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# Self-supply: unlocking the potential of household investment

Tim Foster and Reinier Veldman

Side Event on Groundwater for Rural Water Supply
@ UN Water Groundwater Summit 2022

Paris - 6th December 2022

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# Self-supply in the Asia-Pacific region

## Immense but overlooked contributor to SDG6 in rural areas

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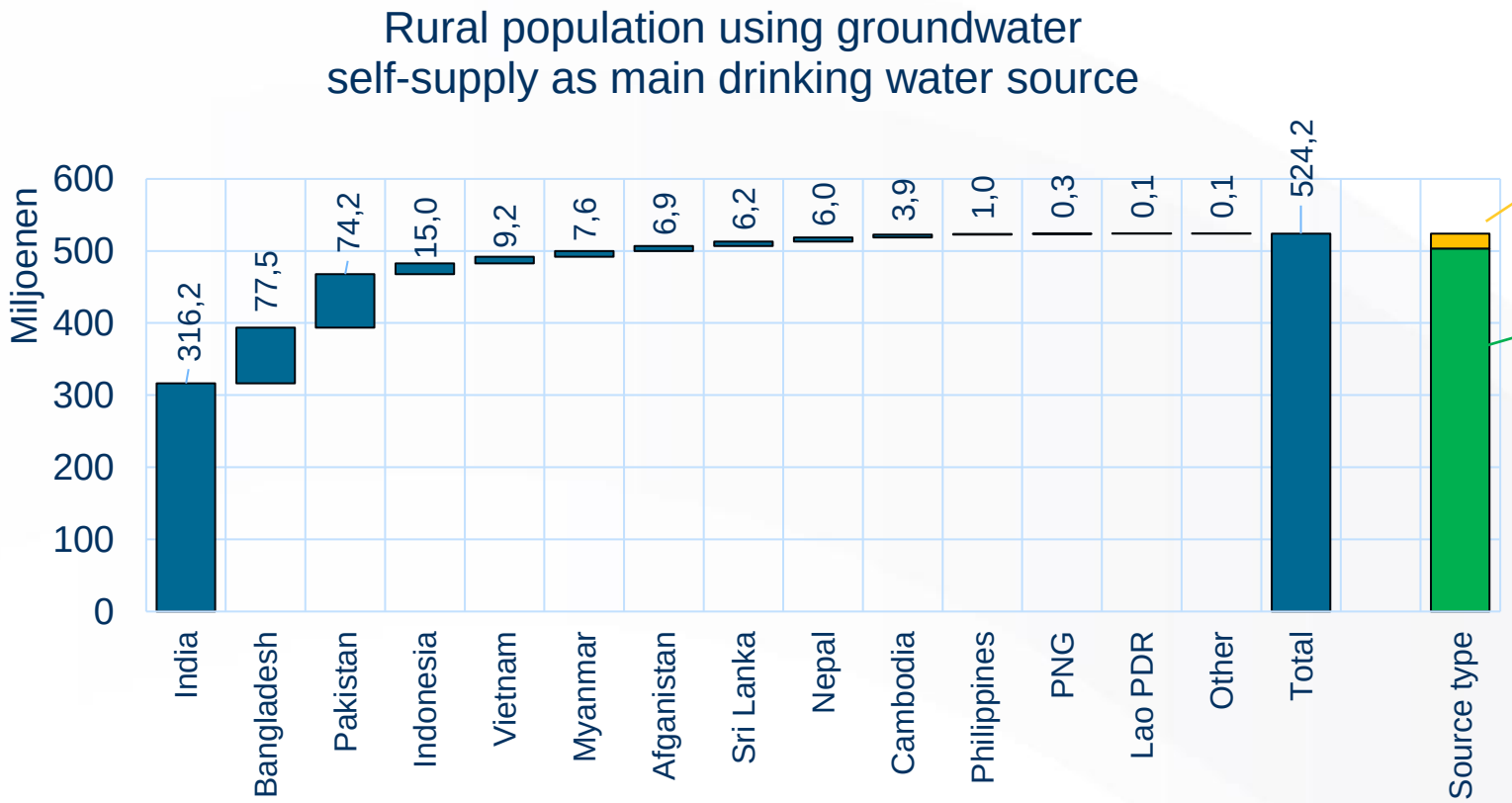
# More than 500 million people in rural areas of Asia-Pacific rely on groundwater self-supply, 96% of whom use an improved source




