Multi-decadal financial assessment of groundwater services for low-income households in rural Kenya

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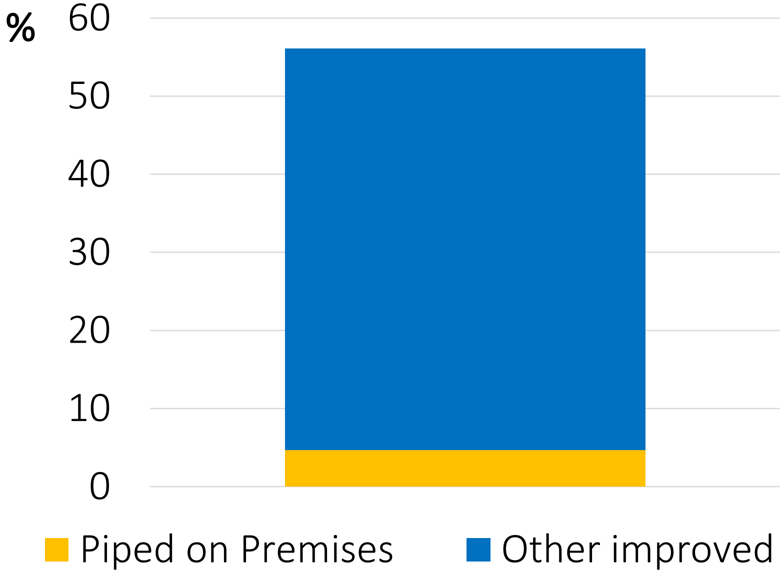
Tim Foster, Rob Hope & Jacob Katuva (presenting)

~200m rural Africans depend on protected groundwater point sources, with O&M costs of ~$500m p.a.

Access to improved water sources in rural sub-Saharan Africa 2015



Estimated annual O&M costs

Hand-pumped groundwater: ~$485m[2]

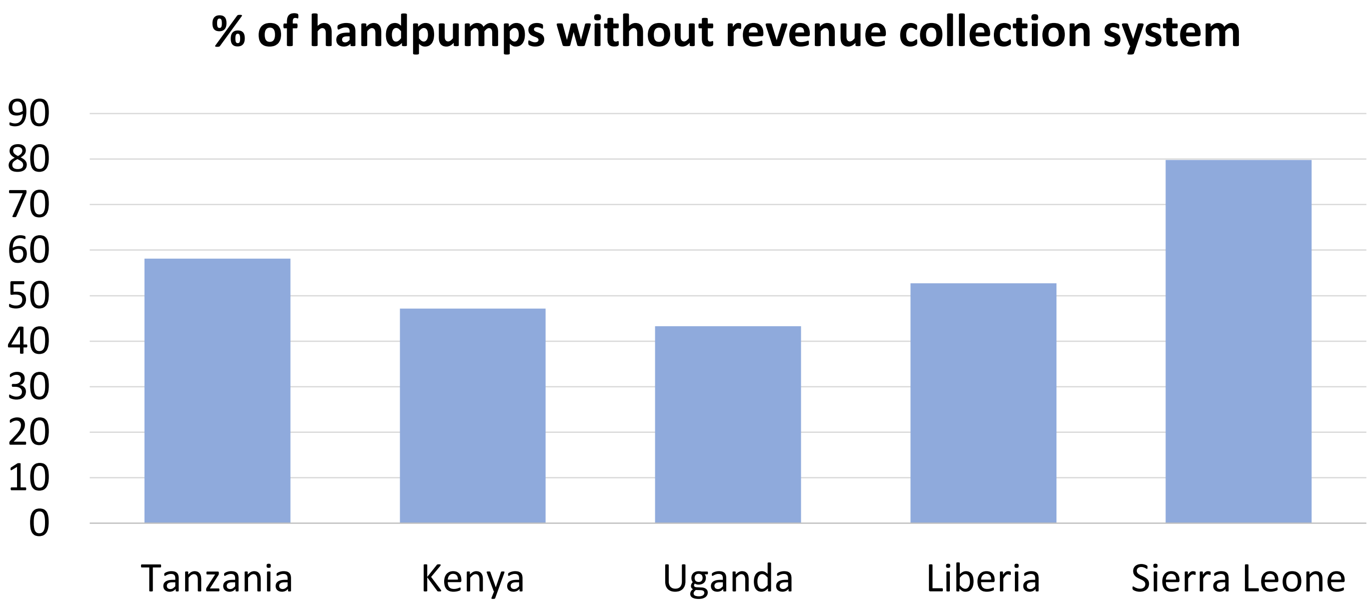
Public taps: ~$490m[3]

