

# Life-cycle cost analysis for rural piped water systems in Viet Nam

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Vietnam & Australia



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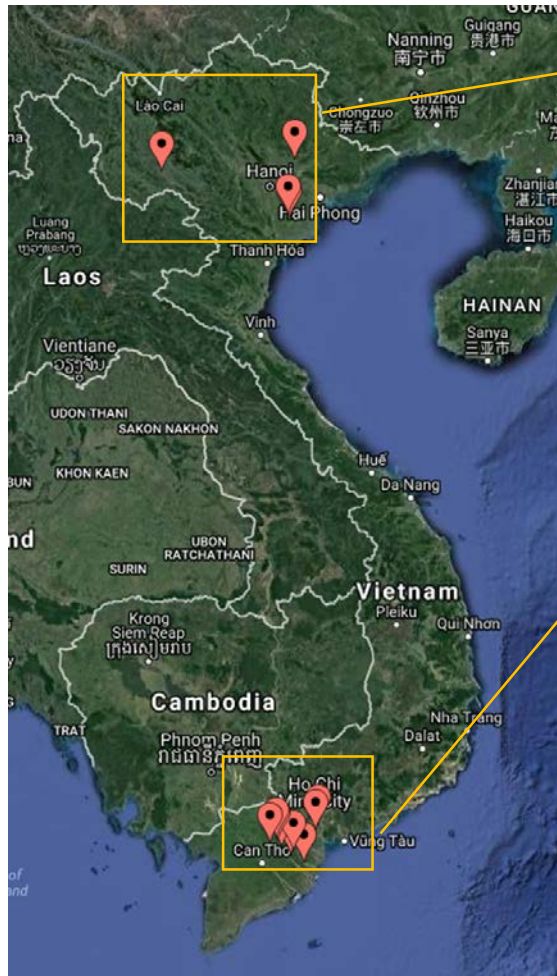


## Background

- Govt of Viet Nam encouraging private sector involvement in rural water supply
- Little has been documented on costs associated with sustainable rural water services
- Better understanding of costs would help govt (e.g. policies, regulation), private enterprises (e.g. tariffs, business planning) and CSOs (e.g. support mechanisms)
- Study aimed to assess cost structures of privately-operated piped schemes



