THE 2019 RWSN DIRECTORY

OF RURAL WATER SUPPLY SERVICES, TARIFFS MANAGEMENT MODELS & LIFECYCLE COSTS

2019

Compiled and edited by Philip T. Deal & Sean Furey

RWSN

Produced by:
Rural Water Supply Network (RWSN), August 2019
Skat Foundation
Vadianstrasse 42
St. Gallen 9000
Switzerland

First Edition. (revision 09/09/2019)

Information on organisations and model derived from information provided in forms from the relevant organisations, direct correspondence, peer-review papers presented at the 7th RWSN Forum (2016) and third-party documentation.

- Compiled by Philip T. Deal, Oklahoma University
- Editing, design and additional content by Sean Furey, RWSN Secretariat/Skat Foundation
- Translation (French edition) by Léo Giordano
- Cover Photo Florian Klingel © Skat – a rural water point in the Pamirs, Tajikistan, 2018
- Handpump functionality statistics compiled, analysed and presented by Dr Tim Foster, University of Technology Sydney (UTS) with support from Brian Banks (Water Point Data Exchange – WPDx) and Dr Juliet Willets (UTS)

This publication was possible through the support of the University of Oklahoma, USA, to Mr P. T. Deal, and to financial contributions to the RWSN Secretariat from the Swiss Agency for Development & Cooperation (SDC).

Suggested citation:

RWSN (2019). The 2019 RWSN directory of rural water supply services, tariffs, management models and lifecycle costs, Skat Foundation, St. Gallen Switzerland, August 2019

The Rural Water Supply Network (RWSN) is a global network of rural water supply professionals and organisations committed to improving their knowledge, competence and professionalism, to fulfil RWSN's vision of sustainable rural water services for all. Both individuals and organisations participate in the network. The Secretariat is hosted by Skat Foundation. RWSN is governed by an Executive Steering Committee with representatives from SDC, UNICEF, African Development Bank, IRC, WaterAid, World Bank and Skat Foundation.

RWSN's vision is of a world in which all rural people have access to sustainable and reliable water supplies which can be effectively managed to provide sufficient, affordable and safe water within a reasonable distance of the home.

Membership is free and open to all: https://www.rural-water-supply.net/en/about/joining

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Agency for Development and Cooperation SDC

skat Swiss Resource Centre and Consultancies for Development

CONTENTS

01 WELCOME!
02 HOW TO USE (AND NOT USE) THE DIRECTORY
03 THE DIRECTORY
04 REFERENCE AND FURTHER INFORMATION
05 HANDPUMP STATISTICS 2019
KEY & GLOSSARY

Photo: Stephanie Theis, © Skat, Nepal 2019

01 WELCOME!

By Sean Furey, Director, RWSN Secretariat

Welcome to the first edition of the *RWSN Directory of rural water supply services, tariffs, management models and lifecycle costs.*

RURAL WATER SUPPLY IS CHANGING

The rural water supply sector is undergoing a period of change. In response to the challenges of achieving universal access to safe, affordable drinking water and sustaining those services, there has been increasing innovation in different types of rural water service models.

In recent decades, the project-based approach, has focused on government delivery of infrastructure and voluntary community-based management.

While this achieved success in many countries in the Millennium Development Goal period of 1990-2015, the bar set by Sustainable Development Goal 6.1 is higher[1] and many countries are off-track to meet their commitments.

LET'S TALK ABOUT MONEY

Since 1992, the Rural Water Supply Network (earlier called the Handpump Technology Network), has been a global platform for professionals to share and collaborate.

However, such discussions and networking often focus on technical and thematic issues and the financial considerations are often either ignored, of secondary importance or vague and unsupported by figures. This is often because either the data is not available or it is too sensitive to share in the public domain.

Decision-making, at every level, is about trade-offs: money spent on rural water is money not spent on schools, or health or other essential services, and *vice-versa*.

If universal access to safe water services is to be achieved by 2030, then we as rural water professionals need to be more financially literate about the options, opportunities and costs[2].

This Directory is intended to show the growing range of management options beyond community-based management (CBM). Some are novel interventions that are still being piloted, others have been established for a decade or more.

This directory is therefore a contribution to the wider conversation of ensuring that no-one gets left behind.

WITH THANKS TO:

I would like to thank Philip Deal, a doctoral candidate at the University of Oklahoma who volunteered his time and efforts to compile and edit the information in this directory. This initiative was part of RWSN's Young Rural Water Professionals initiative[3]. French edition translation by Léo Giordano.

I would also like to thank the organisations and individuals who submitted and reviewed information for this directory: Mathieu Metois (Inter Aide); Nicolaas Van der Wilk (Uduma); Matthias Saladin (Skat/SMART Centre Group); Adam Harvey (Whave); Andrew Armstrong (Water Mission); Kishan Nanavati (Spring Health); Monroe Weber-Shirk (AguaClara); Alejandro Meleg (SISAR); Vahid Jahangiri (EverFlow). Any errors or omissions are the authors own.

[1] https://sustainabledevelopment.un.org/sdg6
[2] "Grown up" finance for rural water? RWSN webinar, 2017: https://vimeo.com/243271423

[3] https://www.rural-water-supply.net/en/rwsn-for-young-professionals

02 HOW TO USE (AND NOT USE) THE DIRECTORY

Table 1: Life-cycle cost components Fonseca *et al.* 2011)

Cost components		Brief description
Capital expenditure (CapEx) The costs of providing a service where there was none before; or of substantially increasing the level of services	Capital Expenditure Hardware (CapExHrd)	Capital investment in fixed assets, such as concrete structures, pumps, pipes and latrines either to develop or to extend a service.
	Capital Expenditure (CapExSft)	Expenditure on one-off work with stakeholders prior to construction or implementation, extension, enhancement and augmentation (including one-off capacity building).
Recurrent expenditure Expenditure associated with maintaining an existing service at its intended level	Operational Costs (Opex)	Recurrent (regular, ongoing) expenditure on labour, fuel, chemicals, materials, and purchases of any bulk water and cleaning products for sanitary facilities, energy costs etc.
	Capital Maintenance Expenditure (CapManEx)	Asset renewal and replacement cost; occasional and lumpy costs that seek to restore the functionality of a system, such as replacing pipes and pumps.
	Cost of Capital (CoC)	Cost of interest payments on micro-finance and any other loans.
	Expenditure on Direct Support (ExpDS)	Expenditure of support activities for service providers, users or user groups.
	Expenditure on Indirect Support (ExpIDS)	Expenditure on macro-level support, including planning and policy making, and support to decentralised service authorities or local government.

A QUICK OVERVIEW OF LIFE CYCLE COSTING APPROACH

The Life Cycle Cost Approach (LCCA) is way of considering all the direct and indirect costs associated with a product or service over the course of its life, from construction to decommissioning.

In the Water, Sanitation and Hygiene (WASH) sector this has been most clearly and thoroughly established by IRC[4] and the main components are summarised in the table above.

WHAT THIS DIRECTORY IS:

A quick reference guide

This Directory is designed to be concise and easy to navigate. Keep a printed version on hand to flick through if you want to get ideas.

A showcase for innovation, successful track records (and failure?)

The intention is to provide an honest overview of innovative new models and service delivery approaches that have a track record of success. In future editions it would be great to include entries from experiences that were not successful. For example, a common feature of many entries is the financial dependency on international aid (either official assistance or charitable) – what happens when the international money runs dry?

Inspiration

We hope that this Directory, and future update, will inspire further financial data sharing and dialogue on tariffs, cost recovery and inclusive financing.

[4] https://www.ircwash.org/news/costs

We also want raise the visibility and discussion of all Life Cycle Cost components, particularly those that are not often discussed or presented, such as the cost of support and the cost of capital.

WHAT THIS DIRECTORY IS NOT:

A detailed analysis or comparison of models.

We don't offer analysis or judgement on any of the entries presented here. Two recent studies that we recommend are:

WaterAid/Aguaconsult (2018) "Management models for piped water supply services", WaterAid, October 2018.[5]

World Bank Group (2017) "Sustainability Assessment of Rural Water Service Delivery Models: Findings of a Multi-Country Review". World Bank, Washington, DC[6]*.*

A database of definitive benchmark costs.

The figures presented in the Directory entries are generalised and often highly context sensitive. The World Bank, and partners, have been working on rural water supply benchmarking metrics and a report on progress is due later in 2019.

The information and figures provided come directly from the organisations concerned and/or from published documentation and therefore have not been independently verified by RWSN.

An exhaustive compendium

In compiling this first edition, the starting point was the 7th RWSN Forum, held in Abidjan in 2016. A number of management models were presented and their experiences captured in peer-reviewed papers[7]. Other organisations were subsequently contacted and those that responded positively were included.

TTTT+S – Where the money comes from

In this edition, we have not included data or analysis of where the money comes from to cover the life cycle costs. A recent RWSN e-discussion tried to address some of these issues[8]. As well as the well-known Tariffs, Taxes and Transfers (3Ts), there is a 4th "T" for Time spent on collecting water (a cost to households that is generally overlooked and falls on the shoulders of women and children) and there is the "S" of self-supply (households investing in their own water supplies) which is widespread around the world but generally ignored by utilities, governments and aid agencies.

