
Launch event
17 October
UNIVERSITY OF
OXFORD
WHY IS
THERE A
HANDPUMP
IN THE
CAR PARK?

Smart Water Systems group

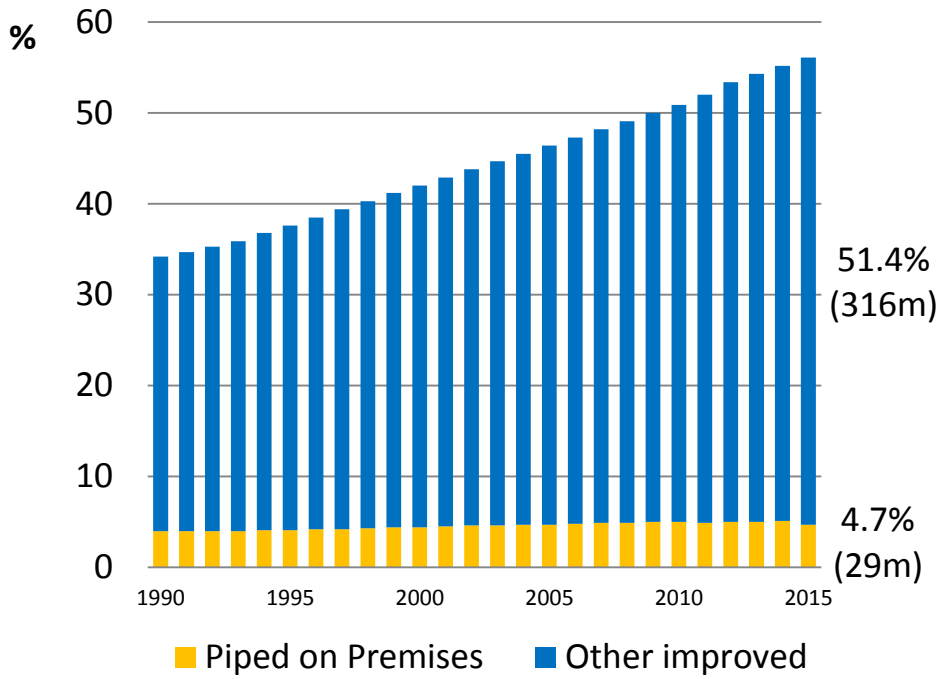
Science-practitioner partnerships which work for the poor

- Novel technology
- Computational informatics
- Institutional design
- Sustainable finance
- Policy reform

The $1bn challenge

Maintaining Africa's rural water infrastructure

Access to improved water sources in rural sub-Saharan Africa[1]



184m handpump users[2]
O&M costs:[3] ~$485m p.a.

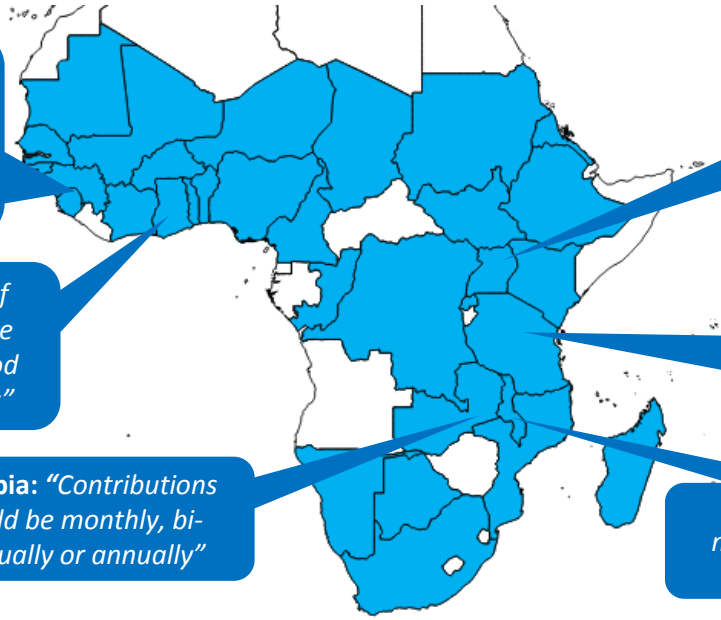
70m standpipe users[4]
O&M costs:[5] ~$490m p.a.

29m with piped connections
O&M costs:[5] ~$205m p.a.

1. Data drawn from WHO/UNICEF Joint Monitoring Programme (2015).
2. Estimate from Macarthur (2014). This corresponds with number of users of boreholes & protected wells, as calculated from JMP country files.
3. Based on mid-points of annual O&M cost requirement of US $2-3 per person (WASHCost 2011, adjusted to 2014 values).
4. Calculated from JMP country files.
5. Based on mid-points of annual O&M cost requirement of US $2-12 per person (WASHCost 2011, adjusted to 2014 values).

Community-based financing of O&M promoted in policy and practice

= country with rural water cost recovery policy or financing plan assuming O&M costs covered by household contributions



Sierra Leone: "*Tariffs… may take the form of levies, monthly payments per household or periodic harvests*"

Uganda: "*Various methods can be adopted for collection of funds depending on the nature of the community*"

Ghana: "*The method of tariff collection… [is] the pay-as-you-fetch method at standpipes or pumps*"

Tanzania: "*Communities will establish a mechanism to pay the full costs of O&M and for higher service levels*"

Zambia: "*Contributions could be monthly, bi-annually or annually*"

Malawi: "*Collecting maintenance funds from each user household*"

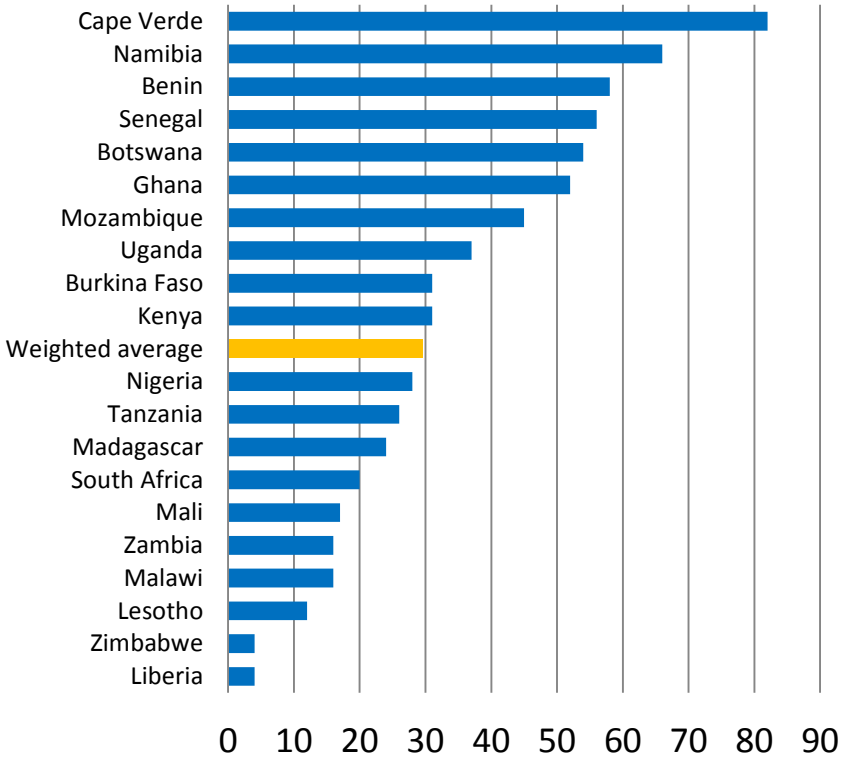
Some policies promote cost sharing for major repairs and rehabilitation

1. Based on information presented in Banerjee & Morella (2011) and GLAAS (2014). Banerjee & Morella (2011) listed countries with a rural water cost recovery strategy. GLAAS (2014) listed countries with a "financing plan [which] defines if operating and basic maintenance is to be covered by tariffs or household contributions". Quotes taken from the following sources: Malawi Ministry of Irrigation and Water Development (2010), Tanzania Ministry of Water and Livestock Development (2002), Zambia Ministry of Local Government and Housing (2007), Uganda Ministry of Water and Environment (2011), Sierra Leone Ministry of Water Resources (2013), Ghana Community Water & Sanitation Agency (2011),