# Study focussed on 14 privately-operated piped schemes across 6 provinces



4 schemes in north



10 schemes in south



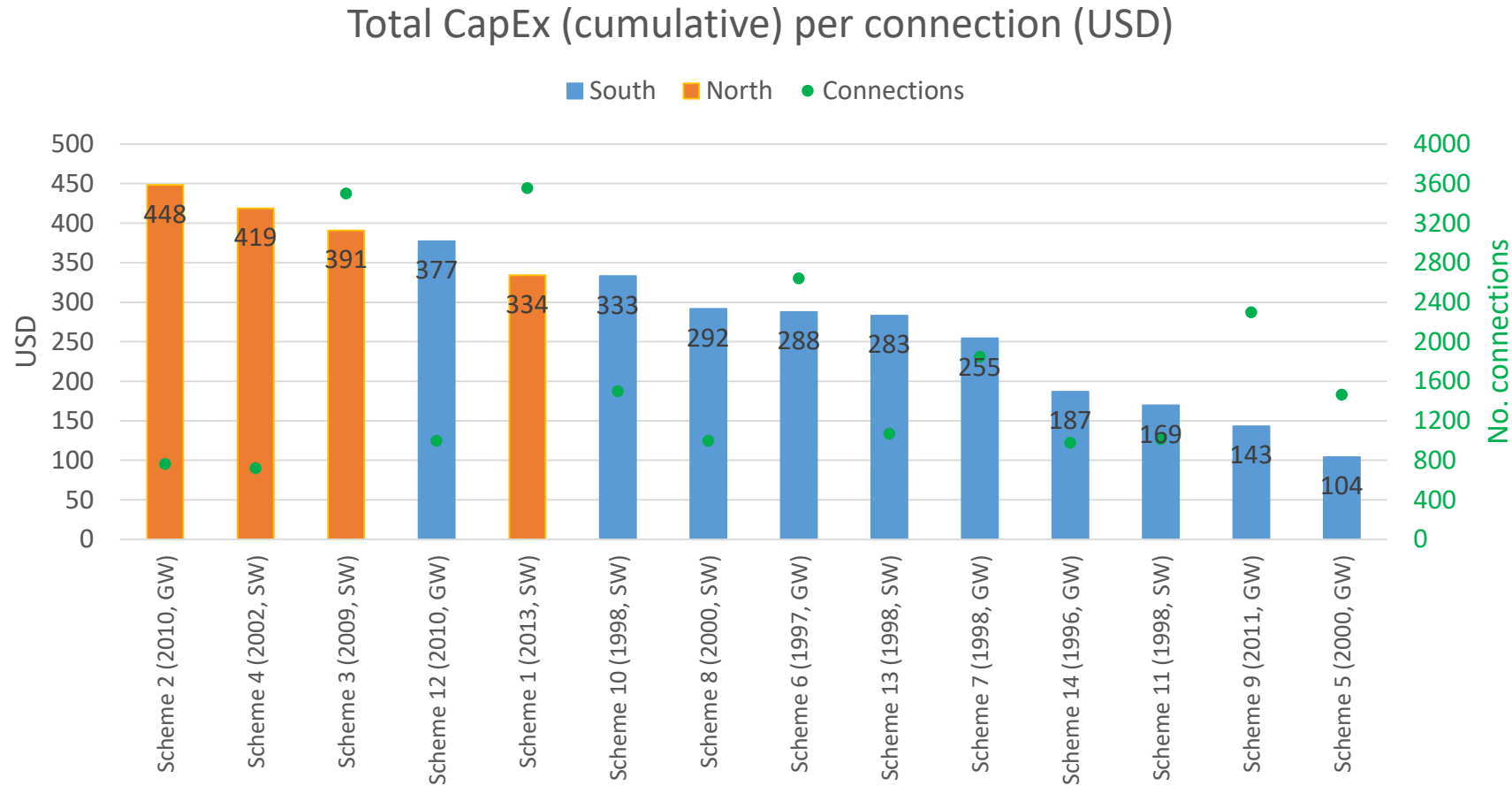
# Summary characteristics

	Mean	SD	Min	Max
System age (years)	13.5	6.9	1	21
Hours of service per day	19.5	5.4	7.0	24
No. connections	1,633	986	720	3,555
Production capacity (m <sup>3</sup> /day)	1,144	783	120	2,400
Actual production (m <sup>3</sup> /day)	729	583	120	2,146
Production per connection (l/day)	470	258	82	933
Tariff (USD/m <sup>3</sup> )	0.32	0.04	0.26	0.38
Connection fee (USD)	53	49	0	153