Unprotected dug wells:
~21m people

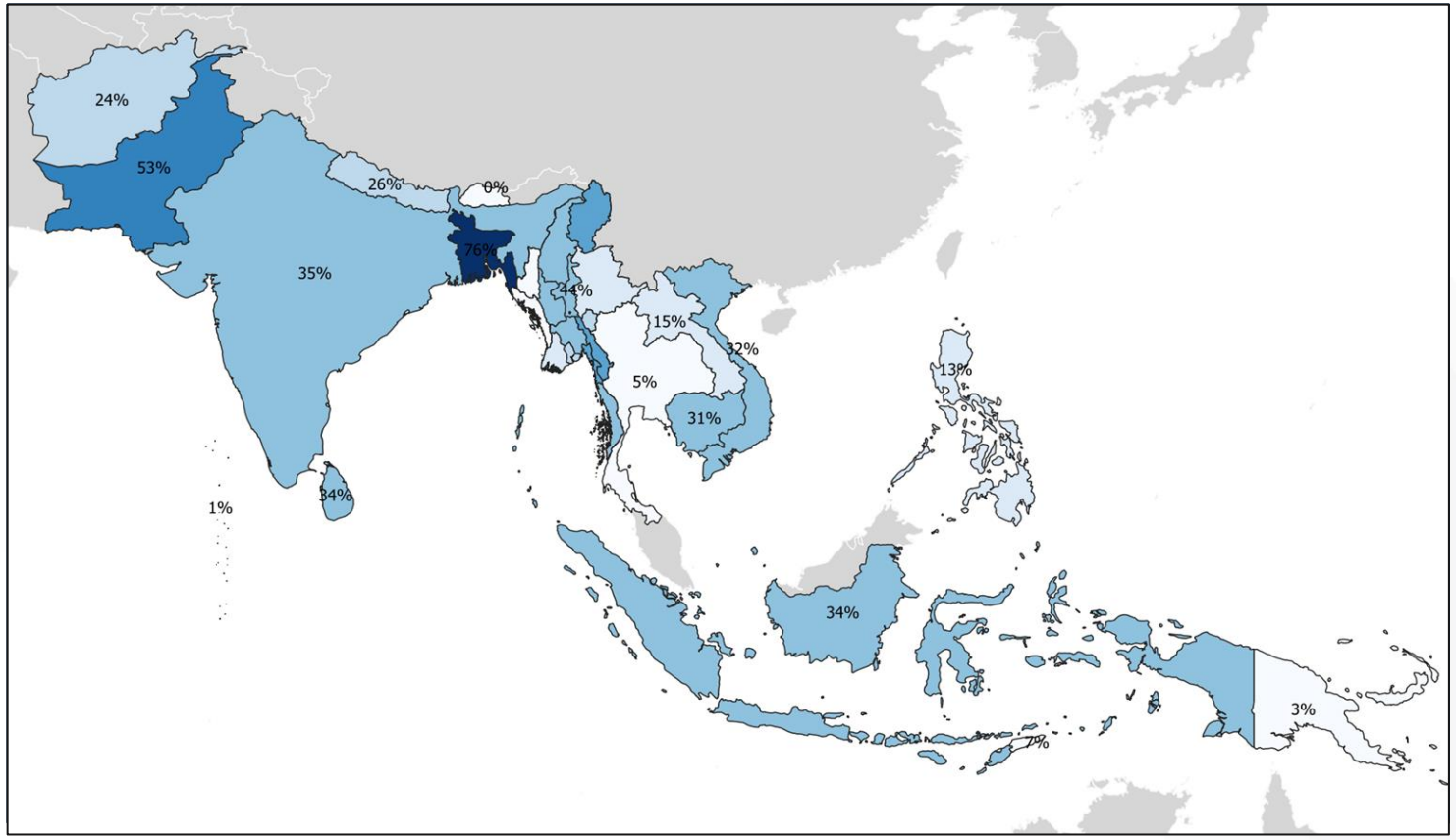
Boreholes /tubewells:
~455m people

Protected dug wells:
~48m people



Data sources: Sri Lanka Census (2012) Pakistan DHS (2017-18), Nepal MICS (2019), Maldives DHS (2016-17) India DHS (2019-21), Bhutan MICS (2010) Bangladesh MICS (2019), Afghanistan DHS (2015) Vietnam MICS (2020-21) Timor Leste DHS (2016), Thailand MICS (2015-16); Philippines DHS (2017), Myanmar DHS (2015-16), Mongolia MICS (2018), Lao PDR MICS (2017), Indonesia DHS (2017), Cambodia Census (2019); Micronesia Census (2010), Fiji MICS (2021), Kiribati MICS (2018-19), Samoa MICS (2019); Solomon Islands HIES (2012-13); Tonga MICS (2019); Vanuatu Census (2020)

# Prevalence of self-supply up to 95% in some areas, with groundwater accessibility, low cost technology and supply chains all key factors