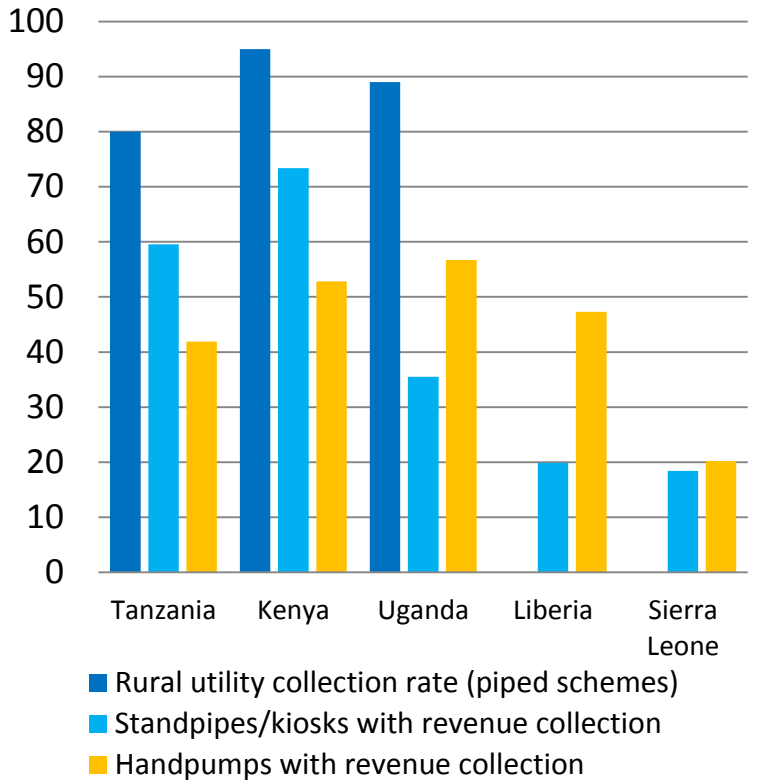
Mismatch between policy and reality

Majority of waterpoints lack revenue collection

Rural households paying for water (2008-09)[1]



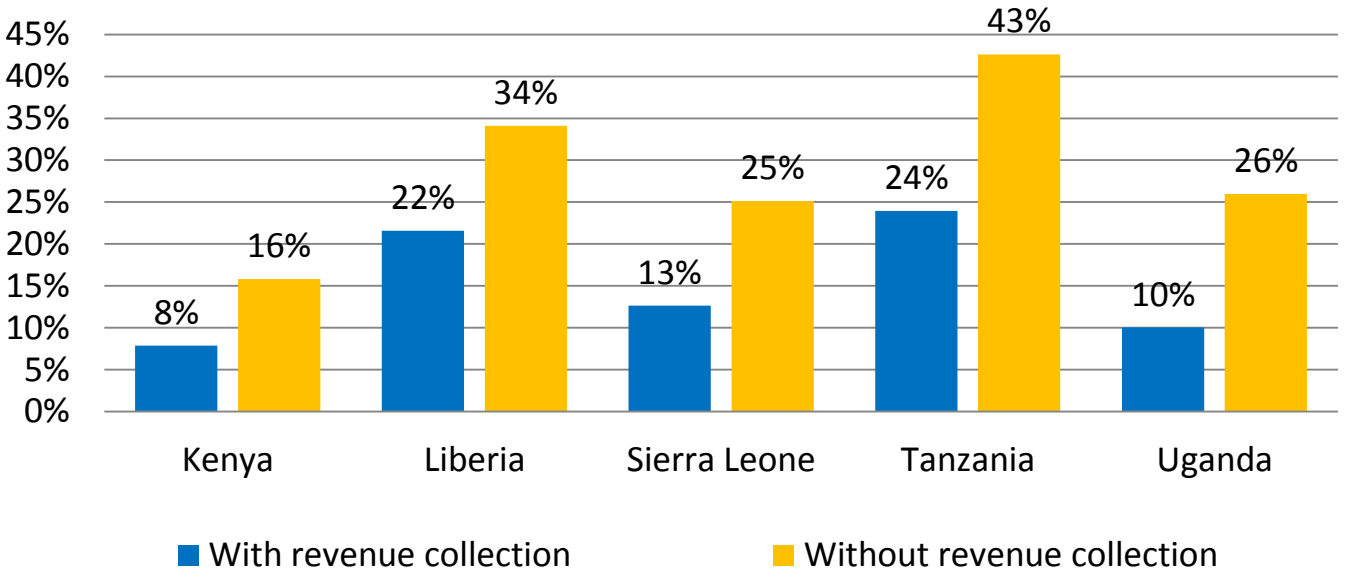
Revenue collection rates[2]



1. n=17,515 (Afrobarometer, 2014). Available at: http://afrobarometer.org/data.
2. Piped scheme data obtained from Uganda Ministry of Water and Environment (2014), WASREB (2014), EWURA (2014). Analysis excludes waterpoints located in urban areas. Analysis based on publicly available waterpoint datasets (Virtual Kenya, 2015; National Water Sanitation and Hygiene Promotion Committee, 2014; Sierra Leone, STATWASH Portal; Government of Tanzania, 2014; Government of Uganda, 2012). For additional data see Waterpoint Data Exchange http://www.waterpointdata.org

Inadequate finance has major operational implications
Non-functionality rate twice as high when no revenue collected

Rural waterpoint non-functionality rates (n=183,149)[1]

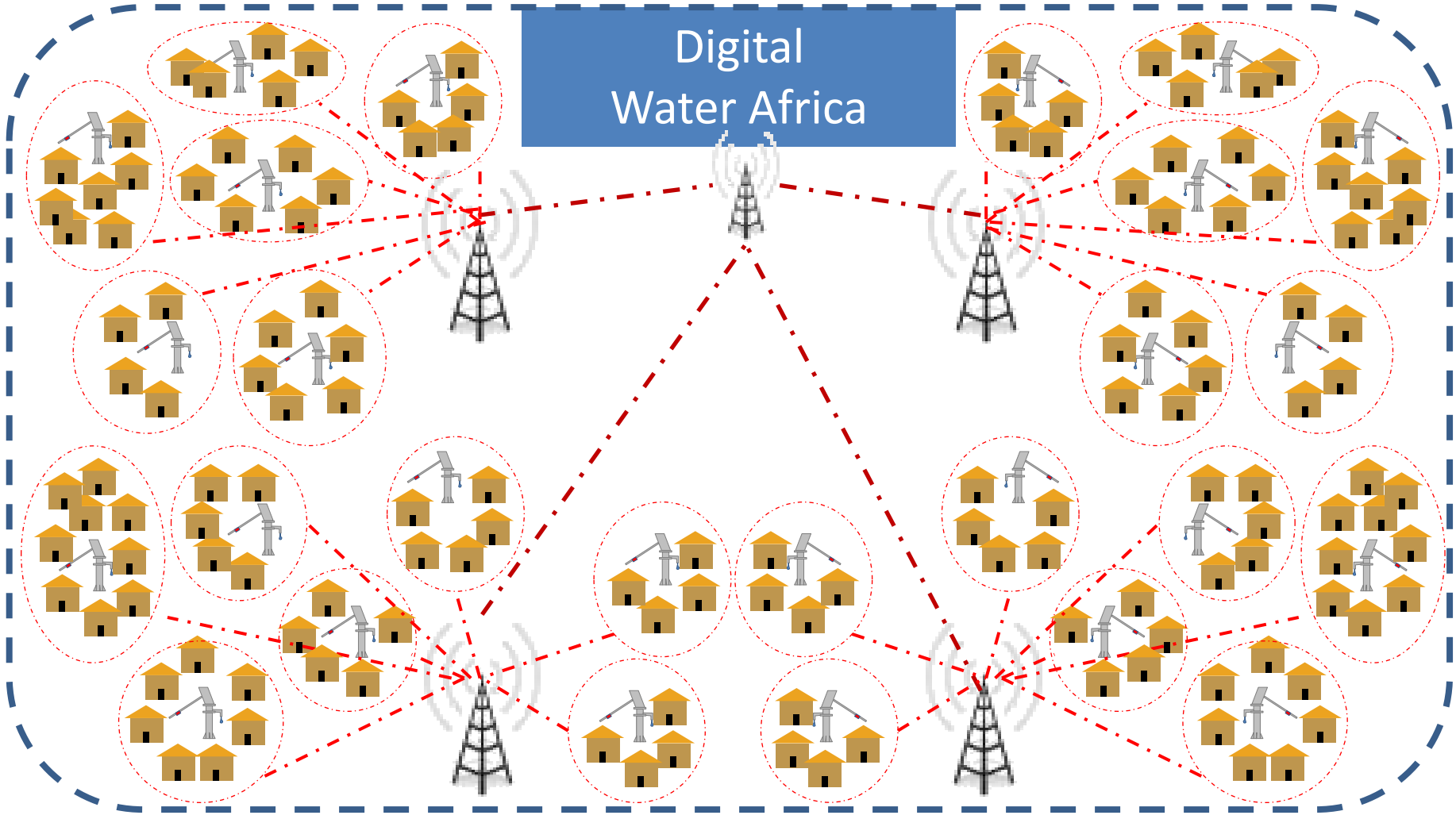


If SDG is to be achieved in rural Sub-Saharan Africa then financial sustainability must be addressed

1. Waterpoints analysed include standpipes, kiosks, handpumps and protected springs. Analysis excludes waterpoints located in urban areas. Data drawn from publicly available waterpoint datasets (Virtual Kenya, 2015; National Water Sanitation and Hygiene Promotion Committee, 2014; Sierra Leone, STATWASH Portal 2014; Government of Tanzania, 2014; Government of Uganda, 2012). For additional data see Waterpoint Data Exchange http://www.waterpointdata.org/

Does scale reduce risk?