Piped connections: ~$205m[3]

Community-based financing of O&M assumed in national policies and plans across Africa

Mismatch between policy and reality

Most communities struggle to pay for groundwater-fed services



Inadequate financing of O&M likely a key reason why 1 in 3 handpumps is non-functional

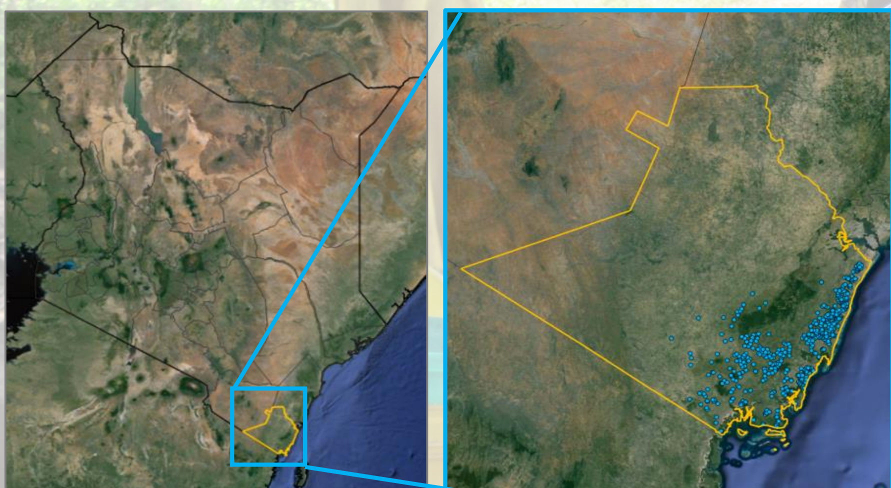
Evidence from water committee records in Kwale, Kenya

Research questions

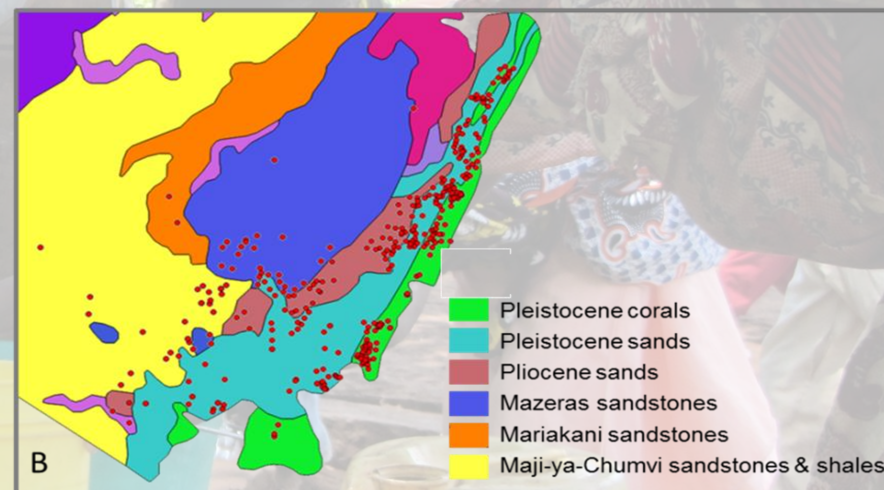
- What factors promote and hinder financial performance?
- How does financial performance impact operational performance?
- What impact does revenue collection have on groundwater use?