7 schemes draw on groundwater and  
7 schemes draw on surface water

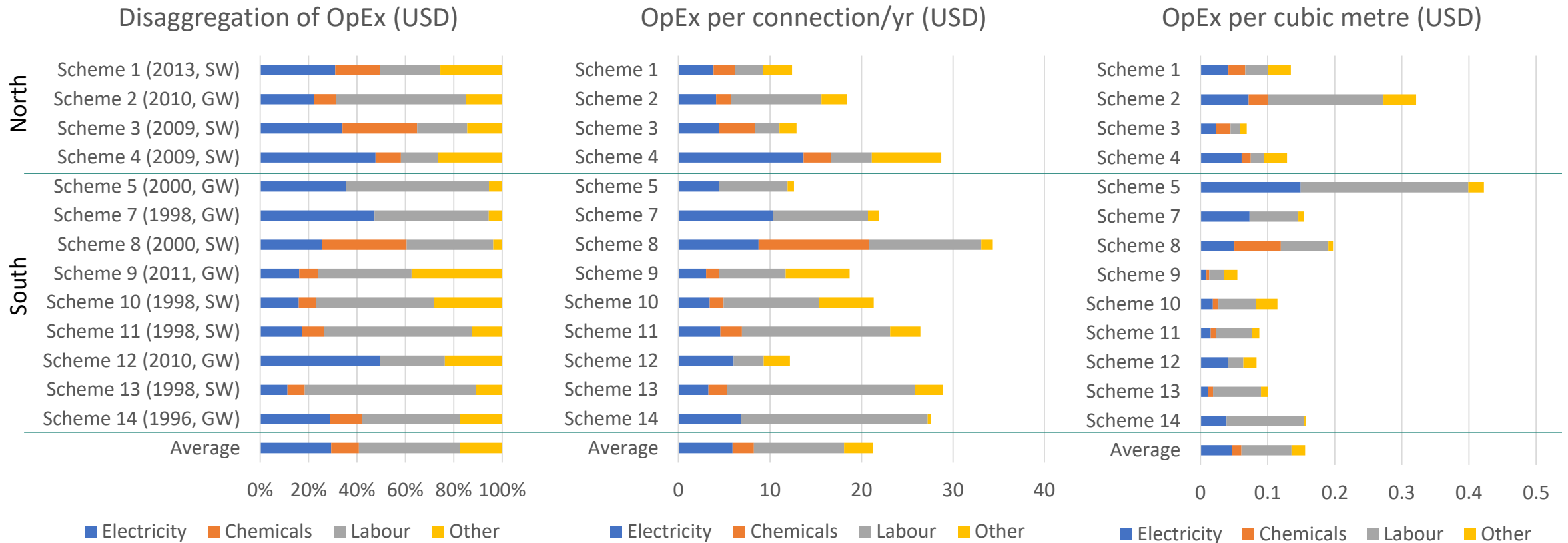


# Cumulative investment in new and expanded systems averages ~USD 287 per connection



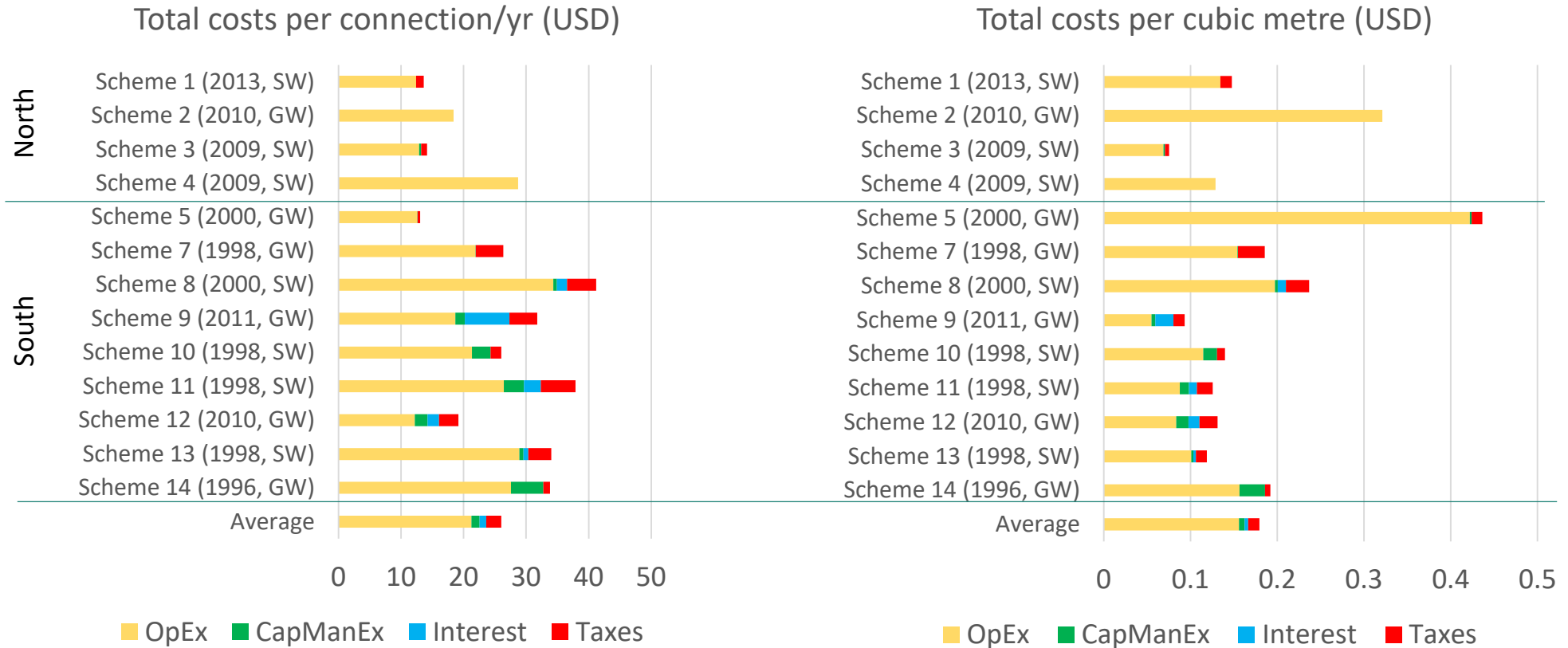
Around one-third of CapEx relates to system expansions subsequent to initial construction