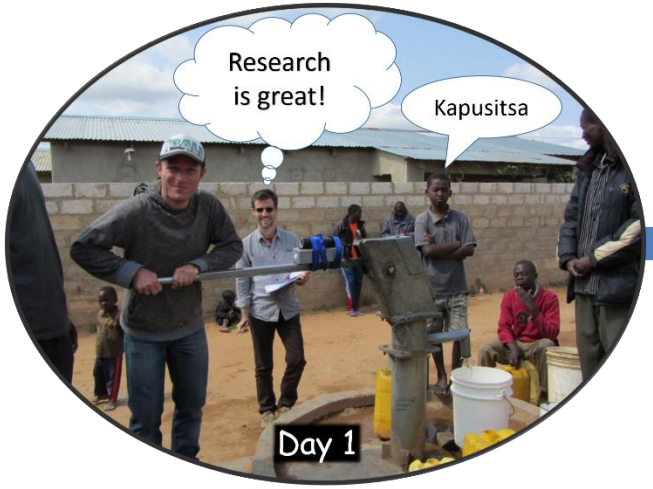
(operational, financial, institutional)



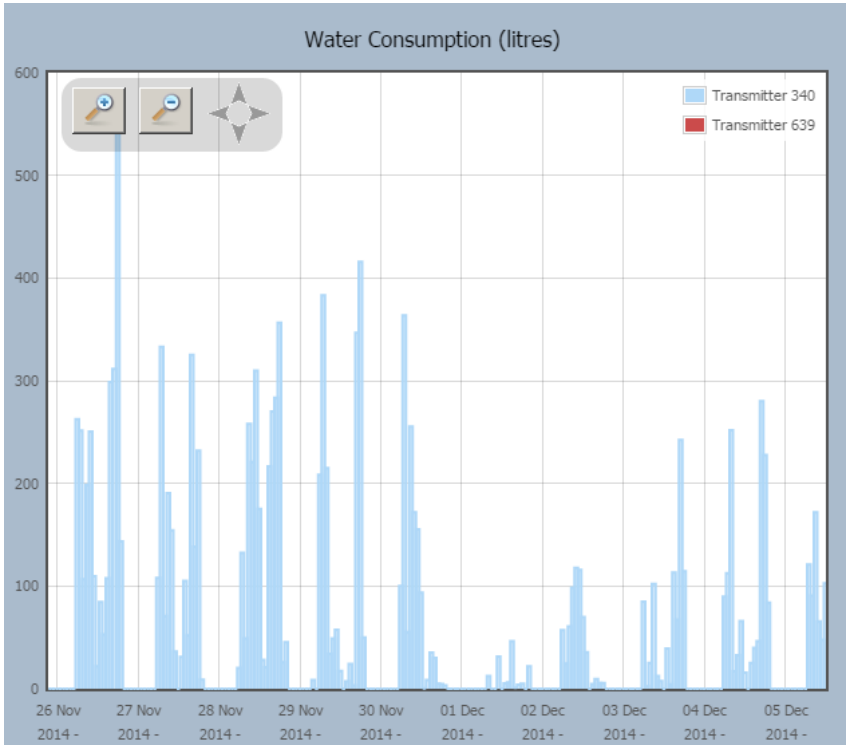
Development of the '*Smart Handpump*'

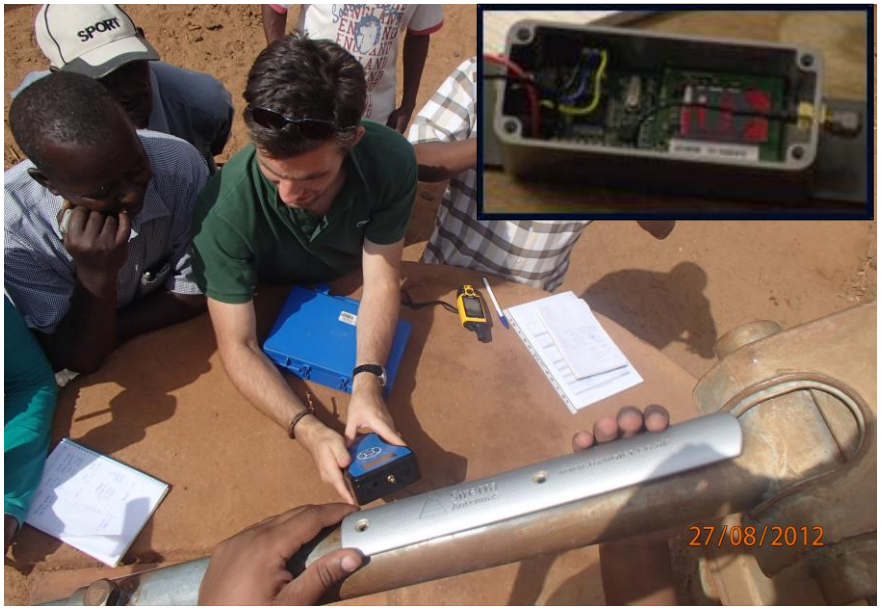
- What is a 'Smart Handpump'?
- How did it come into being?
- What does it tell us?
- What more might it tell us?

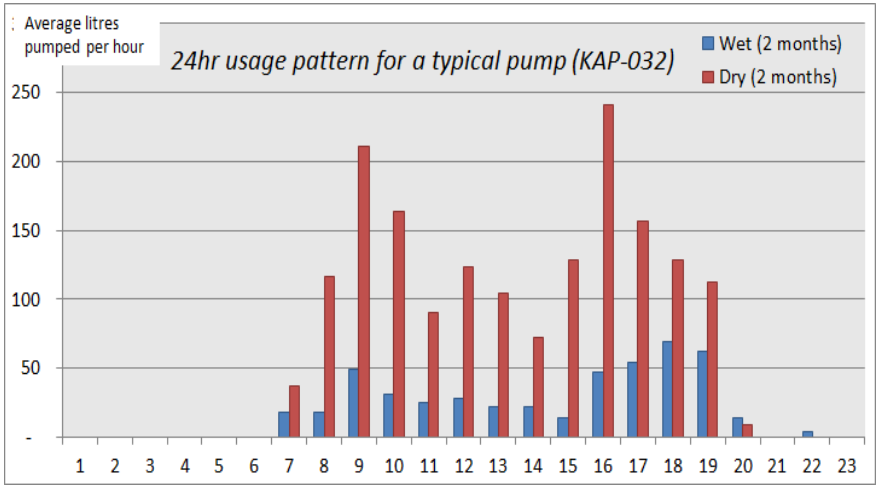
Initial research and development in Zambia