HOW TO INCLUDE YOUR SERVICE

It is the intention to produce annual editions of this directory to give an opportunity for entries to be updated to include new information, and to give space for entries from other organisations and services.

Being included is really easy. If you would like to be considered for the next edition, then please contact the RWSN Secretariat to receive a form to complete or online at: www.surveymonkey.com/r/rwsn-directory

[5] https://washmatters.wateraid.org/publications/management-models-for-piped-water-supply
[6] https://openknowledge.worldbank.org/handle/10986/27988
[7] https://rwsn7.net/content/sustainable-services/
[8] Hutton G., Gosling L, Adank M, Boulenouar J., Furey S G, Naughton M. and S. Fürst (2019) Cost effective ways to leave no-one behind in rural water and sanitation - Summary of RWSN E-discussion. , RWSN, Sankt Gallen https://www.rural-water-supply.net/en/resources/details/856

03 THE DIRECTORY

Entries listed alphabetically and summarised below. You can find the key to the symbols on the back page.

Name	Type of Model	Type of Service	Operating area(s)
AguaClara	CBM-1 LG-1 PB-1		Honduras, Nicaragua, India
BESIK Program	LG-1 LG-2 LG-3		Timor Leste
EverFlow	CBM-3		Uganda (Apac and Kwania Districts)
Fundifix	PV-1 CBM-2		Kenya (Kwale & Kitui Counties)
Inter Aide	CBM-3 LG-2 LG-3 NGO-1 NGO-2		Malawi, Ethiopia, Madagascar, Mozambique, Sierra Leone, Haïti
RWSSP	CBM-2 LG-1		Tajikistan, Uzbekistan
SISAR	CBM-4		Brazil (Ceará)
SMART Centres	CBM-3 NGO-1		Established: Tanzania, Malawi, Mozambique, Zambia, Early Stages: Ethiopia, Kenya, Nicaragua
Spring Health	PV-2		India (Orissa)
Uduma	PV-1		Burkina Faso
Water for Good	CBM-2		Central African Republic
Water Mission	CBM-2 NGO-1 NGO-3 LG-3 PV-1 PV-2		Peru, Haiti, Kenya, Indonesia, Honduras, Tanzania, Malawi, Mexico, Uganda
WaterCredit	NGO-1 other		Kenya, Uganda
Whave Solutions	CBM-3 LG-3		Uganda (Amaudat, Kaabong, Kamuli, Kotido, Kumi, Mityana, and Nakaseke Districts)

AguaClara

CBM-1 LG-1 PB-1

Country/Countries of operation	Honduras, Nicaragua, India
Context Description	In 2015, about 85% of people in India and Honduras had at least "Basic" water services. Even the poorest quintiles are above 79% coverage. However, those sources that are safely managed are drastically reduced in Honduras. Very few communities with populations below 50,000 people have safe water on tap.
Water System Description	AguaClara uses a gravity-fed water treatment system to clean water and distribute it through a piped network. No electricity is necessary. The standard treatment path is grit removal, chemical dosage, flocculation, floc blanket, sedimentation, and stacked rapid sand filtration.
Tariffs	Tariffs are 3 – 5 USD per household per month.
Tariff Collection and fund management system	Either a community water board or the municipal government is in charge of tariff collection and money management. Standard community-based collection is practiced.
Social inclusion policies	The community water board may subsidize tariff costs to the elderly and widows unable to pay.
Name(s) of funding/backing organisations (if applicable)	Swiss Agency for Development & Cooperation (SDC), Cornell University, AguaClara Cornell, AguaClara Reach, Agua Para el Pueblo, Agua Para la Vida, Water for People, Gram Vikas
Further Information	https://www.aguaclarareach.org/

AguaClara Life Cycle Costs

Capex	Opex	CapManEx	CoC	ExpDS	ExpIDS
Not responsible	Responsible and covered	Responsible and covered	Not responsible	Responsible and covered	Not responsible

Life Cycle Costs	The AguaClara water treatment plant was designed to be a low cost, long-term solution to piped water access. Being gravity powered with few moving parts, the life-cycle of the system is meant to be robust. At present, 18 of 20 treatment plants are covering the recurring costs of operation.
Capital expenditure – hardware and software (CapEx)	The typical costs associated with the design, build, train, and transfer of a treatment plant are estimated at 10,000 USD per L/s of production. Financing is typically derived from the local government or donor partners. Communities, ranging from populations of 1,500 to 12,000 people, have covered between 10% and 100% of the initial CapEx costs.
Operating and minor maintenance expenditure (OpEx)	Operational costs are dominated by labour costs and chemicals, with minor repairs made to the few moving parts (float valves). These costs vary with the size of the treatment plant.
Capital maintenance expenditure (CapManEx)	Capital maintenance is presently not considered for anything but the plant and piping repairs. Being gravity powered with few moving parts, the plant is expected to last 30 years.
Cost of capital (CoC)	CoC is not considered because CapEx has been financed primarily through donors, NGOs, and governments, with the exception of one community financing themselves.
Expenditure on direct support (ExpDS)	Most support costs associated with monitoring and training are covered by the tariff or the local government.
Expenditure on indirect support (ExpIDS)	The Honduran water regulatory agency and health ministry periodically records water quality measurements, taking on the costs of external monitoring and oversight. Other peripheral support for research, program development, and training is provided by NGO partners and Cornell University.
Total Expenditure (TotEx)	Includes: CapEx AguaClara Treatment Plant: 40 USD/person Includes: OpEx, CapManEx, ExpDS Operations: 7 to 13 USD/person/year **These figures vary depending on the size of the community*
	Data year: 2018

BESIK Programme

LG-1 LG-2 LG-3

Country/Countries of operation	Timor-Leste
Context Description	As of 2015, in rural Timor-Leste, 60% of people had access to "Basic" water services[9]. Within that, there is disparity between rich and poor, with 72% of the richest quintile having access to a "Basic" water service but only 36% of the poorest quintile having similar access.[10] Piped water systems are typically found in Timor-Leste, powered either by gravity or electricity. There are limited hand pumps or wells near the coastal areas, so water is usually distributed by public tap stands.
Water System Description	The BESIK program attempted to establish water service provider contracts for routine operation and maintenance of the piped water systems. Management contracts were established with either the local government, private operators, or community officers. A study was conducted on the long-term cost requirements associated with CapManEx.
Tariffs	Communities pay monthly tariffs at a rate of 0.50 - 1.00 USD per household.
Tariff Collection and fund management system	Communities collect the tariff and pay to a community management group. As of 2016, they were formulating plans to cluster pump systems to attain economies of scale.
Social inclusion policies	Future plans for cross-subsidies on piped tariffs were in place.
Name(s) of funding/backing organisations (if applicable)	National Directorate of Water Services, Australian Department of Foreign Affairs and Trade (DFAT)
Further Information / References	https://rwsnforum7.files.wordpress.com/2016/11/full_paper_0239_submitter_0294_choksey_jonathan.pdf

[9] https://washdata.org/ (accessed 01.08.19)
[10] https://washdata.org/ (accessed 01.08.19)

BESIK Life Cycle Costs

Capex	Opex	CapManEx	CoC	ExpDS	ExpIDS
Not responsible	Responsible but not covered presently	Responsible but not covered presently	No information	Not responsible	No information

Life Cycle Costs	In 2016, these piped systems were heavily subsidized and relied on significant financial support. On average, community tariffs alone were estimated at only 600 USD per year. In a detailed analysis of one community, they were only covering 38% of operating costs.
Capital expenditure – hardware and software (CapEx)	Capital expenditures required outside support to fund the high investment costs. A new piped system was estimated at 93,500 USD, and a new borehole was about 15,350 USD.
Operating and minor maintenance expenditure (OpEx)	The annual cost for covering staff salary, office expenses, travel, electricity, materials, and vehicles was estimated at 37,720 USD per year, or roughly 21 USD per person per year.
Capital maintenance expenditure (CapManEx)	A number of large repairs or rehabilitation expenses were tracked historically over three years, including pump replacements, control panels, manifolds, and other mechanical and electrical equipment. In total, they spent 103,100 USD over 73 sites between 2012 and 2015. This equated to about 2.70 USD per person per year. Specific Examples: 8,350 USD per solar pump replacement 3,350 USD per 3-phase control panel 4,350 USD per borehole rehabilitation
Cost of capital (CoC)	-
Expenditure on direct support (ExpDS)	-
Expenditure on indirect support (ExpIDS)	-
Total Expenditure (TotEx)	Included: OpEx, CapManEx Service Contract: 23.70 USD/person/year
	Data year: 2015/16