# OpEx averages \$21 (\$12-34) per connection per year or \$0.16 (\$0.05-0.42) per cubic meter



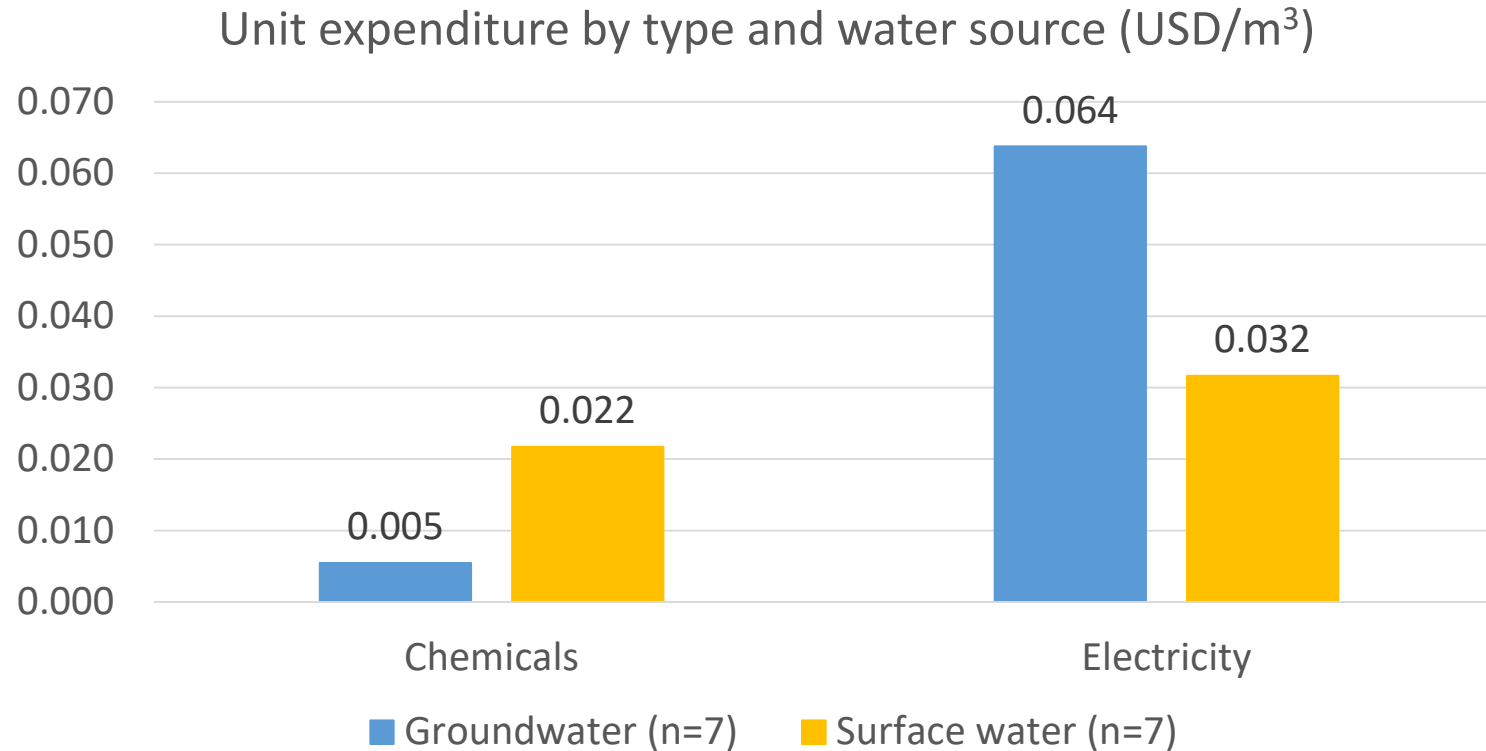
**Electricity and labour are the major operational cost drivers**