Accessible groundwater

Low cost technology

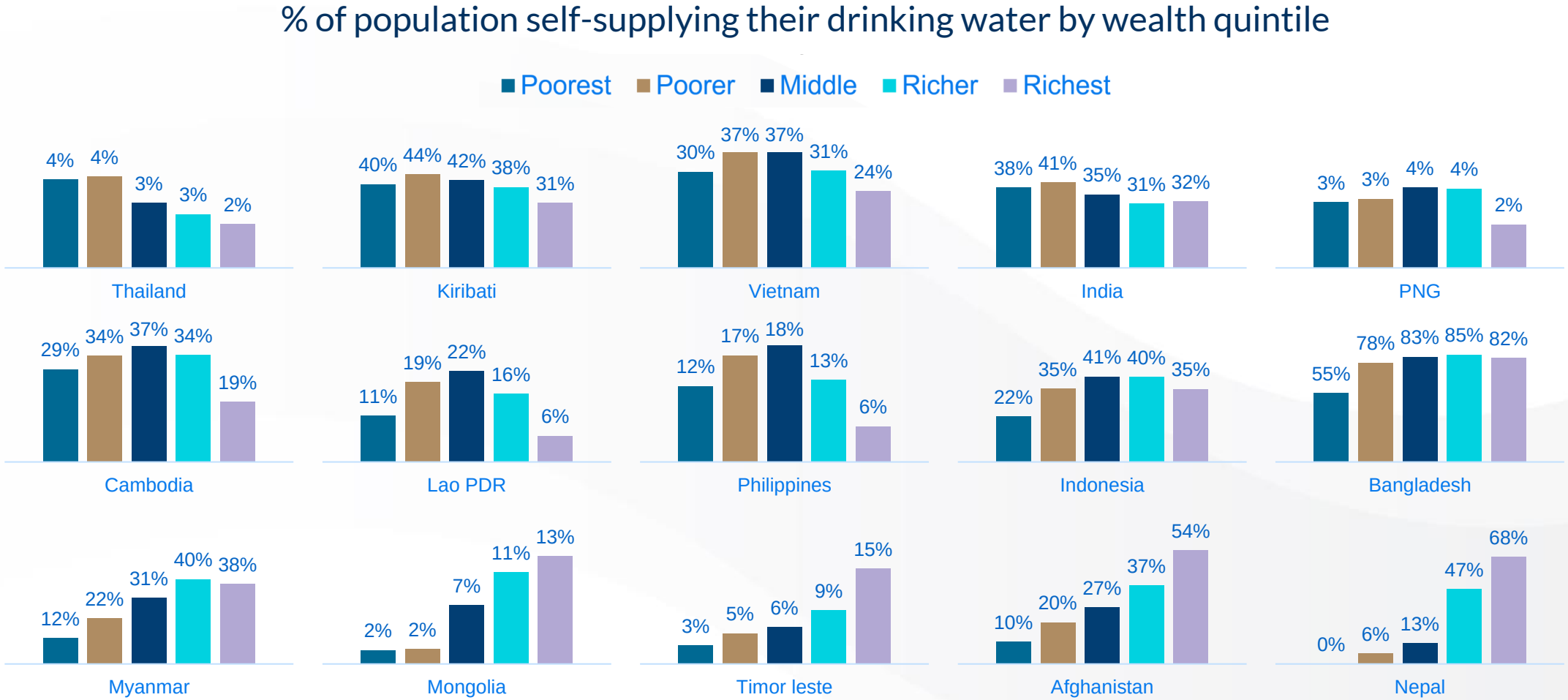
Supply chains

Access to electricity



Data sources: Sri Lanka Census (2012) Pakistan DHS (2017-18), Nepal MICS (2019), Maldives DHS (2016-17) India DHS (2019-21), Bhutan MICS (2010) Bangladesh MICS (2019), Afghanistan DHS (2015) Vietnam MICS (2020-21) Timor Leste DHS (2016), Thailand MICS (2015-16); Philippines DHS (2017), Myanmar DHS (2015-16), Mongolia MICS (2018), Lao PDR MICS (2017), Indonesia DHS (2017), Cambodia Census (2019); Micronesia Census (2010), Kiribati MICS (2018-19), Samoa MICS (2019); Solomon Islands HIES (2012-13); Tonga MICS (2019); Vanuatu Census (2020)

# Groundwater self-supply is adopted by rural households across the wealth spectrum, but is most common amongst the middle quintiles