EverFlow

CBM-3 PPP

Country/Countries of operation	Uganda (Apac and Kwania Districts)
Context Description	In 2015, in rural Uganda, 32.5% of people had access to at least a "Basic" water service.[11] This rate is consistent across most quintiles, with the exception of nearly 50% of the richest households having "Basic" water service.[12]
Water System Description	EverFlow provides a full-time maintenance and repair service for water systems under its care with the aim of maximizing uptime of water points. The company trains and employs technicians that provide regular maintenance, pump performance checks, and scheduled overhauls. They also keep a stock of spare parts, operate a toll-free hotline for emergencies, and will dispatch technicians as needed. EverFlow also employs community caretakers to record daily performance metrics, which inform the administration of any warning signs or issues. This information provides a more comprehensive understanding of handpump health through simple and robust engineering metrics. As of May 2019, EverFlow serves close to 15,000 people who have enjoyed an uptime (continuous pump functionality) of 99.4%. This is possible due to rapid emergency response and good customer behaviour - 33% of issues submitted via the hotline were reported before a full breakdown.
Tariffs	Each community is required to pay UGX 90,000 (roughly 25 USD) per month for EverFlow's services. This equates to about 0.70 USD per person annually to meet domestic water needs.
Tariff Collection and fund management system	The community water committee is responsible for determining the cost per household and collecting tariffs. These funds are deposited into an EverFlow bank account. Once the funds are secured by EverFlow, they are allocated toward various present and future costs, including the payment of local mechanics and caretakers, commonly worn parts, future high-cost repairs, and regular business operations. The system includes a provision for water service disconnection in the event of payment delinquency, as the revenue stream of monthly subscriptions is the foundation of a financially sustainable enterprise.
Social inclusion policies	The responsibility of determining who is able or willing to pay the tariff is delegated to the community water committee.
Name(s) of funding/backing organisations (if applicable)	International Lifeline Fund Thrive Networks George Wolf Memorial Trust Generosity.org
Further Information / References	http://lifelinefund.org/work/uganda/clean-water/ www.everflowafrica.com

[11] https://washdata.org/ (accessed 01.08.19)
[12] https://washdata.org/ (accessed 01.08.19)

EverFlow Life Cycle Costs

Capex	Opex	CapManEx	CoC	ExpDS	ExpIDS
Not responsible	Responsible and covered	Responsible and covered	No information	Responsible but not covered presently	Not responsible

Life Cycle Costs	EverFlow service fees are used to cover primarily OpEx and CapManEx costs. In its current form, the enterprise does not take responsibility for initial construction or other support costs. At present, the 300 USD annual fee is divided as follows: 9% mechanic payment 11% caretaker payment 13% business operations 17% routine wear parts 50% reserve fund for high-cost spare parts
Capital expenditure – hardware and software (CapEx)	Any construction costs are delegated to external funders, which can be coordinated by the International Lifeline Fund. Communities are incentivized to be loyal customers, as this can encourage access to these external funds for upgrades.
Operating and minor maintenance expenditure (OpEx)	Half of the required tariff is used for operational expenses and minor repairs. This translates to 150 USD per year per community.
Capital maintenance expenditure (CapManEx)	Half of the required tariff is set aside for major repairs or replacements in the future. This translates to 150 USD per year per community.
Cost of capital (CoC)	-
Expenditure on direct support (ExpDS)	Only direct support expenses, such as the help desk hotline, are covered. Other direct business expenses, such as marketing, monitoring, and program support beyond that of the technicians, are currently externally funded. As EverFlow graduates to a scale of 1,000 communities (or 500,000 people), it is expected that these can be covered using subscription fees.
Expenditure on indirect support (ExpIDS)	Development costs and the overhead required to create the enterprise are externally funded.
Total Expenditure (TotEx)	Included: OpEx, CapManEx, some ExpDS 0.75 USD/person/year
	Data year: 2018

Fundifix

PV-1 CBM-2 PPP

Country/Countries of operation	Kenya (Kwale County, Kitui County)
Context Description	Overall, in 2015, in rural Kenya, 50% of people had access to a "Basic Water service. Within that, there is disparity between rich and poor, with 70% of the richest quintile having access to a "Basic" water service but only 28% of the poorest quintile having similar access. Kitui County falls in the Arid and Semi-Arid (ASAL) belt of Kenya, and its poverty level was estimated at 47.5 percent, compared to the national average of 36.1 percent in 2016. Kwale County is a semi-arid coastal area and in 2016, 70 percent of the population was living below the poverty line.
Water System Description	FundiFix is a non-profit social enterprise established in 2014 that operates county-based franchises. Each franchise offers preventive maintenance and repair services for existing rural water infrastructure in communities, schools, and health facilities. The FundiFix model is based on the insurance logic of 'scale reduces risk', which is applied to rural water services to reduce the cost of maintenance and improve service delivery. Maintenance contracts with Water Management Committees (WMCs) are based on the performance of FundiFix. The company must provide repairs within three days for handpumps and five days for a piped scheme, or service is free for the month. Sensors fitted on handpump handles are used to remotely monitor handpump usage and functionality.
Tariffs	Payments for the repair and maintenance service are collected monthly from WMCs based on a flat fee for handpumps and volume usage for piped schemes. On average, handpumps pay USD 10/month. Low-use handpumps, schools, and poor communities pay a subsidised fee - 5 USD/month or 1 USD /month - based on FundiFix's assessment of ability to pay. Tariffs charged to piped schemes are based on volume of water produced and size/complexity of the supply network. Payments to FundiFix range from 30-40 percent of the monthly billing of a piped scheme.
Tariff Collection and fund management system	WMCs pre-pay for repair and maintenance service to FundiFix monthly through M-PESA, a mobile money service in Kenya. Select WMC members are sent notifications and reminders via text messages. WMCs then bill and collect payments from households. Water is supplied through a network of water kiosks, stand pipes or yard connections, with the pay-as-you-fetch system of tariff payment widely adopted. The Maintenance Trust Funds pool financial resources from taxes, transfers, and investors in order to cover the full cost of the maintenance program.
Social inclusion policies	Observed handpump usage data allow variable tariffs to be designed with provision for regular, low or special cases. Most communities fall in the former; low users are monitored with a reduced tariff; and 'special' cases, including schools, clinics or other facilities with handpumps

	benefit from a reduced rate. The latter provides a basis for government support.
Name(s) of funding/backing organisations (if applicable)	Oxford University, UK DFID, UK Science Councils (UPGro programme / REACH programme), USAID Sustainable WASH Systems programme
Further Information / References	http://fundifix.co.ke/ http://www.oxwater.uk/research.html https://www.smithschool.ox.ac.uk/research/water/report-performance-based-funding.html https://rwsnforum7.files.wordpress.com/2016/11/full_paper_0224_submitter_0276_goodall_susanna1.pdf

FundiFix Life Cycle Costs

Capex	Opex	CapManEx	CoC	ExpDS	ExpIDS
Not responsible	Responsible but not covered presently	Shared responsibility	Not responsible	Responsible but not covered presently	Responsible but not covered presently

Life Cycle Costs	FundiFix focuses on the recurring cost components of OpEx, ExpDS, and ExpIDS. None of these costs are completely covered through WMC payments alone, but County-based Maintenance Trust Funds allow for taxes, transfers, and investors to provide external performance-based financing. User/WMC payments cover 15-20% of FundiFix operating costs. The deficit is financed by the County Maintenance Trust Funds in exchange for social impact, measured through agreed KPIs and targets to be achieved by FundiFix.
Capital expenditure – hardware and software (CapEx)	County Governments in Kenya are legally mandated to provide clean and safe water in adequate quantities for all. Therefore, responsibility for CapEx primarily falls under county governments. Other actors involved in financing CapEx include non-governmental organisations, bilateral donors and national government agencies. Software costs are built-in during the design of new projects.
Operating and minor maintenance expenditure (OpEx)	Operation and maintenance costs for the water infrastructure are covered from tariff payments, usually collected by WMCs. The WMCs pay for operation costs, including the monthly repair and maintenance fee charged by FundiFix, staff wages, fuel, electricity and other admin costs.
Capital maintenance expenditure (CapManEx)	FundiFix's service provision is governed by a tripartite contract with WMCs and the respective county government. In the contract, the county government is responsible for rehabilitation of broken water infrastructure before signing a contract with FundiFix, providing oversight/governance, and ensuring asset replacement where infrastructure failure is beyond repair.
Cost of capital (CoC)	County/National Governments bear the cost of capital, where rural water infrastructure development is financed through loans.
Expenditure on direct support (ExpDS) and Expenditure on indirect support (ExpIDS)	Costs of performance monitoring, supervision of elections, oversight of operations, technical advice/supervision of capital maintenance/replacement etc. are paid by county governments. It is unlikely that tariffs will fully cover ExpDS and ExpIDS in the medium-term. For signed up WMCs, FundiFix provides training to WMCs and scheme operators for improved data collection/monitoring, management, and to mitigate breakdowns. Within FundiFix, the ExpDS and ExpIDS of providing repair and maintenance services are currently subsidised by the County-based Maintenance Trust Funds.
Total Expenditure (TotEx)	1.5 – 2.0 USD / person / year. Included: FundiFix's OpEx, ExpDS, and ExpIDS.
	Data year: 2018