# On average, CapManEx, interest + taxes increase cost base by 15-20%, equivalent to \$4.75 per connection/yr or \$0.02 per m<sup>3</sup>

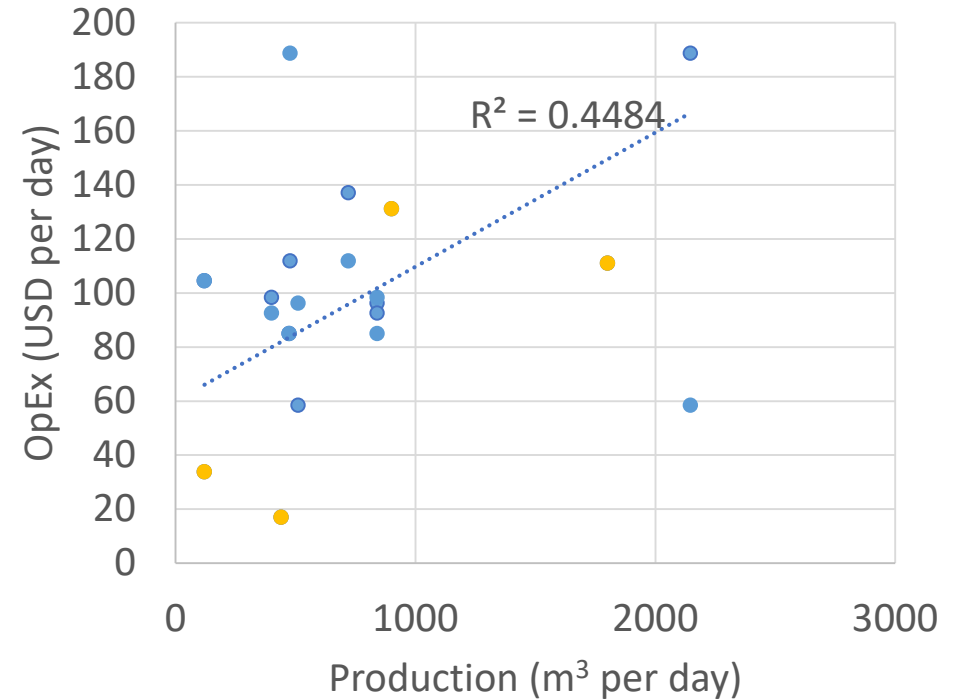
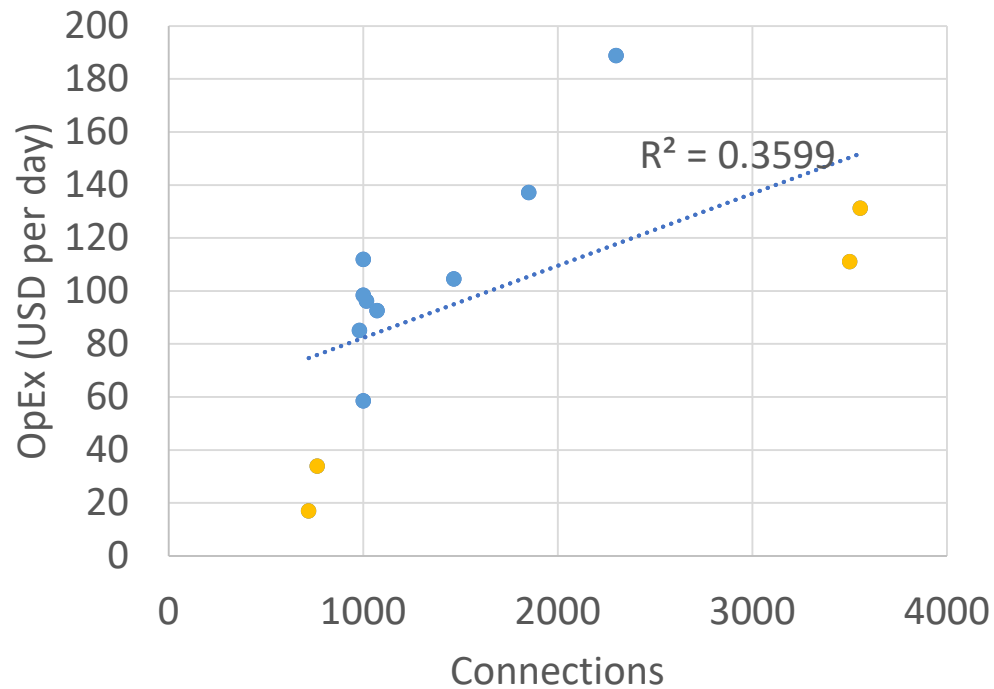