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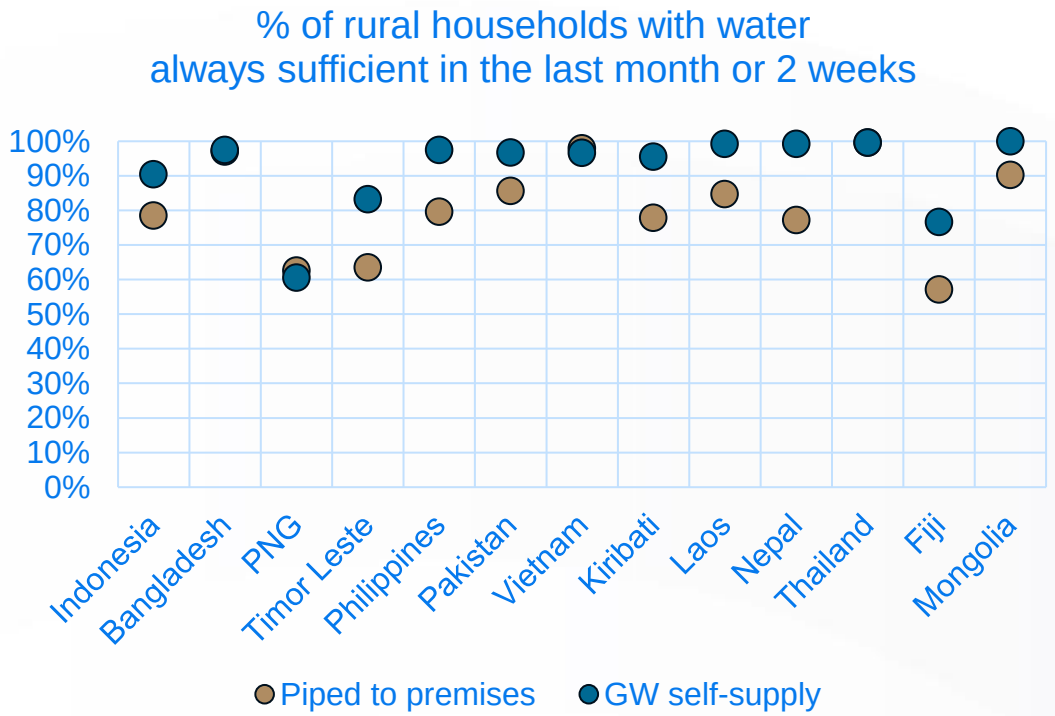
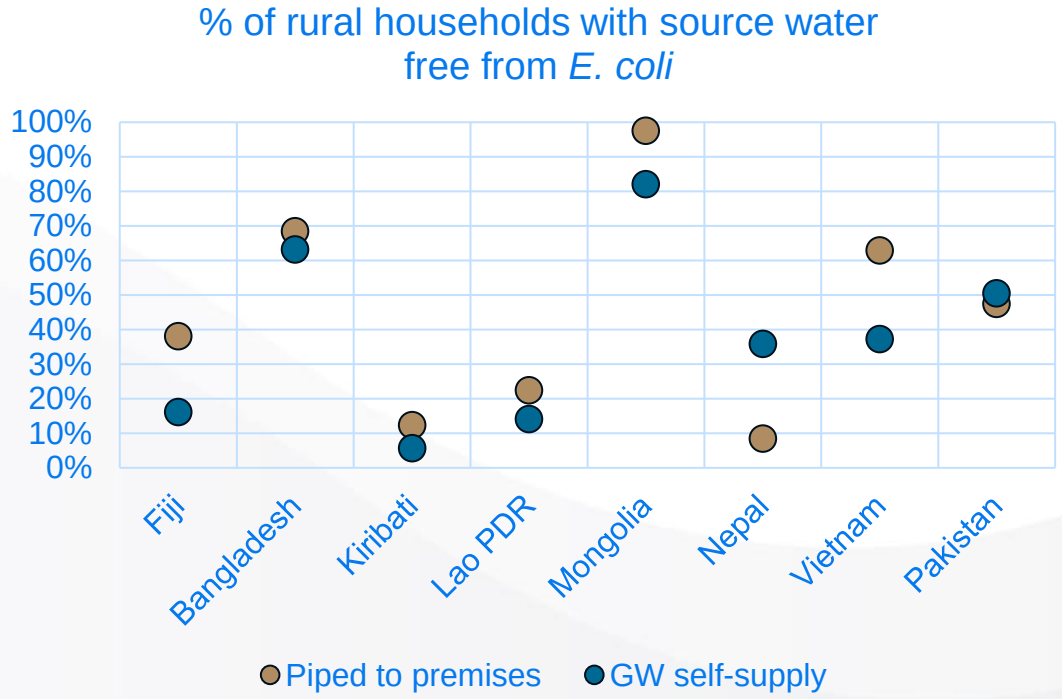
Data sources: Pakistan DHS (2017-18), Nepal MICS (2019), India DHS (2015-16), Bangladesh MICS (2019), Afghanistan DHS (2015) Vietnam MICS (2020-21) Timor Leste DHS (2016), Thailand MICS (2015-16); Philippines DHS (2017), Myanmar DHS (2015-16), Mongolia MICS (2018), Lao PDR MICS (2017), Indonesia DHS (2017), Cambodia DHS (2014); Fiji MICS (2021), Kiribati MICS (2018-19)

# In countries with available data, groundwater self-supply is more likely to provide a safely managed water service than a piped supply



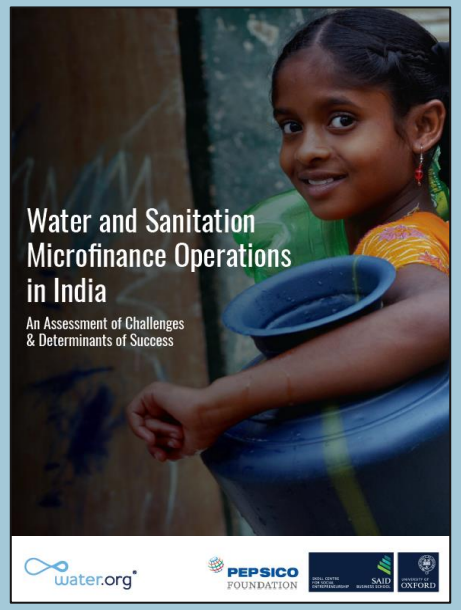

For every rural household receiving safely managed water from a piped system, there are **four** households receiving safely managed water from self-supply