A heavy dependence on groundwater in Kwale

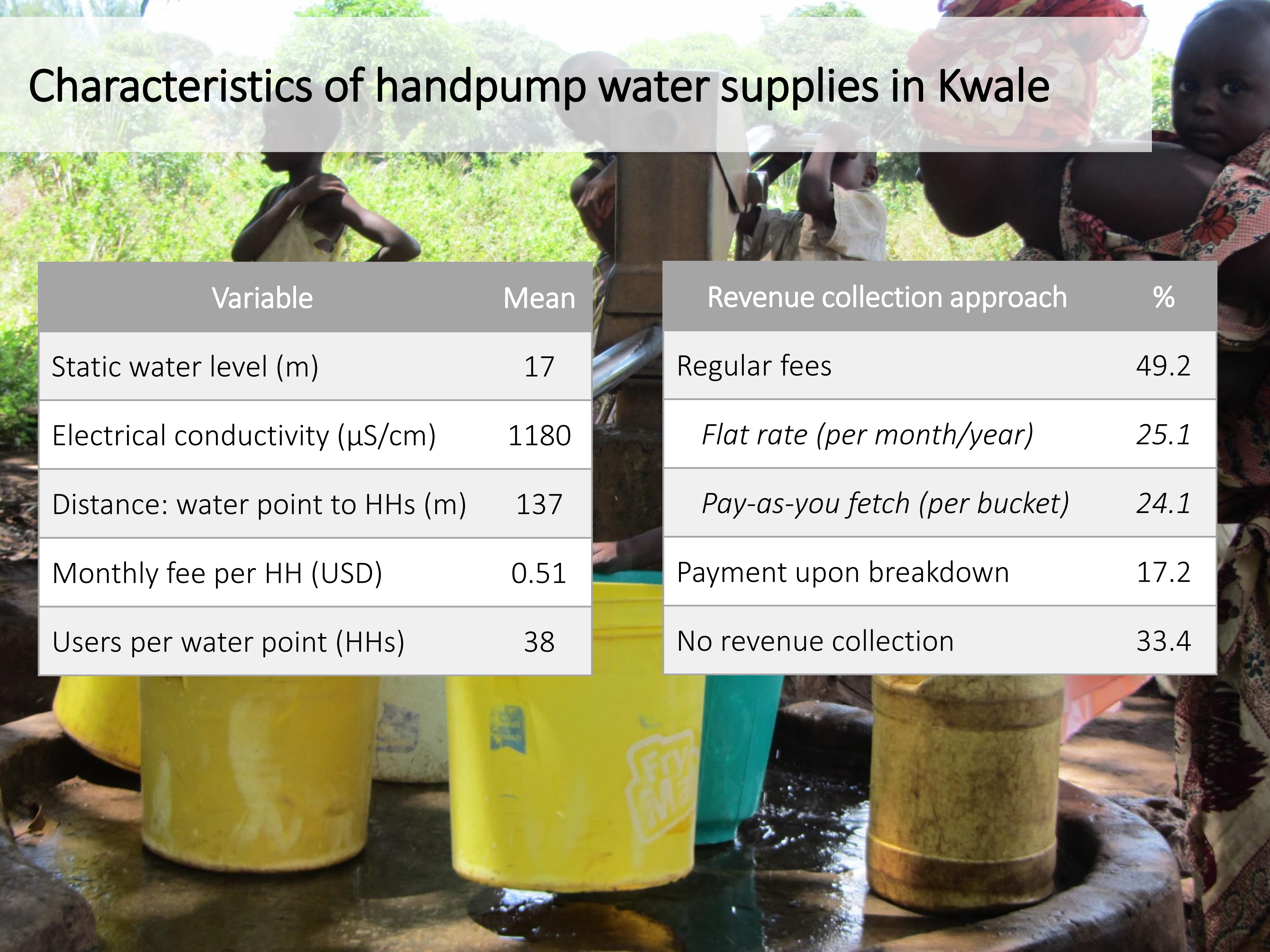
550+ Afridev handpumps installed 1983-95, with 40% non-functional by 2013