# Systems lifting groundwater incur higher electricity costs but have lower expenditure on chemicals

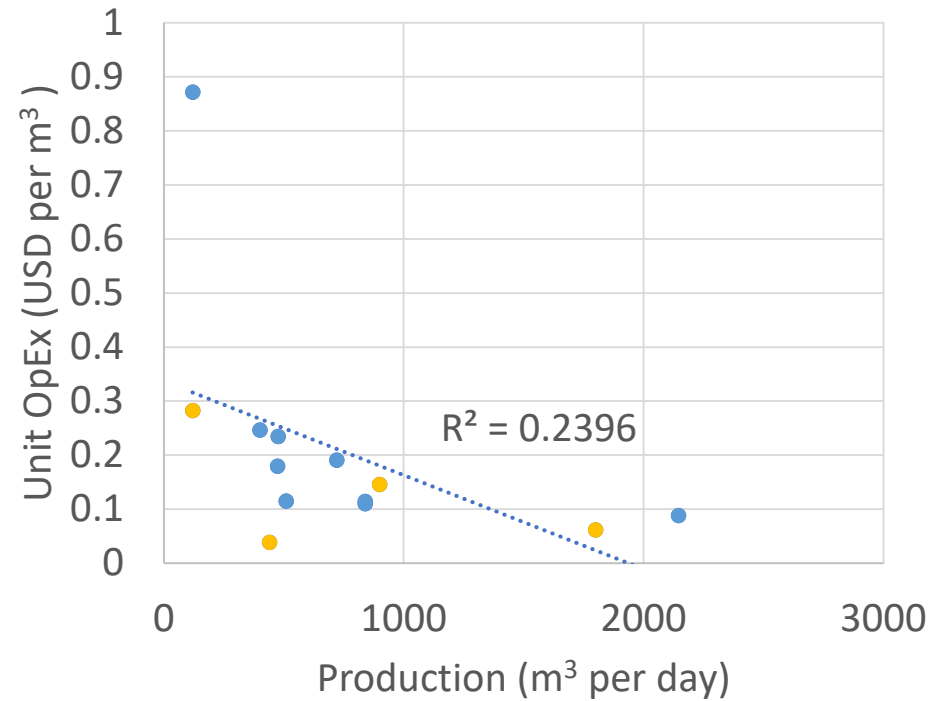
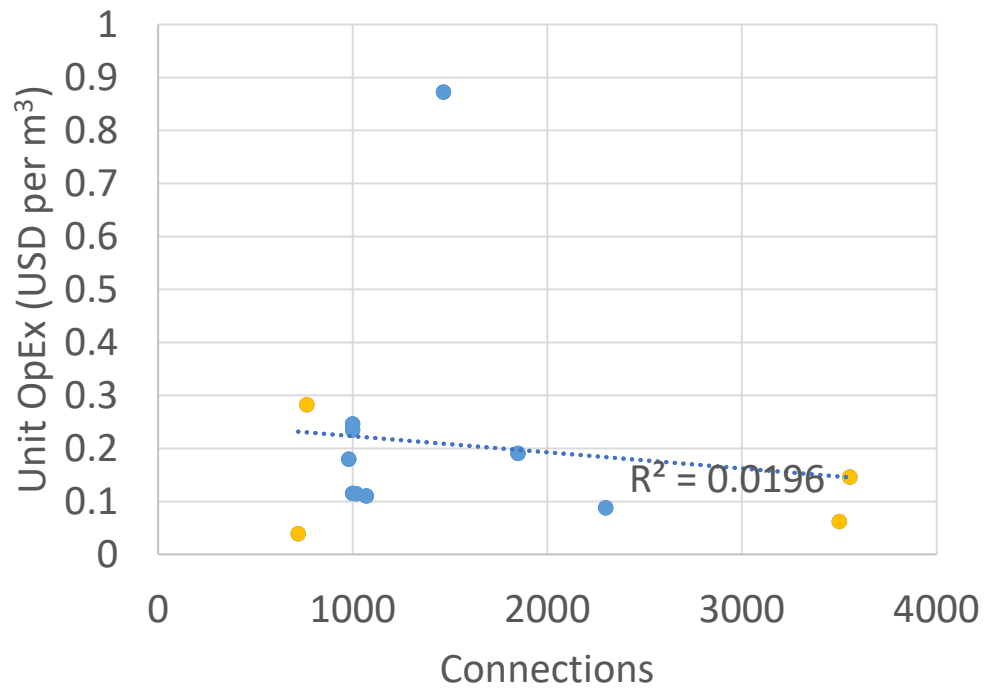


