innovation Lab is a dynamic and collaborative unit established by GOAL to foster innovation within GOAL's programmes and to promote this work both internally and externally with the wider development and humanitarian community.

To get involved or find ways to support our innovations, visit our website at **goalglobal.org/innovation** or contact us at: **resilience@goal.ie**

Scan to visit our website

The GOAL Humanitarian Innovation Fund is designed as dynamic collaborative process through which strategic partners can engage and provide support to foster innovations which have the potential to enable marginalised populations overcome humanitarian crisis.

The Innovation Fund is a vehicle for strategic partners who are passionate about innovation and how innovation can be applied to overcome humanitarian crisis to support efforts to maximise the potential of innovation to transform Crisis to Resilience. Partners from across the full spectrum of society are invited to engage including from the private sector business, philantropists, trusts and foundations, civil society organisations, academic institutions and government organisations.

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