Most handpumps underlain by Pleistocene corals and Pliocene/Pleistocene sands



Characteristics of handpump water supplies in Kwale

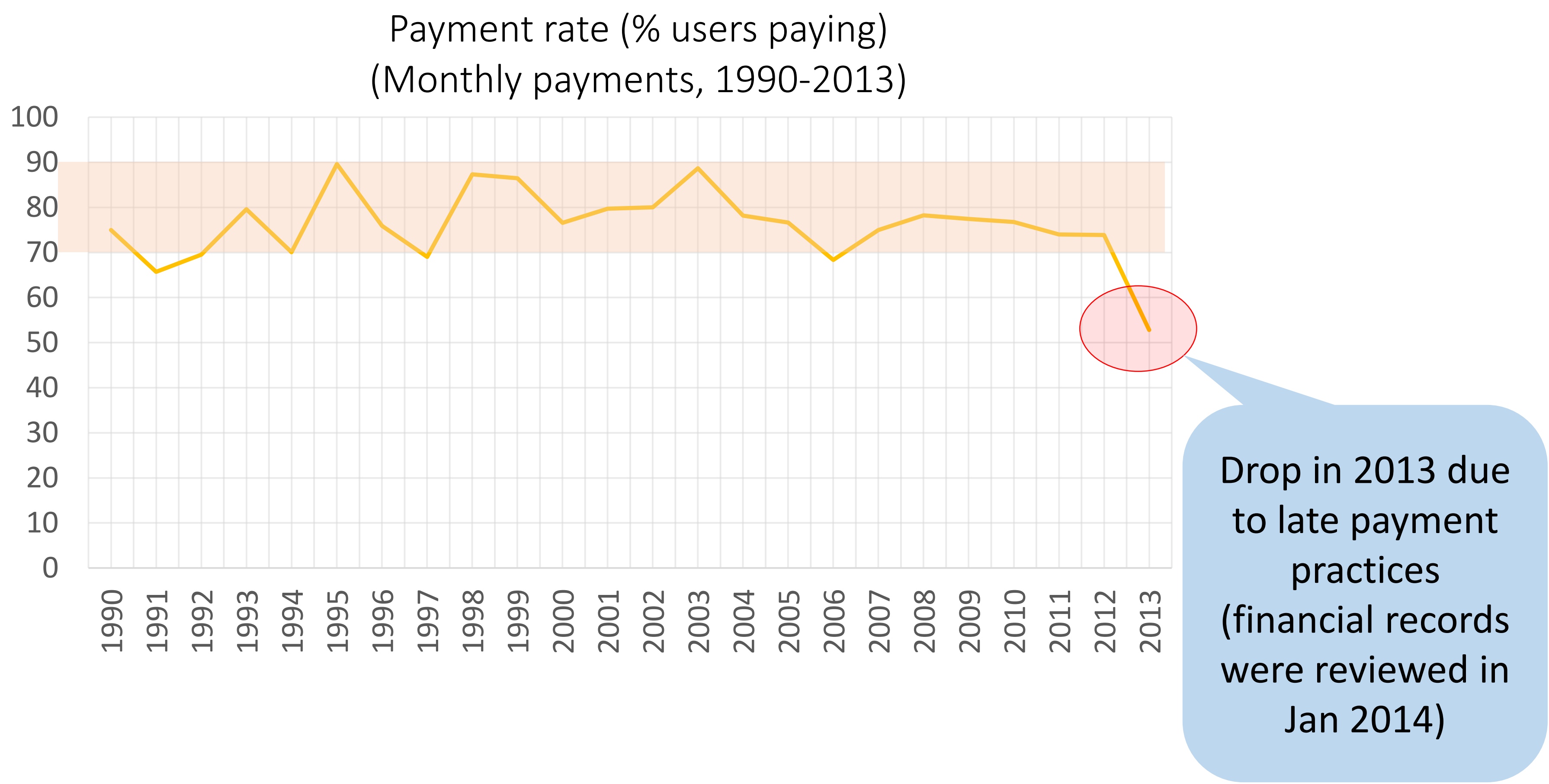


Variable	Mean
Static water level (m)	17
Electrical conductivity (µS/cm)	1180
Distance: water point to HHs (m)	137
Monthly fee per HH (USD)	0.51
Users per water point (HHs)	38

Revenue collection approach	%
Regular fees	49.2
Flat rate (per month/year)	*25.1*
Pay-as-you fetch (per bucket)	*24.1*
Payment upon breakdown	17.2
No revenue collection	33.4


- Financial records located at 100 communities
  - 270+ waterpoint years
  - 43,020 monthly contributions
  - Spanning 1987-2013
- Financial data integrated with data from large household survey (n=3,000+) & water point census

On average, each month around 1 in 4 households do not pay their water user fees



Payment rates predicted by water point location, water quality, rainfall season and productive uses

Geographic
- Distance: HHs to WP
- Distance: WP to WP
- Night lights

Environmental
- pH
- Elect. conductivity
- Taste
- Rainfall season
- Alternative sources