# Total production and number of customers key drivers of operational expenditure



● South ● North

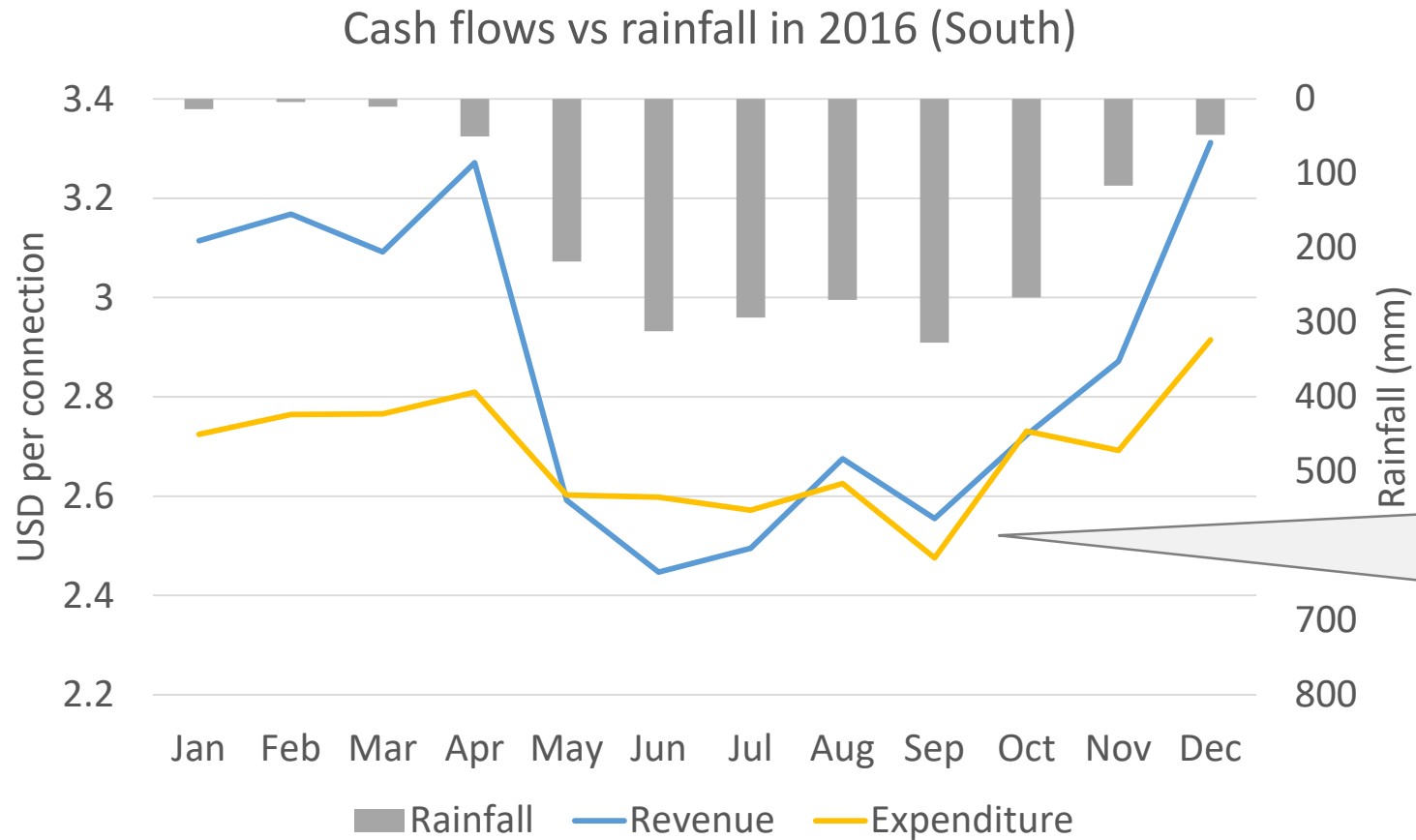
# Unit operational expenditure decreases with size of operations, suggestive of economies of scale