Inter Aide

CBM-3 LG-2 LG-3 NGO-1 NGO-2 PPP

Country/ Countries of operation	Malawi*, Ethiopia, Madagascar, Mozambique, Sierra Leone, Haïti *Case study focus
Context Description	In 2015, in rural Malawi, 63.5% of people had access to at least a "Basic" water service.[13] However, most quintiles except the richest are just below 50% coverage at the "Basic" service level.[14]
Water System Description	Starting in 2008, Inter Aide extended its activities of well and borehole construction in Malawi to include maintenance services. Private area mechanics were trained and organized to serve roughly 50 handpumps each, while a firm supply chain of handpump parts were established in stores throughout three districts. These mechanics would be under contract for regular service and repairs. Presently, this system has grown into 175 shops and 430 mechanics servicing an estimated 22,000 handpumps. Former staff of Inter Aide have since created their own entity – BASEDA. Inter Aide and this local NGO are supervising 7 districts each, 14 in total.
Tariffs	Service contracts can be established for a given handpump for a year at a time. These contracts allow for periodic inspection visits and preventative maintenance on seals or wearing parts at a rate of about 11 USD per year. If a repair is required, the area mechanic will inform the water committee of the price for replacement parts and the service fee. Depending on the severity, repairs are estimated at 8 - 45 USD every 4 – 5 years
Tariff Collection and fund management system	Local water committees collect the funds required to pay for either the service contracts and/or repair costs. Ideally, there are funds saved over time by the committee, but often times they are paid only when required. This process is not carried out by Inter Aide mechanics or suppliers.
Social inclusion policies	Periodic inspection visits for service contracts are aimed at harvest periods in the year to allow for seasonal incomes. Local water committees are in charge of determining who has to contribute to the cost of repairs and maintenance based on their ability.
Name(s) of funding/backing organisations (if applicable)	Agence Française de Développement (AFD), Vitol, Waterloo Foundation, Agence de l'Eau Seine Normandie, Ville de Paris, Fonds Suez Environnement
Further Information / References	www.interaide.org www.interaide.org/watsan/malawi www.interaide.org/pratiques

[13] https://washdata.org/ (accessed 01.08.19)
[14] https://washdata.org/ (accessed 01.08.19)

Inter Aide Life Cycle Costs

Capex	Opex	CapManEx	CoC	ExpDS	ExpIDS
Not responsible	Responsible and covered	Not responsible	No information	Not responsible	No information

Life Cycle Costs	Total reported life cycle costs are estimated to be between 440 – 880 USD per pump per year, when accounting for CapEx, OpEx, CapManEx, and ExpDS. This value is based on the cost of service contracts and repairs for all community handpumps under an area mechanic over ten years.
Capital expenditure – hardware and software (CapEx)	Hand dug wells are estimated to cost 2400 USD, while mechanized drilling is 6800 USD on average per well.
Operating and minor maintenance expenditure (OpEx)	OpEx is estimated at only 20 USD per year for a water point, including spare parts, labour, minor committee meeting expenses, cleaning, and slab maintenance.
Capital maintenance expenditure (CapManEx)	The replacement of an Afridev pump in addition to civil work repairs are estimated at 1400 to 1700 USD every 10 to 15 years.
Cost of capital (CoC)	-
Expenditure on direct support (ExpDS)	Training and M&E costs are estimated to be about 10 USD per pump per year.
Expenditure on indirect support (ExpIDS)	-
Total Expenditure (TotEx)	Included: CapEx 9.6 to 27.2 USD/person Included: OpEx, CapManEx, and ExpDS 0.49 to 0.80 USD/person/year
	Data year: 2018

RWSSP

CBM-2 LG-1

Country/Countries of operation	Tajikistan, Uzbekistan
Context Description	It is estimated that 25% of the rural population in these two countries have access to safe drinking water. The Ferghana valley is one of the most populated areas of this part of the world with population density as high as 500 inhabitants per square km. The needs are therefore very high in terms of access to safe drinking water.
Water System Description	Water is pumped from underground aquifers to a reservoir and then distributed by gravity through piped networks. Consistent electricity for the pump is often a problem. Underground water is of good quality and needs only light chlorination to avoid further contamination. Sanitation is often of very poor quality in public places and is part of the improvement works of the project: installation of eco-san toilets, various systems of water treatment etc.
Tariffs	A tariff covering all costs, including the amortisation of the investment, is charged by a Drinking Water Organisation, or DWO, (non-commercial, non-governmental organisation) managing the system. The standard tariff is around 0.35 USD per cubic meter. Each household connection is metered.
Tariff Collection and fund management system	The DWO is in charge of the management of the water system, the tariff rates, the allocation of subsidies, and of the management of the funds. This DWO may pay an appointed executive committee to perform these tasks in addition to minor maintenance.
Social inclusion policies	The Drinking Water Organisation may subsidize tariff costs to the elderly, widows, or households unable to pay.
Name(s) of funding/backing organisations (if applicable)	International Secretariat for Water, Swiss Agency for Development & Cooperation (SDC)
Further Information	https://www.newsd.admin.ch/newsd/NSBExterneStudien/882/attachment/en/3733.pdf

RWSSP Life Cycle Costs

Capex	Opex	CapManEx	CoC	ExpDS	ExpIDS
Not responsible	Responsible and covered	Responsible and covered	Responsible and covered	Responsible and covered	Responsible and covered

Life Cycle Costs	The life-cycle costs of the RWSSP system is reflective of many community-managed piped schemes. There is a high initial cost to construct the system, with operating expenses focused on the continued supply of piped water through chemical and electrical costs.
Capital expenditure – hardware and software (CapEx)	With a cost far under 100 USD per capita, an average system with private connections would range around 300,000 USD for a village of 5,000 people.
Operating and minor maintenance expenditure (OpEx)	Operational costs are dominated by labour costs, taxes and royalties, but small costs also go toward chemicals and minor repairs. They are estimated at 2000 to 3000 USD per month to operate the water system.
Capital maintenance expenditure (CapManEx)	Capital maintenance is part of the tariff and represents 30% to 45% of the costs. Amortisation is calculated over a period of 30 years.
Cost of capital (CoC)	CoC is not considered because CapEx has been financed primarily through donors, NGOs, and governments.
Expenditure on direct support (ExpDS)	Direct support costs are part of the tariff.
Expenditure on indirect support (ExpIDS)	Water quality measurements are made by services of the Ministry of Health and their cost is included in the tariff.
Total Expenditure (TotEx)	Includes: CapEx Piped System: 60 USD/person Includes: OpEx, CapManEx Operations: 4 USD/person/year

Data year: 2018

SISAR

CBM-4

Country/ Countries of operation	Brazil (Cearà)
Context Description	As of 2015, about 86% of rural Brazilians have access to at least "Basic" water service. Urban communities claim that over 97% of people have access to "Safely Managed" services.
Water System Description	The SISAR system is a tiered water management system in the Brazilian state of Cearà. The regional SISAR oversees 8 basin-level SISARs. These SISARs focus on water provision, corrective maintenance, major repairs, training, quality control, and business management based on a cross subsidies approach among member Community Water Supply Organisations (CWSOs). Both levels oversee the water treatment systems of CWSOs, who pay a service fee for their metered consumption. These CWSOs are responsible for piped water system operation, administration, and minor repairs. The CWSO operator is trained and supported by SISAR.
Tariffs	SISAR guides a block tariff structure that each CWSO implements at the local level. Any changes are voted on by the SISAR General Assembly before implementation. The tariffs are composed of a water fee, energy costs, a CWSO fee, and a sanitation fee.
Tariff Collection and fund management system	The revenue is collected at pharmacies, local banks, or through mobile billing and managed by SISAR, which acts as a bank for the regional payments. This method is a relatively recent development to the old practice of CWSO manual collection. CWSOs are then reimbursed with the costs for energy, CWSOs fees, and local support costs. SISAR manages the water fees collected from all member CWSOs.
Social inclusion policies	There is a block tariff structure so that the first 10 cubic meters of water is cheaper. After 10 cubic meters, prices increase per volume. Cross subsidies allow for larger communities to support smaller ones.
Name(s) of funding/backing organisations (if applicable)	Companhia de Àgua e Esgoto do Ceara (CAGECE), State of Cearà, German Bank Kreditanstalt für Wiederaufbau (KfW)
Further Information / References	http://documents.worldbank.org/curated/en/664321506030643918/pdf/119890-WP-PUBLIC-6p-P159188-21-9-2017-10-39-35-W.pdf http://sabersocial.virtual.avina.net/Conocimiento.aspx?documentId=199

SISAR Life Cycle Costs

Capex	Opex	CapManEx	CoC	ExpDS	ExIDS
Not responsible	Responsible and covered	Responsible and covered	Responsible and covered	Responsible and covered	Responsible and covered

Life Cycle Costs	It took about 15 years for SISAR to cover annual operating costs and work at a surplus. Operational subsidies from both CAGECE (11.5 million USD) and KfW (14.5 million USD) were used for a period to help cover staffing and vehicles, but were phased out over time. Accounting data from eight basin-level SISARs show positive financial records for 2018. On average, they each spent 63,000 USD per month to operate and maintain their piped water systems, while billing 82,000 USD per month in revenue. Service populations range from 39,796 to 127,968 people. Detailed records from two SISARs describe the distribution of these recurring costs below.
Capital expenditure – hardware and software (CapEx)	Capital expenditures are funded either by the State of Ceará or through international development organizations, with the most prominent being KfW. Stipulations for funding include micro- and macro-meters, water treatment, sufficient flow, and a connection for each household in the community.
Operating and minor maintenance expenditure (OpEx)	All recurring costs in SISAR records are considered "Operational Expenditures". However, accounting categories involving minor repairs, personnel expenses, treatment chemicals, administrative costs, and general maintenance amount to 6.24 USD per person per year.
Capital maintenance expenditure (CapManEx)	Accounting categories related to major repairs, system recoveries, and the replacement of equipment and materials were estimated at 3.96 USD per person per year. The level of detail in financial records allows for some trade-off between OpEx and CapManEx costs.
Cost of capital (CoC)	CoC expenses were largely attributed to financial expenses, loan repayments, and banking fees. They were estimated at about 0.85 USD per person per year. This does not account for large loan repayments attributed to the initial CapEx costs and construction, as SISAR is not responsible for these costs.
Expenditure on direct support (ExpDS)	Only one SISAR had a cost that could be directly attributed to monitoring, specifically the cost of water analysis. This cost about 0.12 USD per person per year. Many other direct support costs are likely included in other personnel and travel cost categories.
Expenditure on indirect support (ExpIDS)	Tax expenses and state fees were attributed to the indirect support costs, and were estimated at about 0.13 USD per person per year. As with ExpDS, other costs such as personnel would be difficult to segregate.
Total Expenditure (TotEx)	Included: OpEx, CapManEx, CoC, ExpDS, ExpIDS Recurring Costs: 11.22 USD/person/year Revenue: 12.72 USD/person/year
	Data year: 2018