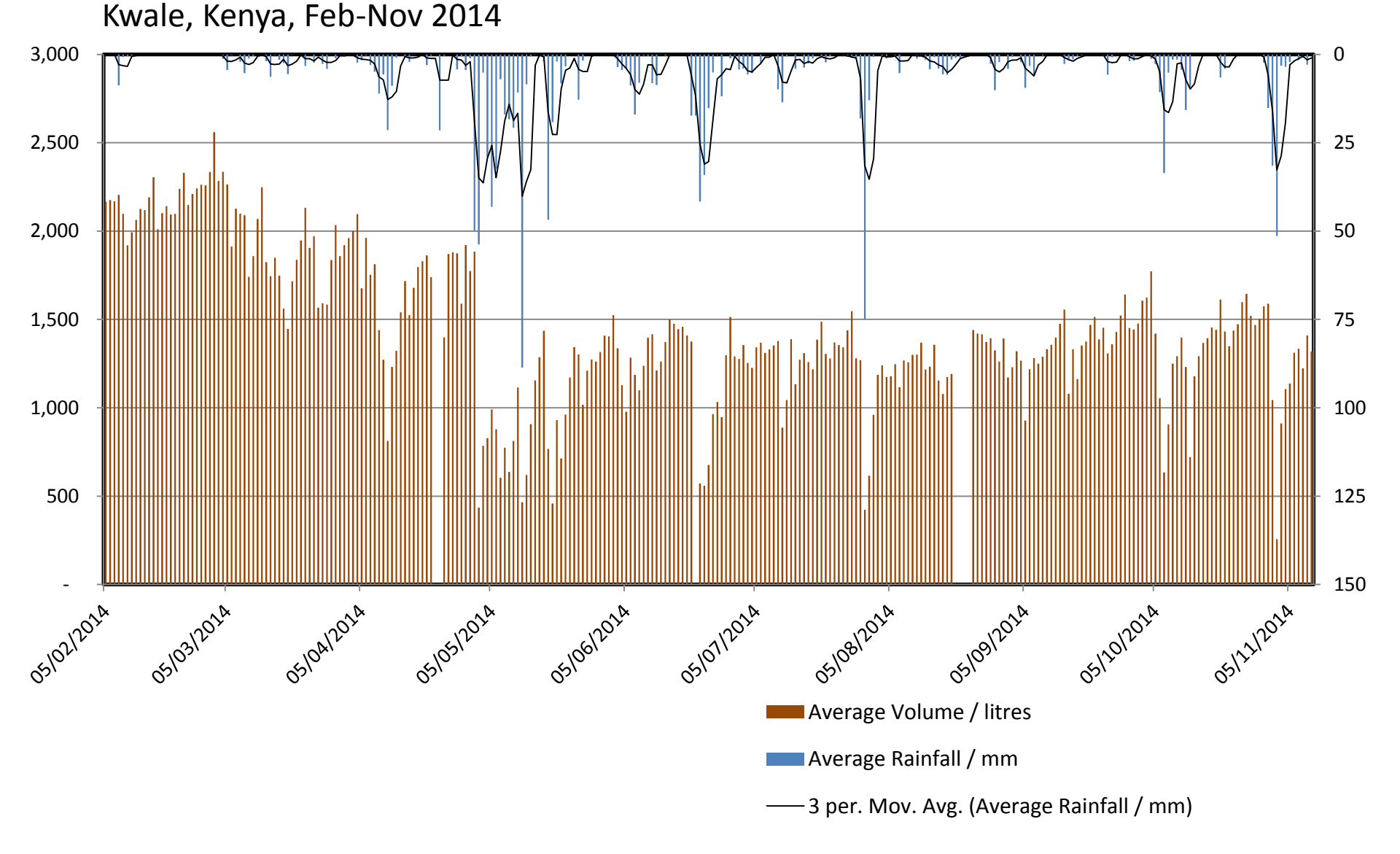
Operational Deployment in Kenya







New insights into rainfall patterns and water use



What on earth do jet engines have to do with handpumps?

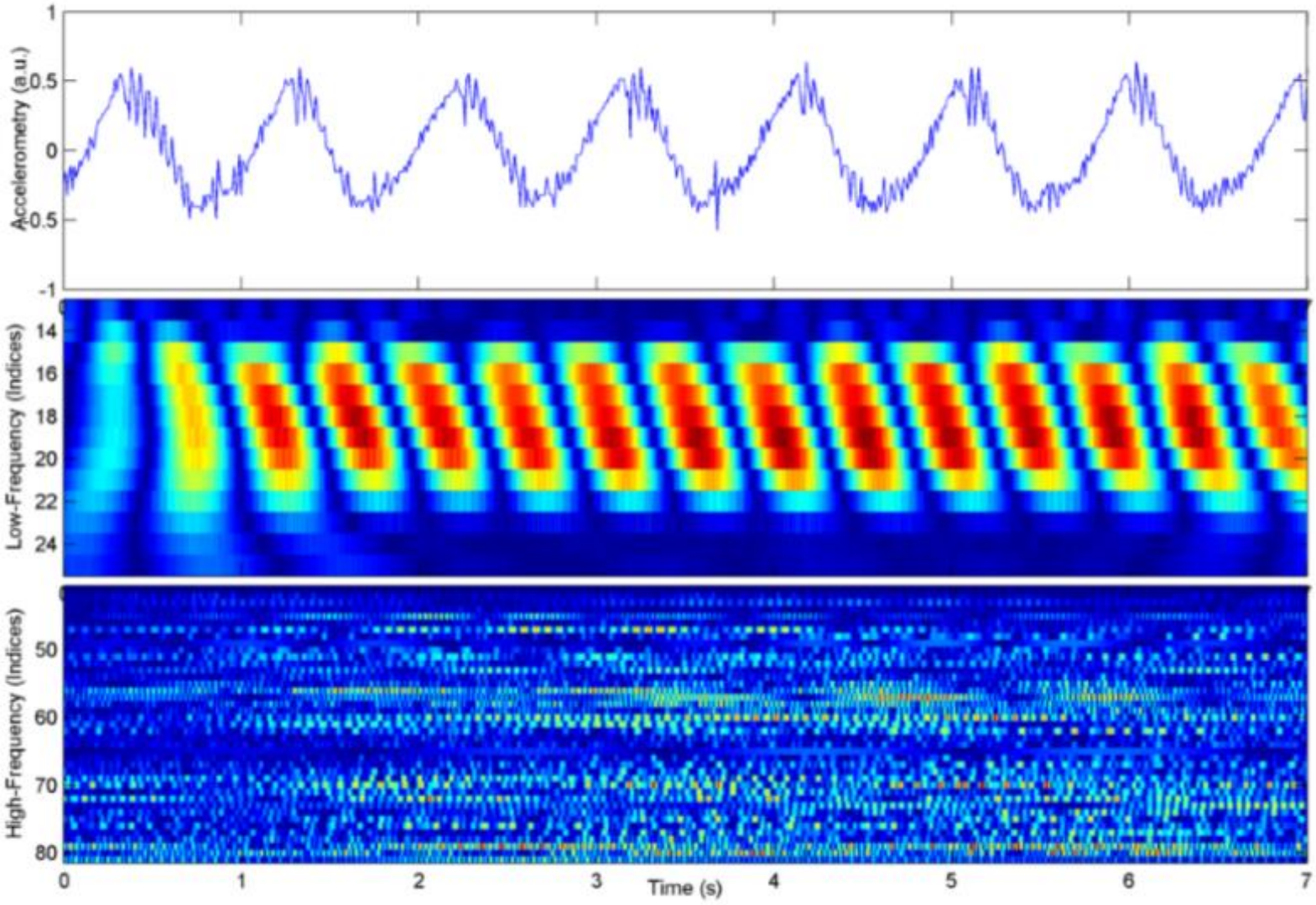
Condition monitoring

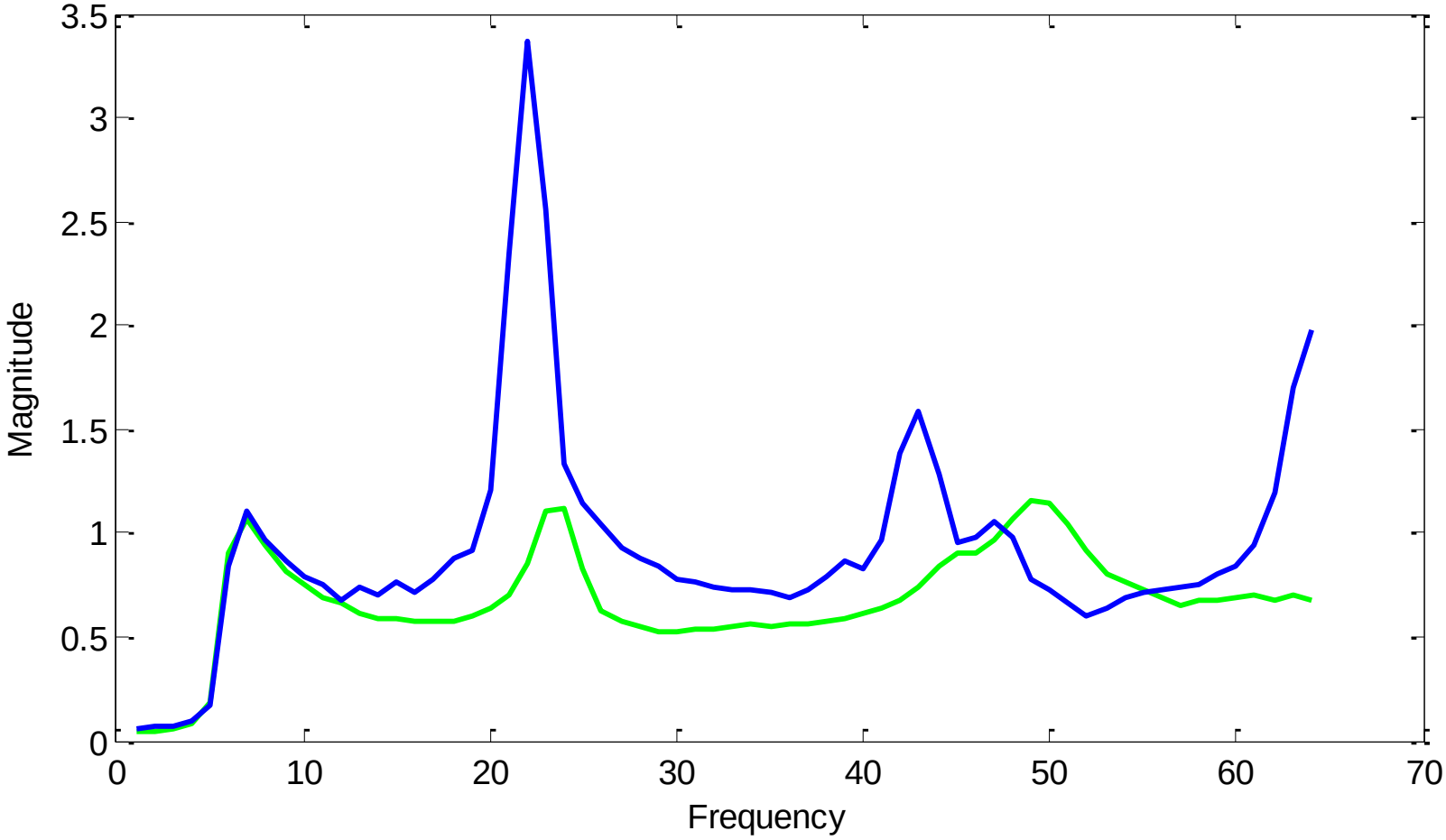
Predicting failure events for human patients and handpumps