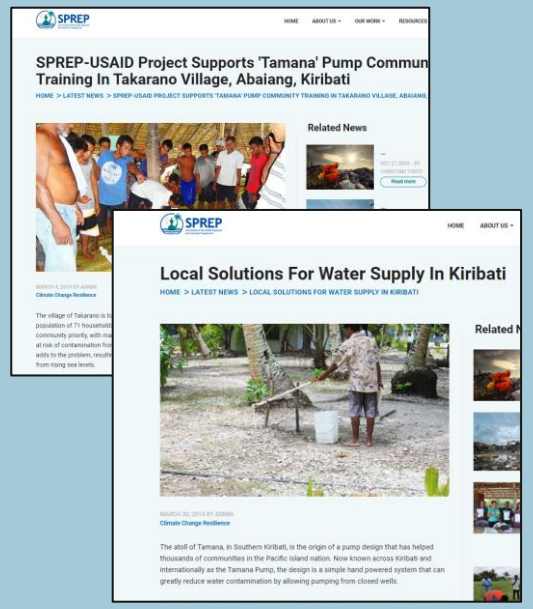
Data sources: Pakistan DHS (2017-18), Nepal MICS (2019), India DHS (2015-16), Bangladesh MICS (2019), Afghanistan DHS (2015) Vietnam MICS (2020-21) Timor Leste DHS (2016), Thailand MICS (2015-16); Philippines DHS (2017), Myanmar DHS (2015-16), Mongolia MICS (2018), Lao PDR MICS (2017), Indonesia DHS (2017), Cambodia DHS (2014); Fiji MICS (2021), Kiribati MICS (2018-19)

# Self-supply rarely supported by policy or practice, though there are examples from across the region

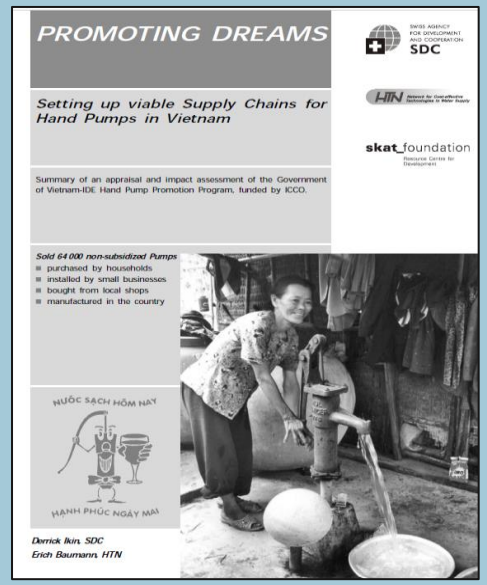
## Financial support




## Technical support




## Private sector development



# With 236 million people lacking basic water services in rural areas of Asia-Pacific, self-supply has an important role to play

**In rural Asia-Pacific, groundwater self-supply is:**

- Widespread and increasing
- Used by households across the wealth spectrum
- A key contributor to SDG6
- Rarely acknowledged in policy

**Recognizing and harnessing these hidden investments could accelerate progress towards the SDG target 6.1**

# Thank you

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# Self-supply and Groundwater