SMART Centres

CBM-3 NGO-1

Country/ Countries of operation	Established: Tanzania, Malawi, Mozambique, Zambia Early Stages: Ethiopia, Kenya, Nicaragua
Context Description	In 2015, rural Zambia had basic water service coverage as low as 15% for all but the richest quintile. SMART Centres focus on serving these rural environments to meet the needs of the 10-20% of people not easily reached by community water supply. For instance, Zambia averages a population density of 12.7 people per square km, forcing people to travel long distances to reach an improved source.
Water System Description	SMART Centres promote a number of cheap WASH products and services that allow for incremental improvement of water supply. Technologies include Rope pumps, EMAS pumps, manually drilled wells, rainwater harvesting tanks, low pressure drip irrigation systems, and water filters. They primarily provide training and support to the local private sector for entrepreneurs and technicians to service and sell these products. With this business, SMART Centres can promote self-supply alternatives to the rural population.
Tariffs	SMART Centres collect revenue from two sources: selling training and contracting. Training is largely subsidized by NGO's looking to grow self-supply. However, entrepreneurs trained by the SMART Centre can then be contracted for welding, repairs, or drilling services to those using the technologies promoted.
Tariff Collection and fund management system	It is common for 15 to 20 people to pool funding for the technology and installation costs. This revenue may go to the local entrepreneurs that were trained by a SMART Centre, rather than the company itself. In this way, a SMART Centre acts as a promotional and supporting entity.
Social inclusion policies	The entire concept of the SMART Centre is to focus on inclusion of households in need of alternative, cheaper water supply solutions.
Name(s) of funding/backing organisations (if applicable)	MetaMeta, Aqua for All, Skat Foundation
Further Information / References	http://smartcentregroup.com/ http://smartcentregroup.com/wp-content/uploads/2017/06/RWSN-SMART-Centre-app.-M-v-D.-Paper.pdf

SMART Centres Life Cycle Costs

Capex	Opex	CapManEx	CoC	ExpDS	ExIDS
Responsible and covered	Not responsible	Not responsible	No information	Responsible and covered	No information

Life Cycle Costs	A SMART Centre is likely to be subsidized and supported largely through NGO's or the government as a capacity building and support entity. The operational costs of running the SMART Centre in Tanzania are about 35,000 USD per year, on average. This includes the training of 20 to 40 people, quality control and follow-up, and the installation of 50 to 150 wells. The greatest financial benefit is provided through the trained entrepreneurs, businesses, and decreased cost of improved water supply through self-investment. Supported self-supply is estimated to cost 10 USD/capita rather than 40 USD/capita for community water supply.
Capital expenditure – hardware and software (CapEx)	Examples of costs paid by customers: Rope Pump: 100 – 130 USD Drip Irrigation: 15 – 25 USD / 100 sq. m Water Filters: 18 – 100 USD Hand Dug Wells: Up to 500 USD
Operating and minor maintenance expenditure (OpEx)	OpEx costs designated to family units.
Capital maintenance expenditure (CapManEx)	CapManEx costs designated to family units.
Cost of capital (CoC)	-
Expenditure on direct support (ExpDS)	Training for technical crafts (masonry, plumbing), hygiene knowledge, quality control, and the cost of SMARTech products are included in the 35,000 USD/year. Monitoring of installations is not included.
Expenditure on indirect support (ExpIDS)	-
Total Expenditure (TotEx)	Includes: CapEx, ExpDS 35,000 USD/year for institutional support and capital expenditures 10 USD/person/year for improved self-supply
	Data year: 2015

Spring Health

PV-2

Country/Countries of operation	India (Orissa)
Context Description	In 2015, 85% of people in rural India had at least "Basic" water service.[15] In 2016, the average income in Orissa was 2.80 USD/day. The climate in Orissa is primarily tropical.
Water System Description	A poly tank is installed near communal wells. The water in the tank is treated by chlorination and microfilters, if necessary. Jerry cans of the treated water are then transported daily by a rickshaw to households paying for Spring Health's service. The volume delivered is usually sufficient to cover drinking water needs.
Tariffs	5 Rupees (0.07 USD) per jerry can (20 L) for home delivery.
Tariff Collection and fund management system	Payment is typically made when water is delivered to the home or upon pick-up. Since the business is run privately, tariff payment translates directly to revenue for the entrepreneur.
Social inclusion policies	Households that do not wish to pay for home delivery can choose to pay just 4 Rupees to pick up their water.
Name(s) of funding/backing organisations (if applicable)	Winrock International, Inc. Antenna Foundation Acumen Fund
Further Information / References	http://www.paulpolak.com/_slide/spring-heath/ https://rwsnforum7.files.wordpress.com/2016/11/full_paper_0175_submitter_0260_heierli_urs-1.pdf

[15] https://washdata.org/ (accessed 01.08.19)

Spring Health Life Cycle Costs

Capex	Opex	CapManEx	CoC	ExpDS	ExIDS
Responsible and covered	Responsible and covered	Responsible and covered	No information	Responsible and covered	No information

Life Cycle Costs	When accounting for treatment and delivery costs in 2016, it was estimated that a Spring Health entrepreneur would need 85 customers within a village to breakeven on costs. At a rate of 5 R/day, this would equate to about 180 USD per month. This does not include additional marketing and some support costs.
Capital expenditure – hardware and software (CapEx)	Initial capital expenses typically include purchasing and installing the poly tank, plumbing, community engagement, and the initial marketing campaigns conducted by the company. An initial investment is expected to cost around 1000 USD.
Operating and minor maintenance expenditure (OpEx)	Operating costs typically include entrepreneur commission, overhead costs for executives assigned to four villages, chlorine and filtering costs, and fuel. The majority of the 180 USD is directed towards these costs.
Capital maintenance expenditure (CapManEx)	The only major asset reported for long-term replacement is the poly tank over 20 years. Auto rickshaws are outsourced so Spring Health is not responsible for their maintenance and repairs.
Cost of capital (CoC)	-
Expenditure on direct support (ExpDS)	Direct support costs are typically not separated from the OpEx costs (which include training), but are minimized.
Expenditure on indirect support (ExpIDS)	-
Total Expenditure (TotEx)	Included: CapEx, OpEx, CapManEx, ExpDS 180 – 200 USD/month/installation Home Delivery: 27 USD/person/year
	Data year: 2015

Uduma

PV-1

PPP

Country/Countries of operation	Burkina Faso
Context Description	As of 2015, 67.6% of people in rural Burkina Faso had access to an improved water source (Basic and Limited)[16]. There are 937 piped water schemes in the country, with overall functionality rates not exceeding 84%[17].
Water System Description	Uduma stands for the professionalization of the management of the water supply systems. The private company has been operating piped water schemes in Burkina Faso since 2008 on the basis of contracts with municipalities. In 2018, Uduma managed 27 schemes (partly solar) with 198 tap stands and 281 household connections. The piped systems provide approximately 100,000 people with drinking water services. Half of the schemes are part of a build-operate-transfer model, whereby the operator, Uduma, leads design and construction of the water system. Uduma is then responsible for long-term maintenance of the equipment. All dimensions of the water supply chain are the responsibility of one actor (the operator): construction, maintenance, operations, revenue collection, water quality control, extension works, monitoring. The responsibilities of the operator and the water tariff are set by the contracting authority (the municipality) and recorded in the contract, to which the operator is held liable.
Tariffs	The tariff is established by the local authorities. Users pay 0.85 USD/m³ at the standpipe and at the household connection.
Tariff Collection and fund management system	For the standpipes and manual pumps, revenues are collected in cash by water point caretakers on a pay-as-you-fetch basis. The household connections are billed post-paid. All collected revenues are centralized by making use of the local banking systems and through mobile money transfers. A cashless electronic payment system is being piloted in 2019.
Social inclusion policies	In the public procurement process for the delegated management of the piped schemes, less profitable systems are grouped with the more profitable systems, so as to allow for cross-subsidizing and keeping one flat tariff for all users. Communal and national water taxes are paid on all water sales.
Name(s) of funding/backing organisations (if applicable)	Odial Solutions Vergnet-Hydro
Further Information / References	www.uduma.net

[16] https://washdata.org/ (accessed 01.08.19)
[17] Burkina Faso *Programme National d'Approvisionnement en Eau Potable 2016-2030*, available at https://www.pseau.org/outils/ouvrages/mea_PN_AEP_2016_2030.pdf