Consumer devices

Clinical devices

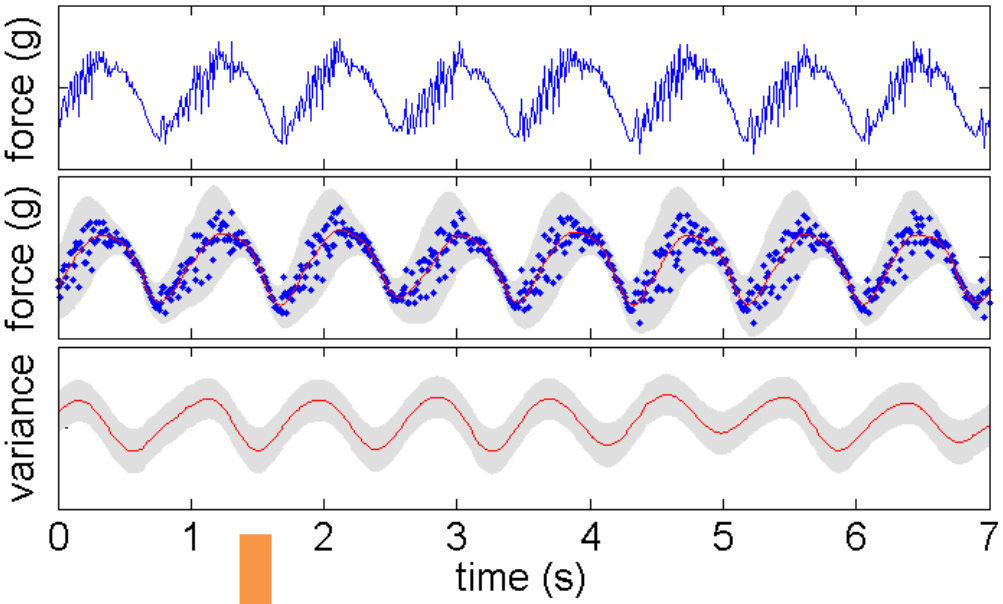
Disposable sensors

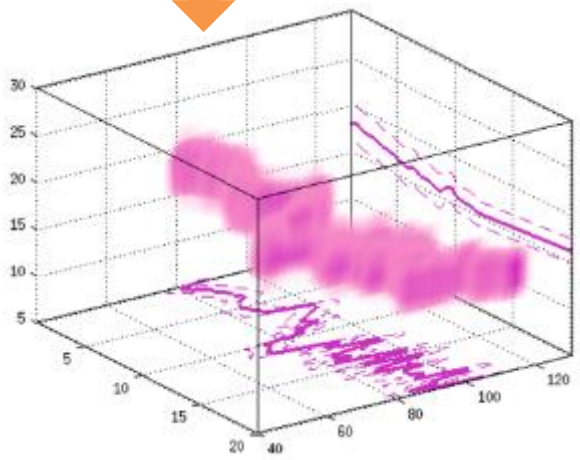

Accelerometry (a.u.)
1
0.5
0
-0.5
-1
Low-Frequency (Indices)
14
16
18
20
22
24
High-Frequency (Indices)
50
60
70
80
0
1
2
3
Time (s)
4
5
6
7

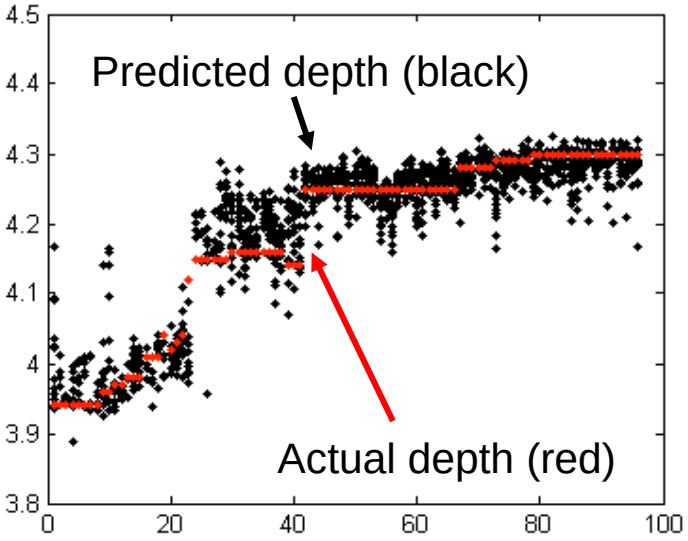

3.5
3
2.5
2
1.5
1
0.5
0
Magnitude
0
10
20
30
40
50
60
70
Frequency

Accidental Infrastructure

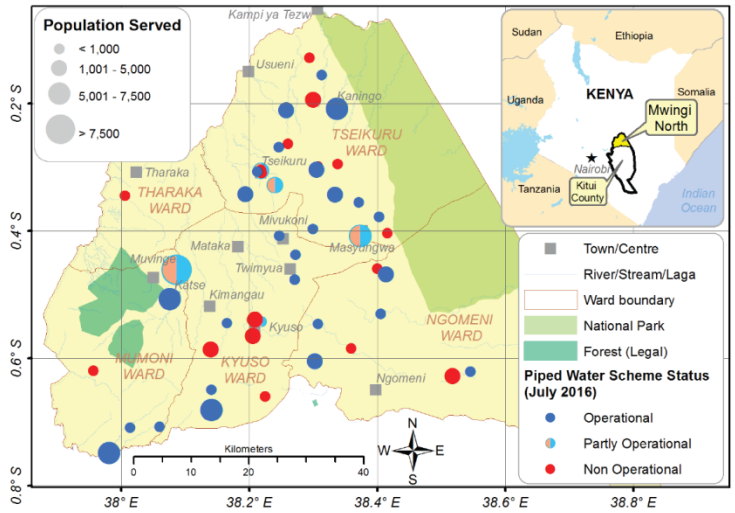
Aquifer estimation via accelerometry

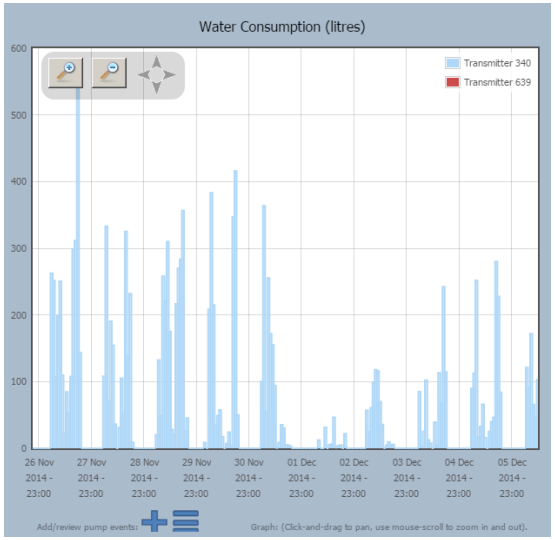


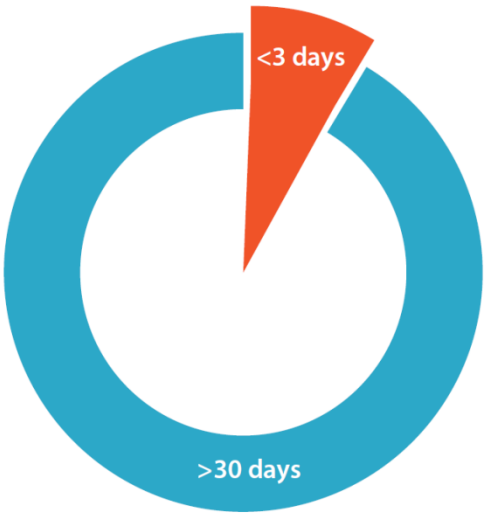




Data + Analytics = Better decisions?