## Examples from Africa

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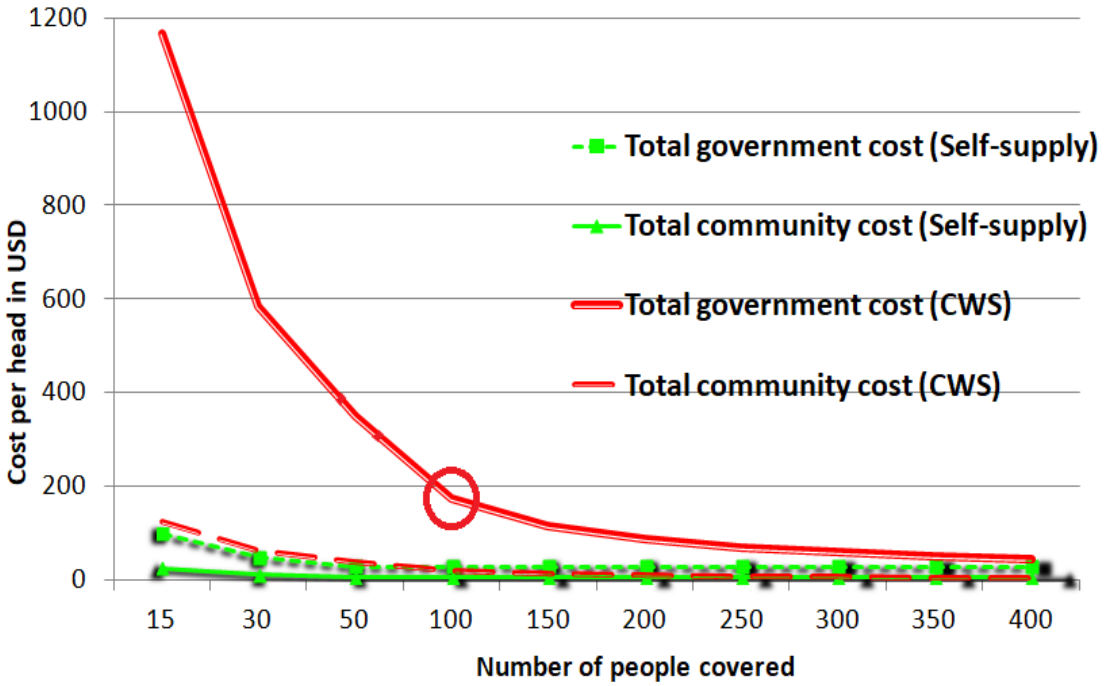
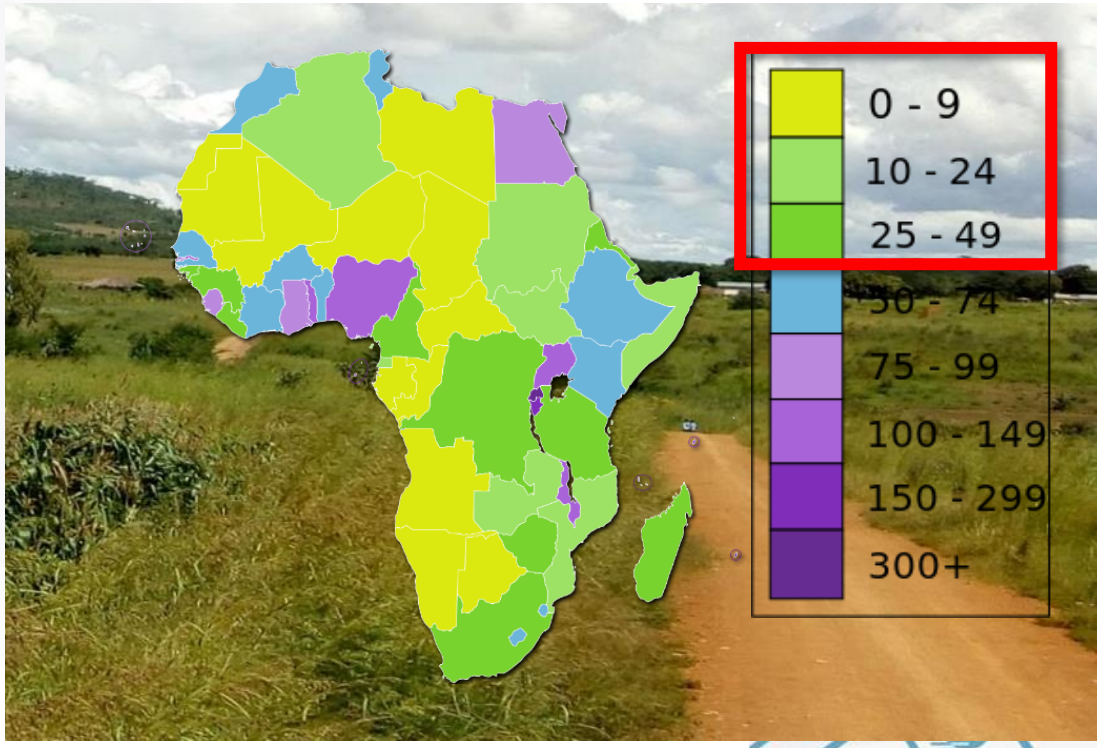
# Current situation: Rural Water supply in Africa

- Conventional techs. expensive for 70% of the SDG6.1 target group
  (remote small rural communities)
  - Machine drilled borehole & imported hand / solar pump
  - Capex: $2 500 - $7 500 for 250 users = $10 - $30/capita
  - The same technology for 50 users = $50 - $150/capita !!!

