

Determinants of rural water point functionality in Chum Kiri, Cambodia

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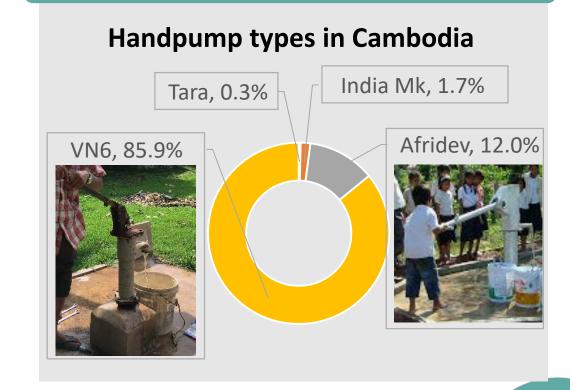


Heavy dependence on handpumps in rural Cambodia, but sustainability challenges persist

3.8m Cambodians use handpumps

- ~30% of rural households
- 270,000+ handpumps nationwide
- 15-20% non-functional
- Evolution of handpump O&M
 - 1980s: emergency response
 - 1990s: VLOM + standardisation
 - 2010s: community mgmt + support

Dominant models: VN6 & Afridev









Characteristics of two main handpump types

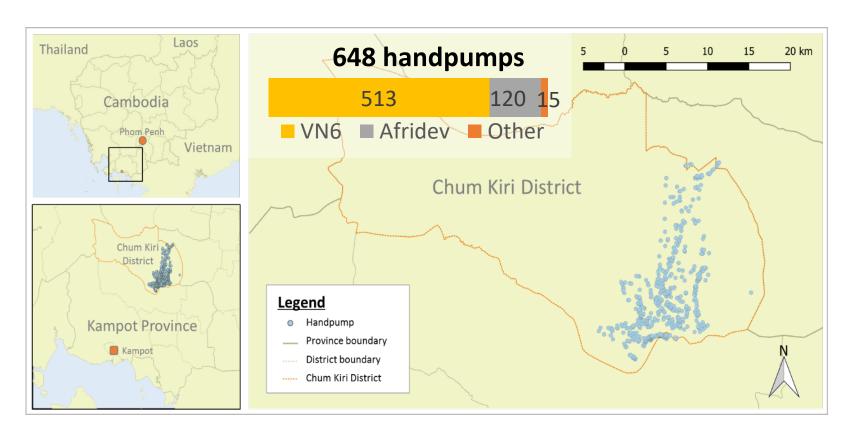
	VN6	Afridev	
Max pumping lift	7 metres	45 metres	
Mode of operation	Suction	Reciprocating	
Plunger & footvalve	Above ground	Below ground	
Bearings	No	Yes	
Pump head/handle	Cast iron	Galvanized steel	
Tools	Open ended spanners	Socket spanner, fishing tool, &	
		open ended spanners	
Rising main	PVC	PVC	
Domain	Public	Public	
Location of manufacture	Vietnam	India	
Spare parts	Locally available	Available in Phnom Penh	







Study focused on Chum Kiri District in Kampot Province



Key characteristics

Population	53,125
GW depth (m) ^b	2-7
Aquifer	Alluvial
Avg. household size ^a	4.5
Electricity (% HHs) ^a	2.0
Open defecation (% HHs) ^a	90.0
Poverty rate (%) ^c	13.8





^a Based on 2008 census. ^b Based on wells included in Cambodia WellMap inventory with information on static water level.⁸ ^c Based on 2015 sub-national poverty report.



Multivariable regression models assessed 3 outcome variables and 6 explanatory variables

Explanatory variables

- Technology: VN6 vs Afridev
- Water quality: Good vs Poor
- Ownership: Private vs Public
- Financing: Private vs Mixed vs Public
- Distance to provincial capital (Kampot)
- Handpump age

Outcome variables

- Functionality
 - -88% functional
- Breakdown since installation
 - 43% never broken down
- Repaired at most recent breakdown
 - 73% repaired at most recent breakdown

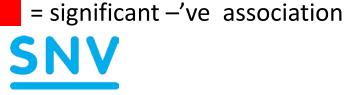




Operational performance associated with technology, water quality, ownership, age, and distance to major town

	Outcome variables		
	Functional status	No breakdowns	Repaired at most
		since installation	recent breakdown
Explanatory variables			
Technology: VN6 vs Afridev			
Water quality: Good vs Poor			
Ownership: Private vs Public			
Financing: Private vs Public			
Financing: Mixed vs Public			
Financing: Private vs Mixed			
Distance to provincial capital			
Handpump age			





= significant +'ve association



Conclusions

- Technology, institutions and hydrogeology all contributed to operational performance
- Handpump choice a trade off between reparability and reliability
 - Afridev more robust, but VN6 easier to fix
 - Need to strengthen Afridev spare part supply chains and technical services
- Proximity to external support appears important, though association may be confounded by other socio-demographic factors
- Privately owned handpumps perform better, supportive of self-supply approach
 - Frees up public funding for poorest and could qualify as 'safely managed' for SDGs

Sustainable rural water supplies will only be achieved with effective and financial viable maintenance services







Thank you

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