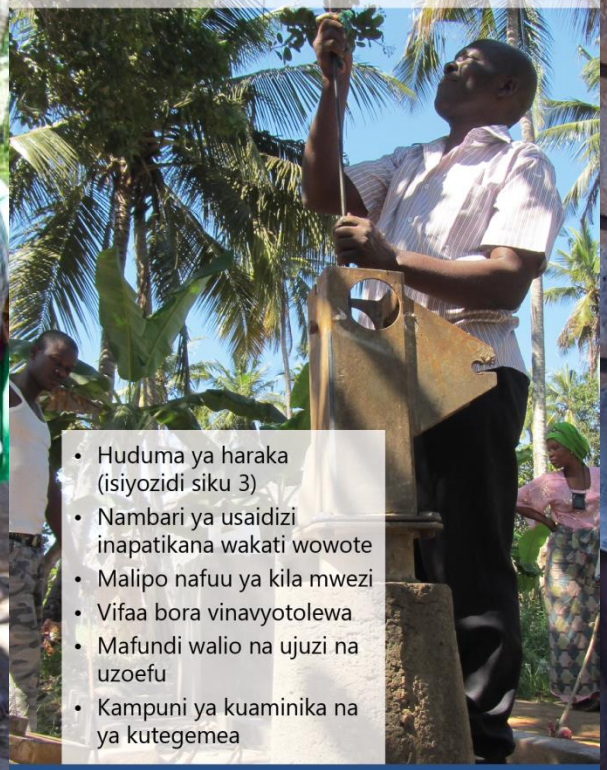






FundiFix *KWALE*

Dhamira: Kutoa huduma endelevu ya utengenezaji wa maji kwa wepesi na unafuu kwa jamii za vijijini

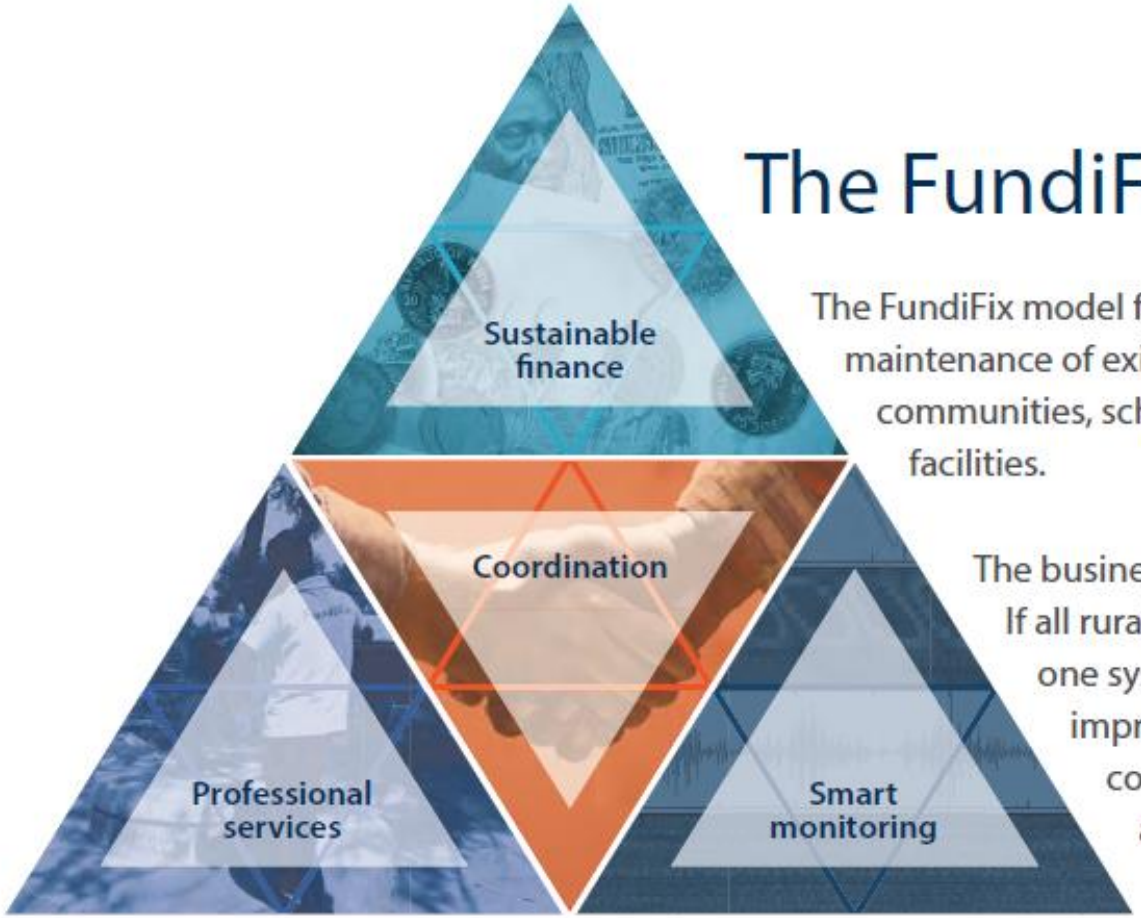


- Huduma ya haraka (isiyozidi siku 3)
- Nambari ya usaidizi inapatikana wakati wowote
- Malipo nafuu ya kila mwezi
- Vifaa bora vinavyotolewa
- Mafundi walio na ujuzi na uzoefu
- Kampuni ya kuaminika na ya kutegemea

Kwa habari zaidi PIGA simu 0719 723000 ama TEMBELEA afisi zetu hapa Bomani

Nambari ya Pampu yako:

FundiFix Ltd. – Local entrepreneurs powered by smart data



The FundiFix model

The FundiFix model focuses exclusively on the maintenance of existing water infrastructure for communities, schools, clinics and other rural facilities.

The business rationale is 'scale reduces risk'. If all rural waterpoints are networked in one system economies of scale can improve service delivery and lower costs. Essentially, it's insurance logic applied to rural water infrastructure.

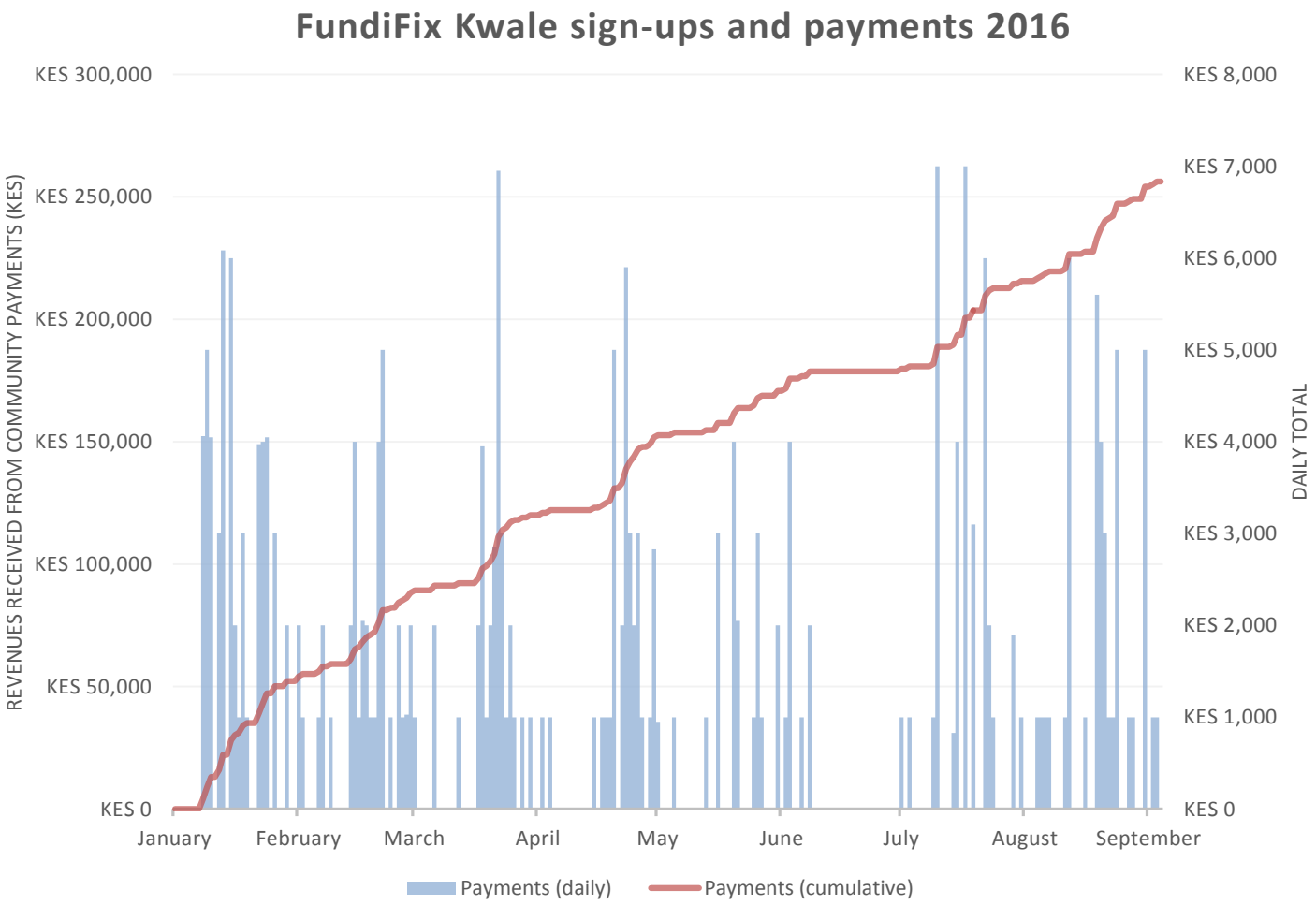
Fundi noun (E. Africa):

Mechanic (by profession), expert in repair and maintenance of machinery. Word origin – Swahili for craftsperson or artisan.