Uduma Life Cycle Costs

Capex	Opex	CapManEx	CoC	ExpDS	ExIDS
Not responsible	Responsible and covered	Responsible and covered	Not responsible	Responsible and covered	Responsible and covered

Life Cycle Costs	Uduma takes responsibility for the OpEx, CapManEx, ExpDS, and ExpIDS costs associated with water treatment and service provision. Their goal is to cover all of these costs solely based on user tariffs, and are not subsidized for operations. Capital expenditures and the associated loans are considered the responsibility of the government. Life-cycle cost calculations were based on 27 piped schemes in Burkina Faso. The total annual expenditure for all systems was estimated to be just over 200,000 USD/year.
Capital expenditure – hardware and software (CapEx)	In case of a build-operate-transfer agreement, Uduma designs and builds the water systems, but the government is responsible for the construction and investment costs. However, Uduma still accounts for other annual capital costs - specifically an average of 414 USD/system/year in 2018 (mainly for software).
Operating and minor maintenance expenditure (OpEx)	OpEx costs include operations, salaries, fuel, revenue collection, water quality testing, and maintenance functions. Operating costs for the piped systems amounted to 5880 USD/system/year in 2018 (includes ExpDS and ExpIDS).
Capital maintenance expenditure (CapManEx)	Major repairs and rehabilitations were calculated to be 1242 USD/system/year in 2018.
Cost of capital (CoC)	-
Expenditure on direct support (ExpDS)	Grouped under OpEx cost estimates.
Expenditure on indirect support (ExpIDS)	Grouped under OpEx cost estimates.
Total Expenditure (TotEx)	Included: OpEx, CapManEx, ExpDS, ExpIDS, soft CapEx 1.27 USD/person/year

Data year: 2018

Water for Good

CBM-2

Country/Countries of operation	Central African Republic
Context Description	The Central African Republic is ranked 188th – second to last – on the human development index. Only 34% of people have access to at least "Basic" water services[18], with a fairly even distribution across wealth quintiles. A combination of extremely low population density, and few handpump installations creates a challenging environment for service delivery.
Water System Description	Four maintenance teams, each composed of two technicians and one data collector, carry out bi-annual, circuit-rider, preventative maintenance and small repair services across 7 of the 16 prefectures. They service approximately 1800 hand pumps used by 500,000 to 600,000 people. Two individual technicians are presently servicing hand pumps in Bangui, the capital, and Berberati, the country's second largest city.
Tariffs	Tariff targets are set at 80 USD per well, or about 0.16 USD per person. In 2018, about 500 well committees paid roughly half this amount. Non-payment is primarily attributed to low economic activity and unplanned visits of the maintenance teams, preventing the preparation of funds.
Tariff Collection and fund management system	Until 2019, tariffs were collected by technicians during their bi-annual maintenance visits. When funds were collected, a receipt was issued for the well-committee, and a picture of the receipt was taken, stored, and uploaded to Water for Good's server from the maintenance teams' iPad. Presently, tariffs are collected more systematically, rather than randomly, so communities can more effectively prepare.
Social inclusion policies	Well committees identify households that may require subsidies or exclusion from payment.
Name(s) of funding/backing organisations (if applicable)	charity: water
Further Information / References	https://waterforgood.org/

18 https://washdata.org/ (accessed 01.08.19)

Water for Good Life Cycle Costs

Capex	Opex	CapManEx	CoC	ExpDS	ExpIDS
Not responsible	Responsible and covered	Responsible but not covered	Not responsible	Not responsible	Not responsible

Life Cycle Costs	Water for Good has deferred their life cycle cost reporting, as they have recognized the present form of their data records would be subjective and conditional. However, assigned responsibilities are shown below.
Capital expenditure – hardware and software (CapEx)	Charity: Water and other donors are typically responsible for capital expenditures and construction costs.
Operating and minor maintenance expenditure (OpEx)	OpEx costs are funded through the tariffs provided by the well committees.
Capital maintenance expenditure (CapManEx)	CapManEx are not yet covered by the tariffs collected, but steps are being made to accomplish this.
Cost of capital (CoC)	Any CoC costs are included within donor funding.
Expenditure on direct support (ExpDS)	ExpDS is provided through Water for Good donor funding.
Expenditure on indirect support (ExpIDS)	ExpIDS is provided through Water for Good donor funding.
Total Expenditure (TotEx)	The service program developed by Water for Good in the Central African Republic is supported by a combination of donor funding and tariff collection.

Data year: 2018

Water Mission

CBM-2 NGO-1 NGO-3 LG-3 PV-1 PV-2

Country/Countries of operation	Peru, Haiti, Kenya, Indonesia, Honduras, Tanzania, Malawi, Mexico, Uganda
Context Description	Water Mission has worked with more than 1000 solar water pumping systems in 15 countries since 2008. There is a wide range of rural contexts that their systems have been implemented. According to JMP records, rates of "Basic water service" could be as high as 97% for wealthy Hondurans, or as low as 19% for poor Tanzanians. The eight countries highlighted in this case study fall at various service levels in this range.
Water System Description	Water Mission is a non-profit company that provides design, construction, and support services to communities in need of clean water solutions and to other implementing agencies. While they provide a number of technological alternatives, the innovations highlighted in this case study focus on their solar pumping design. The design consists of a submersible pump, a decentralized water treatment centre, and an elevated storage tank for distribution to multiple tap stands. The entire system is powered by solar panels, which have shown increasing potential for efficient long-term energy costs for improved water service.
Tariffs	Water Mission does not take responsibility for tariff pricing, but invests in building the capacity of community-based water committees to set tariffs, which manage the trade-offs between sustainability, affordability and risk, and to collect and handle revenues through up-front training and through ongoing support arrangements.
Tariff Collection and fund management system	Tariff collection may occur monthly, seasonally, or when fetching water according to preferred, local management practices. On average, water supply systems supported by Water Mission have 350 USD saved after 1 to 2 years. 20% of the communities supported by Water Mission have bank balances greater than 1,000 USD.
Social inclusion policies	Water Mission works with community-based management to develop budgets and set water prices that balance cost recovery goals with affordability. Water committees and other socially-minded entities in the community such as local faith actors identify households that are not able to pay and co-develop customized mechanisms for allotting and tracking free or reduced price distribution of water to those households.
Name(s) of funding/backing organisations (if applicable)	
Further Information / References	https://watermission.org/wp-content/uploads/2017/10/Armstrong-2654.pdf

Water Mission Life Cycle Costs

Capex	Opex	CapManEx	CoC	ExpDS	ExIDS
Not responsible	Responsible and covered	Responsible but not covered	Not responsible	No information	No information

Life Cycle Costs	The following estimates are based on Water Mission's records for 85 rural solar pumping systems. Life-cycle costs are attributed to three population groups, including small schemes (<500 people), medium schemes (500-5000 people), and intermediate schemes (5000-15,000 people). 84 of the systems were shown to collect enough revenue to cover at least OpEx costs for the water system.
Capital expenditure – hardware and software (CapEx)	CapEx costs include engineering design, water source development, yield and quality testing, construction, equipment, and materials. • **Intermediate**: 60,769 USD or 9.58 USD/person • **Medium**: 60,960 USD or 39.17 USD/person • **Small**: 46,733 USD or 139.60 USD/person
Operating and minor maintenance expenditure (OpEx)	OpEx costs were calculated based on data from logbooks for each solar system, with an average operating period of 21 months. Costs included water treatment supplies, water quality monitoring, administration, tariff collection, salaries, marketing, public relations, and conflict resolution. • **Intermediate**: 68 USD/month or 1.09 USD/person/year • **Medium**: 83 USD/month or 0.52 USD/person/year • **Small**: 30 USD/month or 0.11 USD/person/year
Capital maintenance expenditure (CapManEx)	CapManEx costs are estimated by considering the life for a given part in the system and their future costs based on an inflation rate of 2.8%. Present value replacement cost of a medium scheme in 2017 was about 37,900 USD. • **Medium**: 1.51 USD/person/year
Cost of capital (CoC)	-
Expenditure on direct support (ExpDS)	-
Expenditure on indirect support (ExpIDS)	-
Total Expenditure (TotEx)	Included: CapEx • **Medium**: 39.17 USD/person Included: OpEx, CapManEx • **Medium**: 2.03 USD/person/year
	Data year: 2018

WaterCredit

NGO-1 other

Country/Countries of operation	Kenya and Uganda
Context Description	Overall, in 2015, in rural Kenya, 50% of people had access to a "Basic Water service[19]. Within that, there is a disparity between rich and poor, with 70% of the richest quintile having access to a "Basic" water service but only 28% of the poorest quintile having similar access.[20] In rural Uganda, 32.5% of people had access to at least a "Basic" water service.[1] This rate is consistent across most quintiles, with the exception of nearly 50% of the richest households having "Basic" water service.[2]
Water System Description	A loan program was developed in local financial institutions, such as banks or microfinancing, specifically for water and sanitation services or products. Products can include water tanks, pipe connections, shallow wells, toilets, etc. Disbursements are made directly to water and sanitation service providers for purchasing of the product or service, rather than the client, to minimize misuse of the loan.
Tariffs	Loan repayments over a period of 6 to 24 months, at a rate of 16%-22%, were 28 to 30 USD per month, on average.
Tariff Collection and fund management system	The financial institutions will be responsible for managing the funds and collecting the contractually bound loan repayment.
Social inclusion policies	Loans create an avenue for clients to access the financing necessary to improve their water and sanitation facilities. However, only households that can afford the loan repayment rate will be able to take advantage of the WaterCredit program since the financial institutions will be reliant on the profits.
Name(s) of funding/backing organisations (if applicable)	Water.org The MasterCard Foundation ECLOF, Equity, KWFT, SMEP, PostBank
Further Information / References	https://water.org/about-us/our-work/watercredit/ https://rwsnforum7.files.wordpress.com/2016/11/full_paper_0257_submitter_0335_gupta_sanjay.pdf