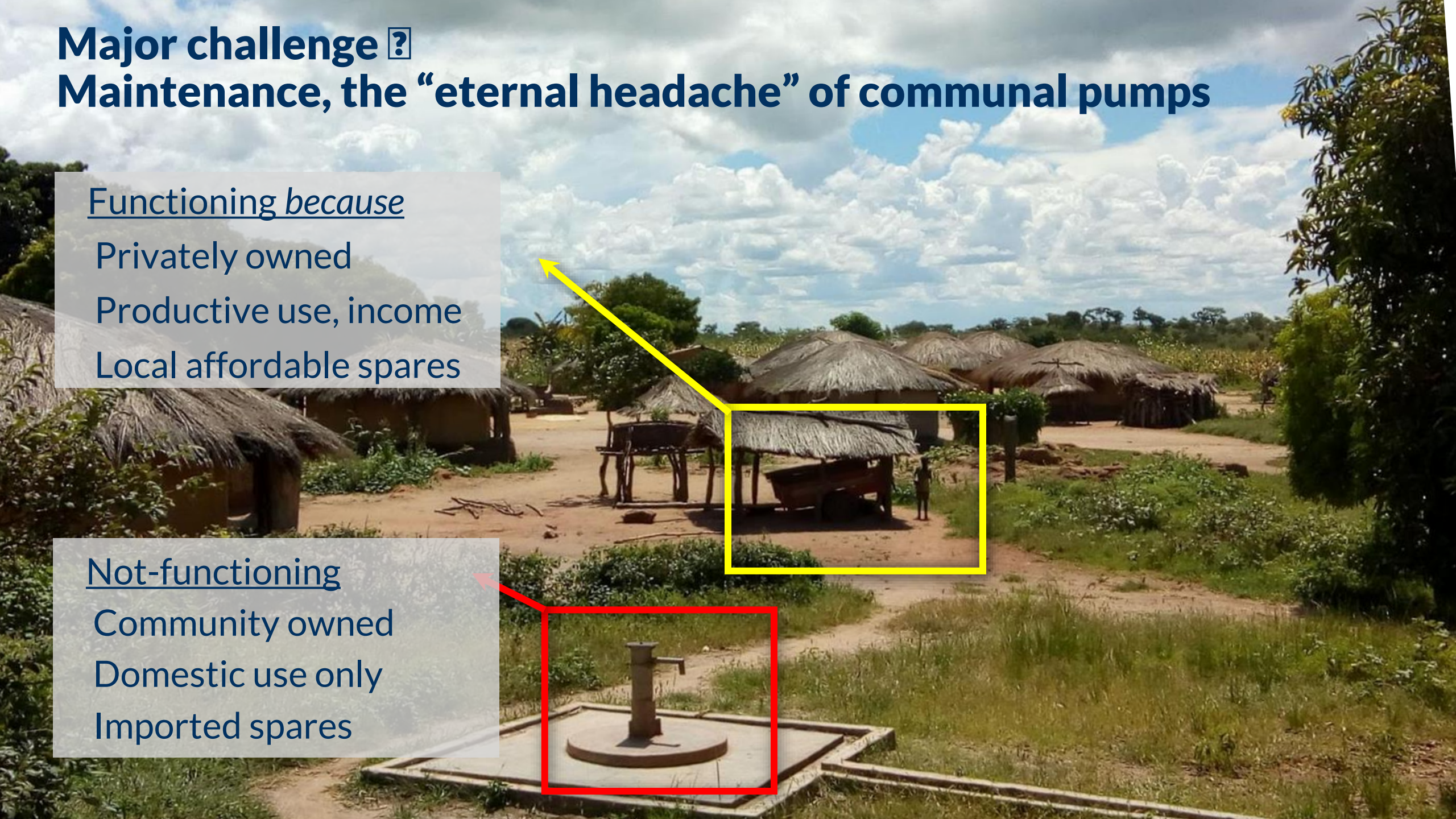



Sally Sutton, WSP/UNICEF/SKAT 2015




Population density Africa, (UN, 2015)

# Major challenge 
# Maintenance, the “eternal headache” of communal pumps



Functioning *because*

Privately owned

Productive use, income

Local affordable spares

Not-functioning

Community owned

Domestic use only

Imported spares

# Self-supply – Water Ladder

With 500-1000 ltr/day a family can “climb” out of poverty

# A solution; The SMART approach

Simple, Market-based, Affordable, Repairable Technologies

**Focus on:**

- **Innovative low-cost technologies** (wells pumps, storage, hh water filters, latrines)
- **Training the local private sector** (technology + business skills)
- **Self-supply** (incl. targeted subsidies for the SDG6.1 group, the rural poor)


# Technologies fit for Self-supply

- **Drilling**: EMAS. Mzuzu, SHIPO, Rotary jetting 10 - 50 m. deep. Cost $10 - $40/ m.
- **Pumps**: EMAS, Rope pumps 4 models, Solar pumps 35 m. head Cost $40 - $500
- **Storage**: EMAS Underground tank, Tube recharge, Deep Bed Farming Cost $20 - $0.1/$m^3$
- **Household Water Filters** 30 - 50 Ltr./day Cost $20 - $40