Professional Services

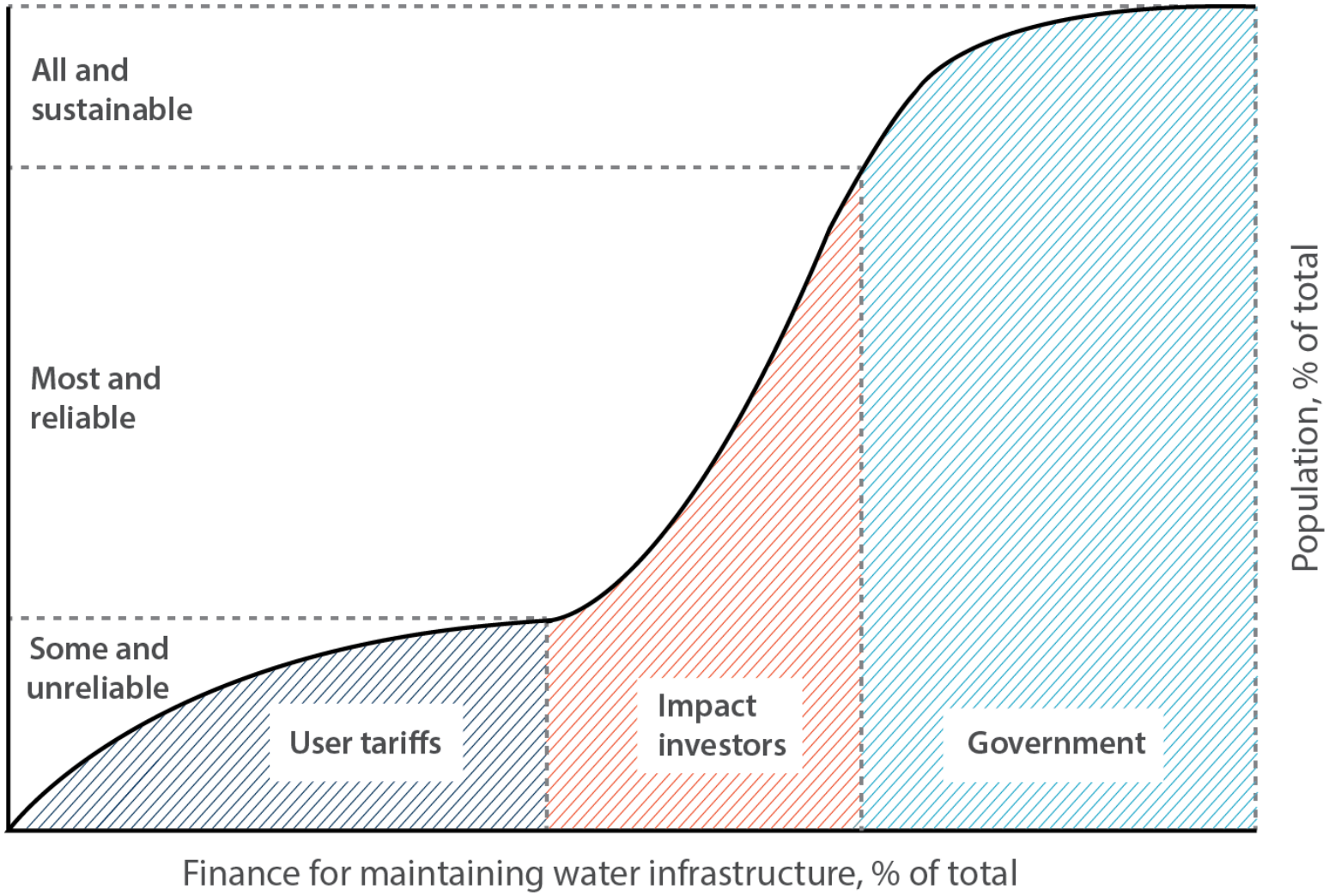
Performance-based management model for every community, school and health clinic

Mobile payments reduce transaction costs and promote accountability



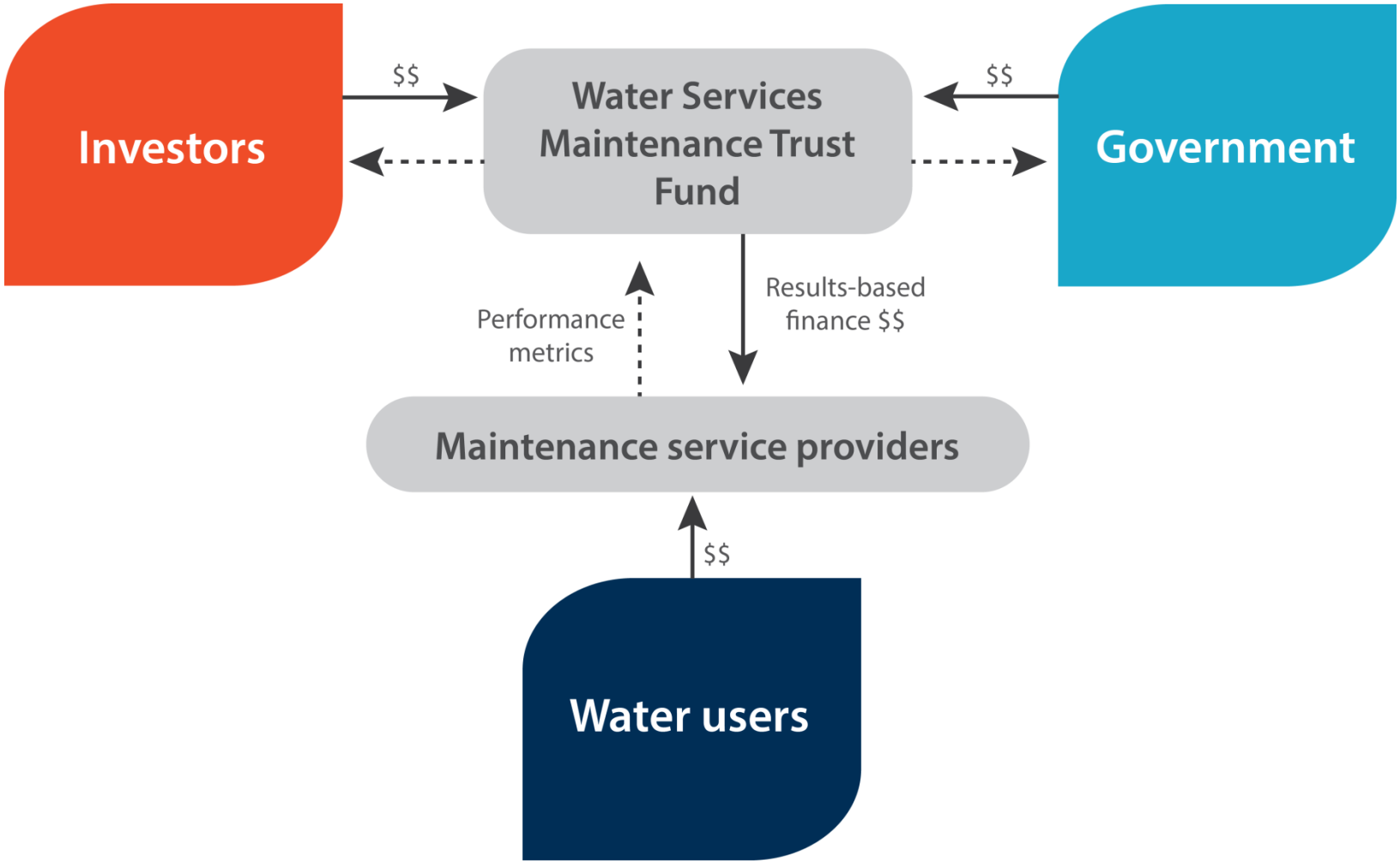
Why a trust fund?