[19] https://washdata.org/ (accessed 01.08.19)
[20] https://washdata.org/ (accessed 01.08.19)

WaterCredit Life Cycle Costs

Capex	Opex	CapManEx	CoC	ExpDS	ExIDS
Responsible and covered	Not responsible	Not responsible	Responsible and covered	Not responsible	No information

Life Cycle Costs	If the fixed cost of product development is included, a financial institution will need to distribute 4700 loans, or 1,175,000 USD, amortized over ten years to breakeven. This would improve water and sanitation infrastructure for roughly 24,000 people. The endline assessment estimated that a financial margin of 4% could be attained with sufficient loan volume.
Capital expenditure – hardware and software (CapEx)	The financial institution would distribute an average loan size of 572 USD between 2010 and 2015, ranging from 250 to 3000 USD. Accounting for interest, the average loan repayment required by the client would amount to 672 to 720 USD.
Operating and minor maintenance expenditure (OpEx)	The client is responsible for maintaining their water and sanitation products.
Capital maintenance expenditure (CapManEx)	The client is responsible for maintaining their water and sanitation products.
Cost of capital (CoC)	In 2015, it was estimated to cost 27,000 USD per year to manage the water and sanitation loans in addition to the regular operating costs incurred by the financial institution.
Expenditure on direct support (ExpDS)	Water.org and MasterCard Foundation offered technical and financial support through 'smart subsidies' to get the loan scheme established in five financial institutions. It is estimated to cost 200,000 USD per financial institution to develop the market research, product prototyping, operations, and product rollout across their branches.
Expenditure on indirect support (ExpIDS)	-
Total Expenditure (TotEx)	Included: CapEx, CoC, ExpDS Self-Supply Construction: 50 USD/person

Data year: 2015

Whave Solutions

CBM-3 LG-3 PPP

Country/Countries of operation	Uganda (Amaudat, Kaabong, Kamuli, Kotido, Kumi, Mityana, and Nakaseke Districts)
Context Description	In 2015, in rural Uganda, 32.5% of people had access to at least a "Basic" water service.[21] This rate is consistent across most quintiles, with the exception of nearly 50% of the richest households having "Basic" water service.[22] All districts are considered to be in a tropical climate except Kotido, which has a local steppe climate.
Water System Description	Whave Solutions supports the new installation, rehabilitation, operation and maintenance of both hand-pumps and piped systems by signing a reliability assurance service agreement with each community. These agreements are made under local government regulation. The assurance agreement is similar to insurance. Communities make regular payments for their sources to be covered for preventive action and immediate repair, when necessary. Whave uses the service fee funds collected to manage and pay technicians. These technicians make routine visits to each water source, carry out preventive maintenance to avoid breakdowns, and conduct immediate repairs. The agreement is called a Preventive Maintenance and Continuous Rehabilitation Agreement (PMCRA) because it covers major and minor part replacements. In this way, the community, and the original CapEx investor of the installation, are assured of indeterminate-life functionality without the prospect of a rehabilitation expense or "end-of-life" expense cropping up in the future.
Tariffs	Whave uses a number of hybrid and Pay-As-You-Fetch tariff schemes dependent on the preference of the community. Handpumps and tap-stands have different prices, ranging from 0.005 to 0.014 USD per 20 litres. Similarly, schools and other institutions may have discounts or annual payment plans, while businesses have a higher price for larger consumption. Alternatively, communities can pay annually at a rate of 95 – 162 USD per year, based on the number of collection points. These annual prices are presently discounted, however, in order to build social consensus while payment normalization is attained.
Tariff Collection and fund management system	Whave collects tariffs in two ways. Primarily, the WSC organizes and collects tariffs. In a secondary trial, the service provider collects through a local representative, with surplus costs taken to the WSC. In both cases, annual community bulk service fee payments are made by the community to the service company, Whave. Preventative maintenance and immediacy of repair are incentivized by imposing deductions on the technician's monthly pay. There are future plans to incorporate ATMs for more efficient payment.

[21] https://washdata.org/ (accessed 01.08.19)
[22] https://washdata.org/ (accessed 01.08.19)

Social inclusion policies	A Water and Sanitation Committee (WSC) represents the institutions, businesses, and households sharing a particular source. This entity collects the bulk user annual service fee and has discretion as to how it charges tariffs – for example, it may charge lifeline rates for basic consumption, tiered tariffs, or institutional rates. Based on welfare circumstances, it exempts or reduces tariffs for some households, so that all members of the community have access to water at all times, and no one is turned away for reason of cash poverty.
Name(s) of funding/backing organisations (if applicable)	Mercy Corps, Siemens Foundation, UNICEF, USAID Sustainable WASH Systems programme
Further Information / References	https://www.whave.org/ https://rwsnforum7.files.wordpress.com/2016/11/full_paper_0194_submitter_0250_goring_emma.pdf

Whave Solutions Life Cycle Costs

Capex	Opex	CapManEx	CoC	ExpDS	ExIDS
Not responsible	Responsible and covered	Responsible and covered	Not responsible	Responsible but currently not covered	Not responsible

Life Cycle Costs	It is estimated that recovering costs for OpEx, CapManEx, ExpDS, and ExpIDS will require 315 USD annually from communities. As payment is normalized, the price for service will rise to meet this requirement. This payment will not account for new construction or expansion, as this is considered an investment cost for which the government is responsible.
Capital expenditure – hardware and software (CapEx)	Government or foreign development partners are expected to meet initial CapEx costs on the condition that the source is signed into a PMCR Service Agreement, which assures that all future functionality costs are covered. Presently, there is a large push for a gradual transition from handpumps to piped schemes closer to the home. These investment costs will be negotiated between Whave, the community, and CapEx partners as they mature.
Operating and minor maintenance expenditure (OpEx) and Capital maintenance expenditure (CapManEx)	Costs associated with management, administration, salaries, and hardware (both minor and major) are covered by the annual fees or tariffs in each community. These expectations are laid out in the service agreement.
Cost of capital (CoC)	CoC costs are also expected to be covered by government or foreign development partners, contingent upon a signed agreement.
Expenditure on direct support (ExpDS) and indirect support (ExpIDS)	As Whave matures, it is expected that both indirect and direct support costs can be supported by tariff revenue. At present, costs associated with contract development and monitoring of performance are expected to be covered by the government. However, training and oversight of technicians is the responsibility of Whave.
Total Expenditure (TotEx)	Included: OpEx, CapManEx, ExpDS, ExpIDS Annual Plan: 1.2 USD/person/year Pay-to-fetch: 5.11 USD/person/year
	Data year: 2018

04 REFERENCES & FURTHER INFORMATION

Fonseca C., Franceys, R, Batchelor, C., McIntyre, P., Klutse A., Komives K., Moriarty P., Naafs, A., Nyarko, K., Pezon, C., Potter, A., Reddy, R. and Snehalatha, N. (2011) Briefing Note 1a: Life-cycle costs approach Costing sustainable services, WASHCost, IRC, The Hague, Netherlands

Foster T., S. G. Furey, B. Banks & J. Willetts (2019) "Functionality of handpump water supplies: a review of data from sub-Saharan Africa and the Asia-Pacific region", International Journal of Water Resources Development, DOI: 10.1080/07900627.2018.1543117

Hutton G; Gosling L.; Adank, M.; Boulenouar J.; Naughton M.; S. Fürst and Furey S. G. (2019) Cost effective ways to leave no-one behind in rural water and sanitation. Summary of RWSN E-discussion, RWSN, Skat Foundation, Sankt Gallen

McNicholl, D., Hope, R., Money, A., Lane, A., Armstrong, A., van der Wilk, N., Dupuis, M., Harvey, A., Nyaga, C., Womble, S., Favre, D., Allen, J., Katuva., J., Barbotte, T., Buhungiro, E., Thomson, P., and Koehler, J. (2019). Performance-based funding for reliable rural water services in Africa

RWSN (2009) Handpump Data 2009 Selected Countries in Sub-Saharan Africa, RWSN, St Gallen, Switzerland.

RWSN Executive Steering Committee (2010) Myths of the Rural Water Supply Sector. RWSN Perspective No 4, RWSN, St Gallen, Switzerland

WaterAid/Aguaconsult (2018) "Management models for piped water supply services", WaterAid, October 2018.

Whaley L., MacAllister D.J., Bonsor H., Mwathunga E., Banda S., Katusiime F., Tadesse Y., Cleaver F. and A. MacDonald (2019) Evidence, ideology, and the policy of community management in Africa, Environmental Research Letters, Volume 14, Number 8

World Bank Group (2017) "Sustainability Assessment of Rural Water Service Delivery Models: Findings of a Multi-Country Review". World Bank, Washington, DC.