Operational
- Attendant
- Spare parts
- Lock
- Community mechanic
- System age

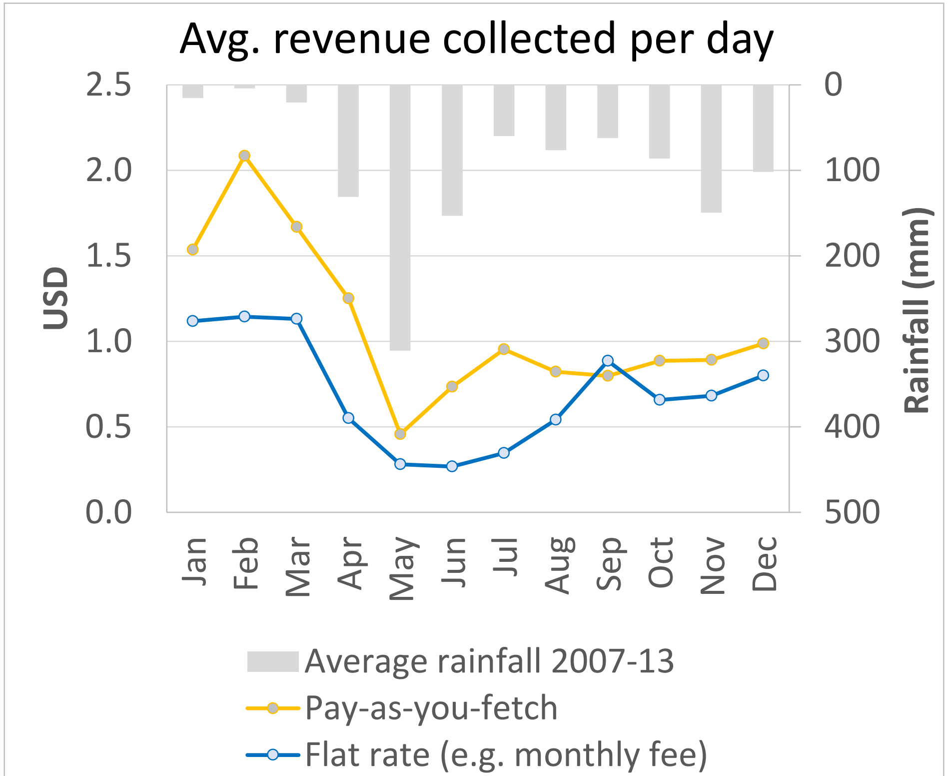
Institutional
- Participation

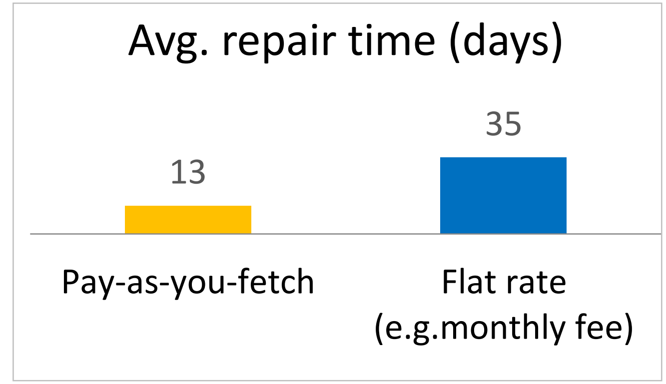
Financial
- Tariff
- Bank account

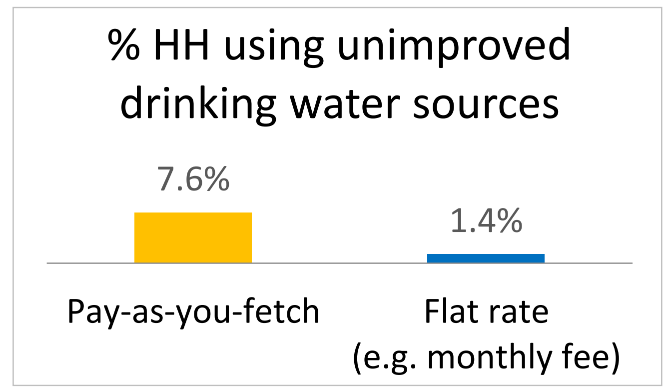
Socio-economic
- Productive uses
- Wealth
- Group size
- Ramadan
- Food security