Rewarding performance with local, sustainable finance



How does the fund work?

Pooling financing risk so no one is left behind

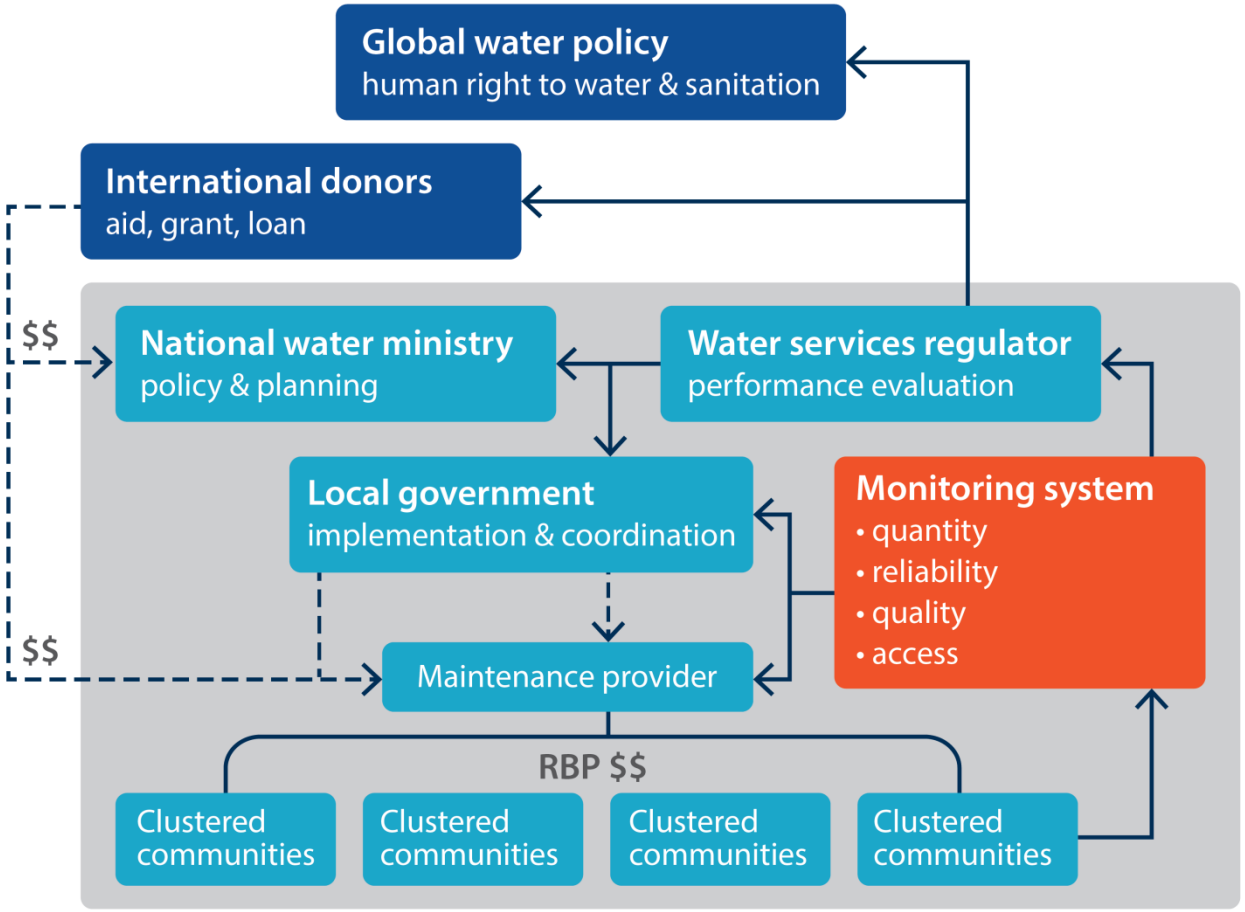


Policy Reform

Decentralisation and water services

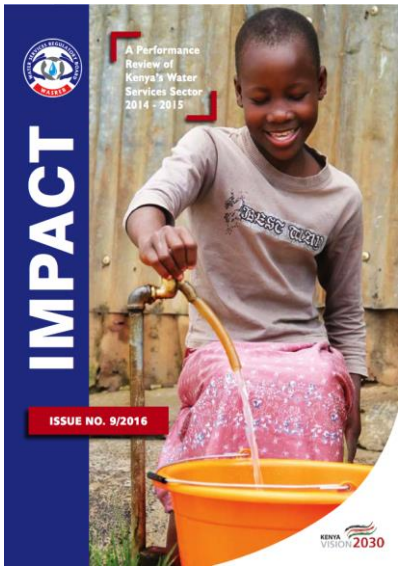
Kenya's Constitution of 2010 states in Article 43(1) (d) that **every person has the right to clean and safe water** in adequate quantities.

Water Services Regulation fails the rural poor without monitoring linking investments with outcomes



Resource flow ----→ Information flow ——→ RBP $$ output-based payment

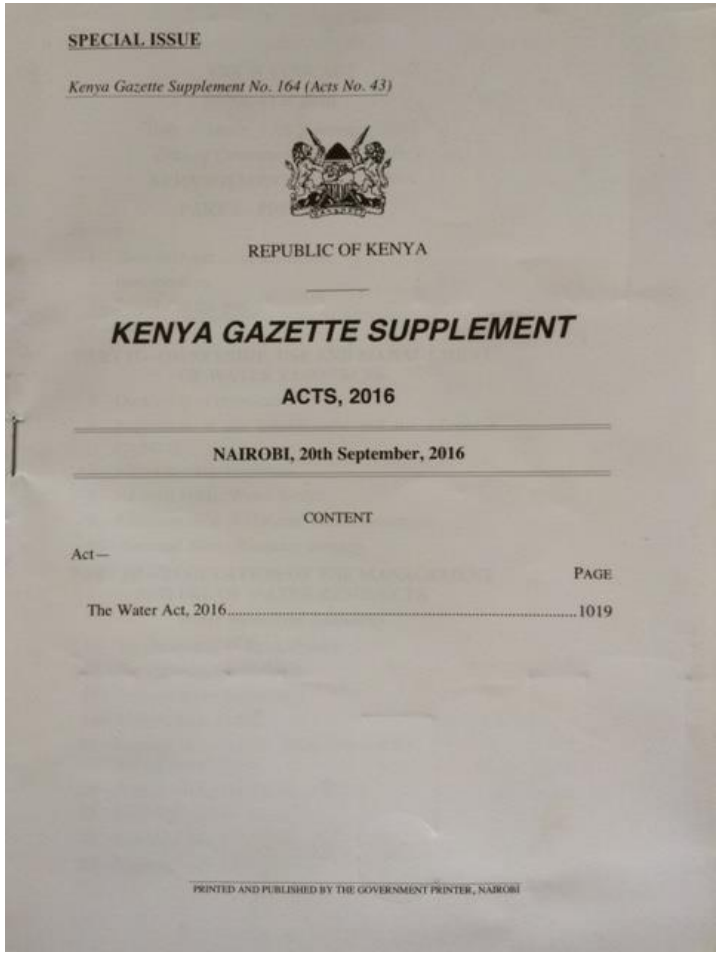
Results-based payment model for rural water services



23% of Kenya's population regulated – in areas considered commercially viable

Kenya takes the lead in Africa

Recognising private sector models with investment and financing plan for rural water services



SPECIAL ISSUE

Kenya Gazette Supplement No. 164 (Acts No. 43)

REPUBLIC OF KENYA

KENYA GAZETTE SUPPLEMENT

ACTS, 2016

NAIROBI, 20th September, 2016

CONTENT

Act—

PAGE

The Water Act, 2016 1019

PRINTED AND PUBLISHED BY THE GOVERNMENT PRINTER, NAIROBI

The Water Act, 2016 – Article 94

- **Nothing** in this **Act shall deprive any person or community of water services**
- Responsibility of the 47 **county governments** to put in place measures for **the provision of water services to rural areas**
- Rural water schemes shall meet the **standards set by the Regulatory Board**
- **Management** by community associations, public benefit organizations or **private** sector models under **contract** with the county government
- Institutional Coordination and reporting to the **Regulatory Board and to the Cabinet Secretary**
- **Five year development plan** incorporating an **investment and financing plan** for the provision of water services in rural areas

What next?

- Digital Water Africa
- Sustainable financial models powered by smart information systems
- First Kenyan county with universal drinking water services by 2019? First African country by 2022?

unicef

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REACH

Improving water security for the poor

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