You can join the online RWSN Sustainable Service community over more than a thousand professionals for free here: dgroups.org/rwsn/sustainable_services_rwsn

Do you want to be in the 2020 Directory?

We hope that you have found this Directory useful. To keep it a living resource we plan to produce an edition every year with new and updated entries. If you are running a rural water supply service, business or pilot you can submit your listing here: www.surveymonkey.com/r/rwsn-directory

Furthermore, we see this becoming the go-to reference for rural water supply products and services so if you would be interested in full, half or quarter page advertising then contact the RWSN Secretariat (ruralwater@skat.ch) for the latest advertising rates.

The RWSN Rural Water Supply Directory is produced in English and French and goes out to our membership of more than 11,000 members in 167 countries.

05 HANDPUMP STATISTICS 2019

In association with the
Water Point Data Exchange (WPDx)
www.waterpointdata.org

In 2007 and again in 2009, RWSN produced a table of estimated figures of handpump functionality for Sub-Saharan African countries[23] which has been widely cited in papers, reports and presentations. Since that time, water point data has become available, thanks to water point mapping tools and the Water Point Data Exchange (WPDx). An analysis of available data from sub-Saharan Africa and the Asia-Pacific region was published in March 2019[24] and summarised below:

Table 1. Handpump functionality statistics for sub-Saharan Africa

Country	Year(s)	Scope	Handpumps	Non-functional
Angola	2015	National	4,389	25%
Benin	2016	National[25]	13,003	12%
Burkina Faso	2017	National	52,596	11%
Burundi	2012	National	229	58%
Cameroon	2011-15	189 of 316 communes	6,899	32%
Central African Rep.	2003	National	3,177	25%
Chad	2000	National	3,267	16%
Congo (Brazzaville)	2008	1 of 10 rural depts.	159	50%
Dem. Rep. of Congo	2011	National sample	2,214	25%
Cote d'Ivoire	2016	National	22,807	30%
Eritrea	2006	National	864	43%
Ethiopia	2010-14	2 of 9 regions	4,620	33%
Gabon	2012	National	1,158	47%
Ghana	2014	6 of 10 regions[26]	32,361	26%
Guinea	2012	National	12,815	18%
Guinea-Bissau	2016	Sub-national[27]	3,190	36%
Kenya	2013	9 of 47 counties	2,580	24%
Liberia	2017	National	12,684	20%
Madagascar	2018	National[28]	15,068	20%
Malawi	2007	National[29]	24,769	22%
Mali	2015-16	5 of 8 regions	19,951	29%
Mauritania	2012	1 of 15 regions	71	54%
Mozambique	2011-12	93 of 128 districts	12,180	20%
Namibia	2000	2 of 14 regions	94	54%
Niger	2015	National	10,072	15%
Nigeria	2006	35 of 36 states[30]	26,423	42%
Rwanda	2008-09	6 of 30 districts	279	16%
Senegal	2014	National	2,903	22%
Sierra Leone	2016	National	11,895	25%
South Africa	2000	8 of 44 districts	34,130	27%

[23] RWSN 2009
[24] Foster *et al* 2019
[25] 2014–15 mapping of handpumps in 6 of 11 Departments found a non-functionality rate of 21%
[26] A 2013 service level assessment of 568 handpumps in three districts found a non-functionality rate of 19%
[27] Data refer to boreholes with handpumps, and data collection is ongoing.
[28] A survey of 121 handpumps in 2013 found a non-functionality rate of 29%
[29] A 2015 inventory of handpumps in Chikwawa District found a non-functionality rate of 22%
[30] Data not collected for Borno State due to security concerns. A 2012 inventory of 21,135 handpumps in 661 of 774 local government areas found a non-functionality rate of 36% while a 2015 inventory of 6108 handpumps in 20 local government areas found a non-functionality rate of 29%

Country	Year(s)	Scope	Handpumps	Non-functional
South Sudan	2009-11	5 of 10 states	11,790	20%
Sudan	2009	6 of 18 states	12,058	35%
Swaziland	2013-15	National	801	28%
Tanzania	2011-13	27 of 31 regions	22,021	33%
Togo	2006-7	National	4,550	30%
Uganda	2016	National	58,366	19%
Zambia	2007	National	25,624	27%
Zimbabwe	2014-17	6 of 8 provinces	29,986	28%
TOTAL				**26%**

Table 2. Handpump functionality statistics for the Asia-Pacific region

Country	Year(s)	Scope	Handpumps	Non-functional
Afghanistan	2013-14	194-398 districts	24,504	36%
Bangladesh	2017	National	1,656,695	9%
Cambodia	2008-14	48-163 districts	136,722[31]	7%
India[32]	2013-17	National	5,723,533	6%
Kiribati	2003	4 of 24 councils	187	81%
Laos	2015	2 of 147 districts	720	35%
Philippines	2014	6 of 81 provinces	10,743	10%
Timor-Leste	2007-8	3 of 13 districts	99	47%
Vanuatu	2014-16	60-66 council areas	245	12%

For full details of methods, data sources and limitations please refer to:

Foster T., S. G. Furey, B. Banks & J. Willetts (2019) "Functionality of handpump water supplies: a review of data from sub-Saharan Africa and the Asia-Pacific region", International Journal of Water Resources Development, DOI: 10.1080/07900627.2018.1543117

Also note that the concept of "functionality" as a binary (yes/no) statistic is a simplification of a complex situation, and forthcoming work from the UPGro Hidden Crisis (e.g. Whaley *et al.*)[33] project is anticipated to provide more insights and evidence. Furthermore, work by Oxford University (e.g. McNicholl, D., *et al.* (2019).) emphasises the importance of down-time as an importance service delivery metric.

[31] Sample includes privately owned handpumps.
[32] In 2009, India's Ministry of Drinking Water and Sanitation reported 4,155,000 handpumps, with 11.8% non-functional
[33] https://upgro-hidden-crisis.org/ and https://upgro.org/consortium/hidden-crisis2/

06 KEY & GLOSSARY

Label	Meaning
Name of project or organisation	Either the name of the management model or the organisation who runs or has designed it.
Name(s) of funding/backing organisations	Any major backers.
Country/Countries of operation	Locations where the service is being run
Type of Service Provision	See back cover
Type of Management Model	See back cover
Context Description	A thumbnail sketch of where the service is being used.
Water Service Description	A short description of the service model.
Tariffs	Typical tariffs that water user pays (in local currency and US dollars)
Tariff Collection and fund management system	Description of how money is collected and managed.
Social inclusion policies	How the service addresses affordability and universal access.

Label	Meaning
Life Cycle Costs[34]	A breakdown of the major costs that need to be covered for a service to be sustainable.
CapEx	Capital expenditure – hardware and software
OpEx	Operating and minor maintenance expenditure
CapManEx	Capital maintenance expenditure: replacement / upgrade of CapEx assets
CoC	Cost of Capital: for example interest on loans.
ExpDS	Expenditure on direct support
ExpIDS	Expenditure on indirect support

[34] www.ircwash.org/sites/default/files/briefing_note_1a_-_life-cycle_cost_approach.pdf

GLOSSARY

CBM	Community-Based Management
CWSA	Community Water Supply Association
DWO	Drinking Water Organisation
LCCA	Life Cycle Costing Approach
RWSSP	Rural Water Supply and Sanitation Programme
RWSN	Rural Water Supply Network
SDC	Swiss Agency for Development and Cooperation (also known as DEZA, DDC, COSUDE)
SDG	Sustainable Development Goal
SISAR	A regional rural water service provider in Brazil
SMART	Simple, Market-based, Affordable, Repairable Technologies
UNICEF	United Nations Children's' Fund
USAID	United States Agency for International Development
UPGro	Unlocking the Potential of Groundwater for the Poor (UK-funded research programme)
USD	United States Dollar
WASH	Water, Sanitation and Hygiene
WHO	World Health Organisation
WPDx	Water Point Data Exchange

KEY TO SYMBOLS

Type of Service Provision

Self-supply: households invest in improving their own water supplies (e.g. domestic wells, rainwater harvesting)

Domestic service or programme: the provision of water supplies or services by a locally-driven company or programme.

International humanitarian intervention: the provision of water supplies or services by an internationally-driven humanitarian response or programme.

International development cooperation project: the provision of water supplies or services through the cooperation of international and national entities.

Public-Private Partnership: a formal agreement between a public entity and a private-sector company that can be used to finance, build, and operate water supply.

Institutional Support: the provision of water supply support systems rather than the services themselves (e.g. training, supply chains, or financing mechanisms).

Pilot/Research project: a small scale water supply or service programme for the purpose of research or to provide a 'proof of concept'.

Type of Management Model

CBM-1	Community Based Management – with minimal support.
CBM-2	Community Based Management with external support.
CBM-3	Community Management with delegation to private operators.
CBM-4	Grouping of community managed organisations into large association.
LG-1	Direct management by local government.
LG-2	Local government with delegation to community operators.
LG-3	Local government with delegation to private operators.
PB-1	Public water utility.
PV-1	Ministry or asset holding entity delegates service provision to private company.
PV-2	Privately owned and operated scheme.
NGO-1	International NGO / UN Organisation.
NGO-2	National / Local NGO.
NGO-3	Faith-based Organisation.
other	Other.