Payment rates highest when:
- pump is located close to users
- pH is >6.5
- Water is palatable
- Rainfall is low
- Households use water for productive purposes

‘Pay-as-you-fetch’: associated with higher revenues and faster repair times, but also unimproved water use







Rainfall also has a major impact on revenue levels

Further details available in the following papers:

A multi-decadal and social-ecological systems analysis of community waterpoint payment behaviours in rural Kenya

Journal of Rural Studies

Evaluating waterpoint sustainability and access implications of revenue collection approaches in rural Kenya

Water Resources Research

A critical mass analysis of community-based financing of water services in rural Kenya

Water Resources & Rural Devt


Journal of Rural Studies

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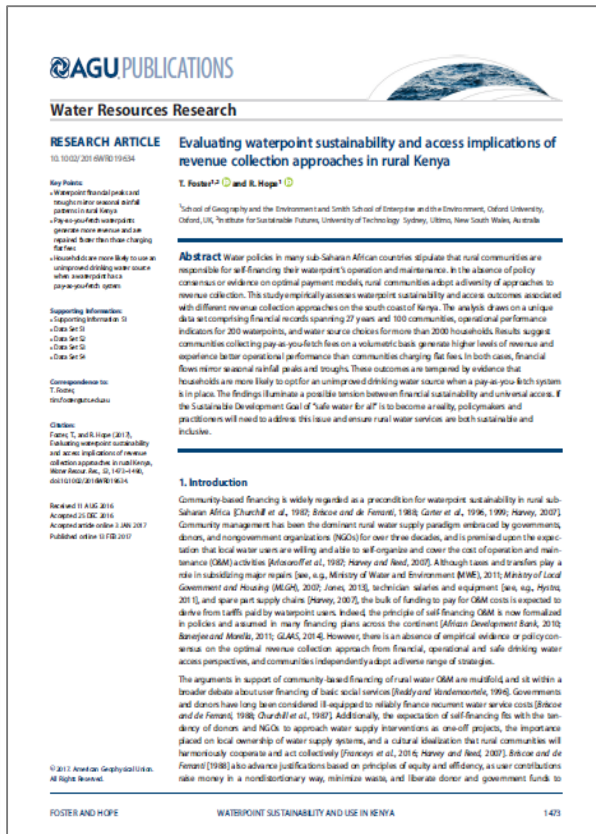
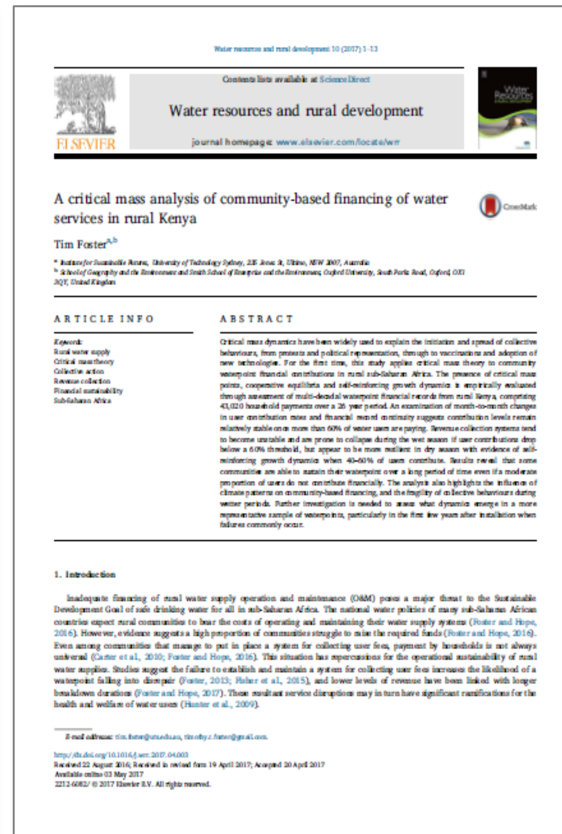

AGU PUBLICATIONS

Water Resources Research

RESEARCH ARTICLE

Evaluating waterpoint sustainability and access implications of revenue collection approaches in rural Kenya

T. Foster and R. Hope


Water resources and rural development

A critical mass analysis of community-based financing of water services in rural Kenya

Tim Foster

Thanks for your attention