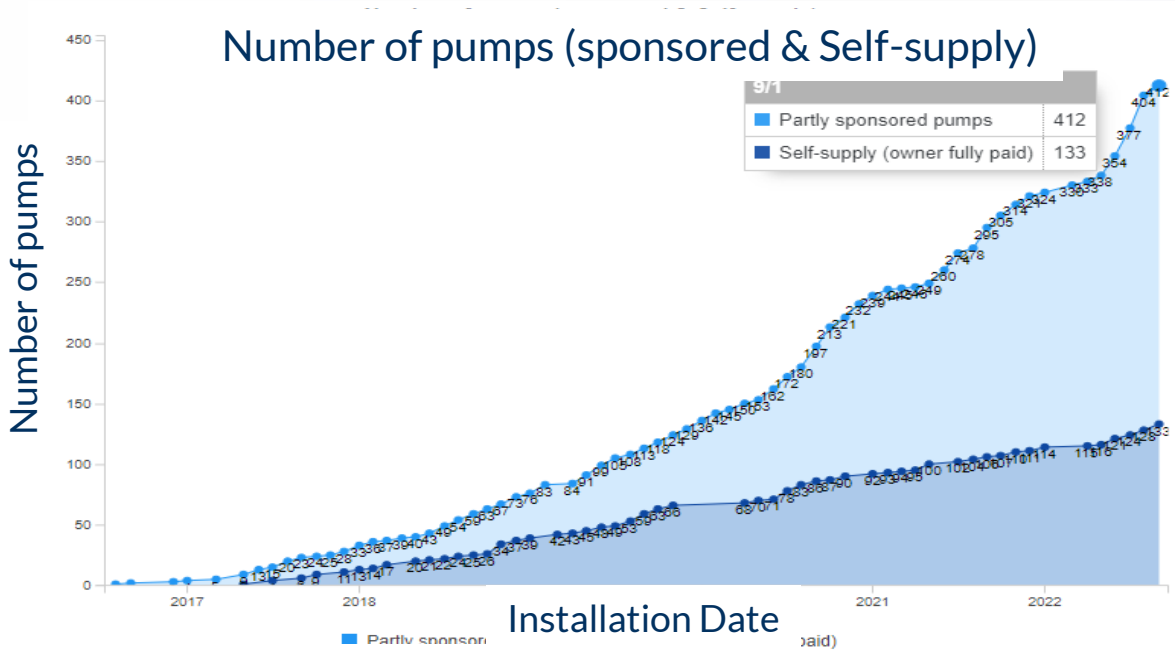




# Two cases of Self-supply: Zambia & Tanzania

## Zambia

- The Jacana SMART Centre subsidizes farm wells.
- >400 wells & Rope pump, 20 - 35m deep
- Average cost $1 000 (excl. overhead)
  - Installed at 1 family, partly subsidized
- Condition for subsidy; the well needs to generate income




mWater Dashboard, Jacana SMART Centre (2022)

## Tanzania

- 700 subsidized communal wells
  - SHIPO drilling + Rope pumps
- SMART Centre trained
  - > 20 well drillers, > 20 pump producers
- Now 15 000 Rope pumps.
  - 80% self-supply, paid for by users
- Problem: Copycats = proof that pumps are attractive & market-based!!

# Impact Self-supply/household wells & the SMART approach

## SDG6.1 for yet unserved

- Family-owned wells serve 40 people so small communities  (source < 10 minutes from home)

## SDG1 and 2, Food & income

- Family with a well/ pump increase food security & income ($ 225/yr/family. RWSN field note 2022)

## SDG3 Gender

- Less or no need to walk to communal wells so time saving and more safety for women/ girls

## Employment

- Well drilling, pump production = employment for 20 companies. Irrigation = work for 400 farm families

# Reaching SDG6.1 in rural areas Sub-Saharan Africa

## Current status

- 1.2 bln. people in SSA of which 0.66 bln. rural (WB)
- 0.36 bln. safe, 0.42 bln. basic, 0.42 bln. unimproved (WHO)
- 0.1 - 0.2 bln. in SSA have Self-supply. Nigeria ca. 50% Ss.
- Cost Water for All in rural SSA = $140 bln. (WHO 2022)

## Proposition

- With (supported) Self-supply and low-cost water technologies (SMARTechs) this cost can reduce by 70%
- 800 mln. with hh water filters ($4 bln) + 20 mln. household/farm wells ($20 bln)

# Take away's

- Farm wells = essential for rural development. 45 million farmers in USA had a well & hand pump. Domestic & productive use (garden, cattle,. )
- They climbed the water ladder. Hand pump - electric pump - piped system. Piped system still to expensive for 20 mln. farmers. They have own well for domestic & productive use

**Can the same logic apply for Africa?**

**Reach water, food and poverty SDGs in Africa?**

Think about shifts; From water for drinking to **also** water for food & income.
From communal to **also** household.
From imported hi tech to **also** local produced lower tech

# References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  - Regarding Groundwater and Drinking Water Access through A Human Rights Lens: Self-Supply as A Norm, Jenny Gronwall, Kerstin Danert (link)
  - Monitoring Groundwater Use as a Domestic Water Source by Urban Households: Analysis of Data from Lagos State, Nigeria and Sub-Saharan Africa with Implications for Policy and Practice, Kerstin Danert, Adrian Healy (link)
  - Groundwater, Self-Supply and Poor Urban Dwellers: A Review with Case Studies; IIED: London, UK, 2010. Grönwall, J.; Mulenga, M.; McGranahan (link)
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# Thank you!

The SMART Centre Group

Training the local private sector in Simple, Market based, Affordable and Repairable Technologies

SMART Centres in 10 countries

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