● South ● North

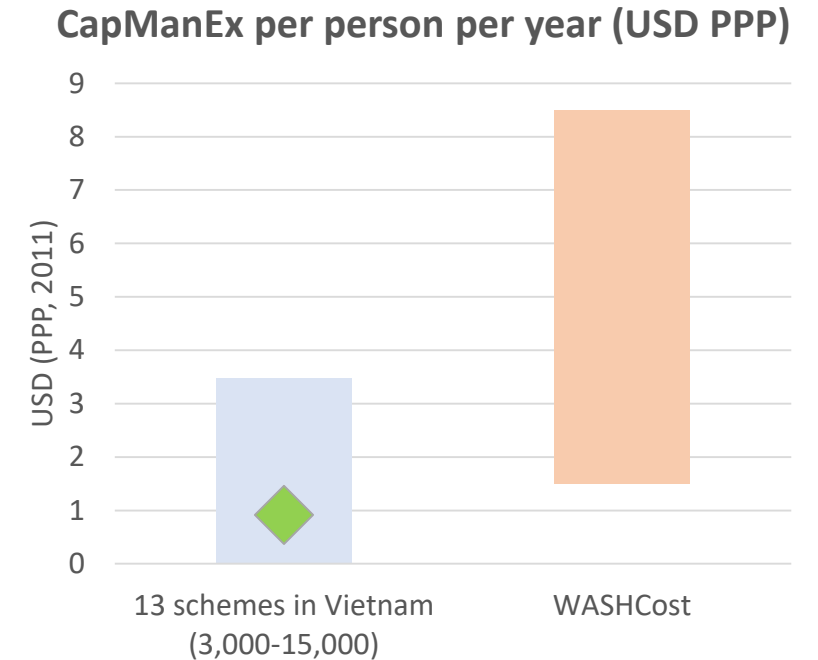
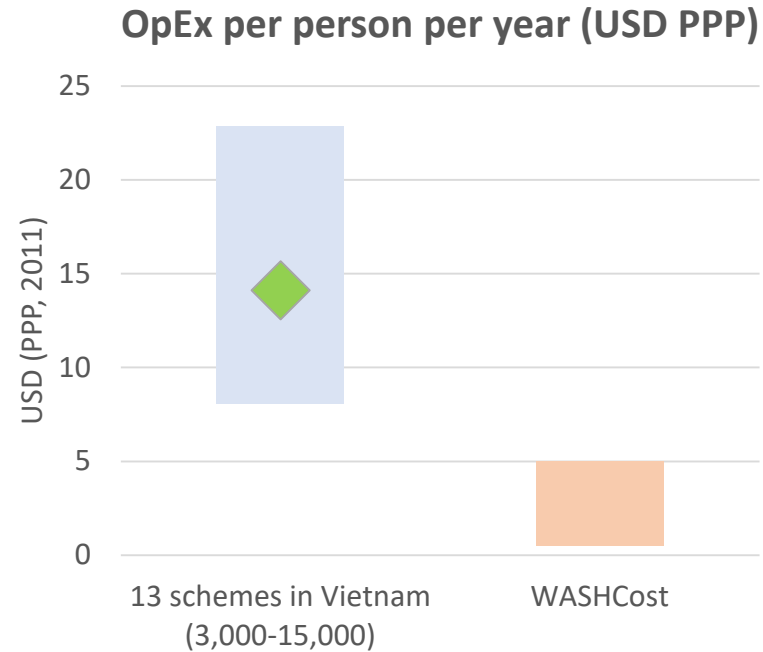
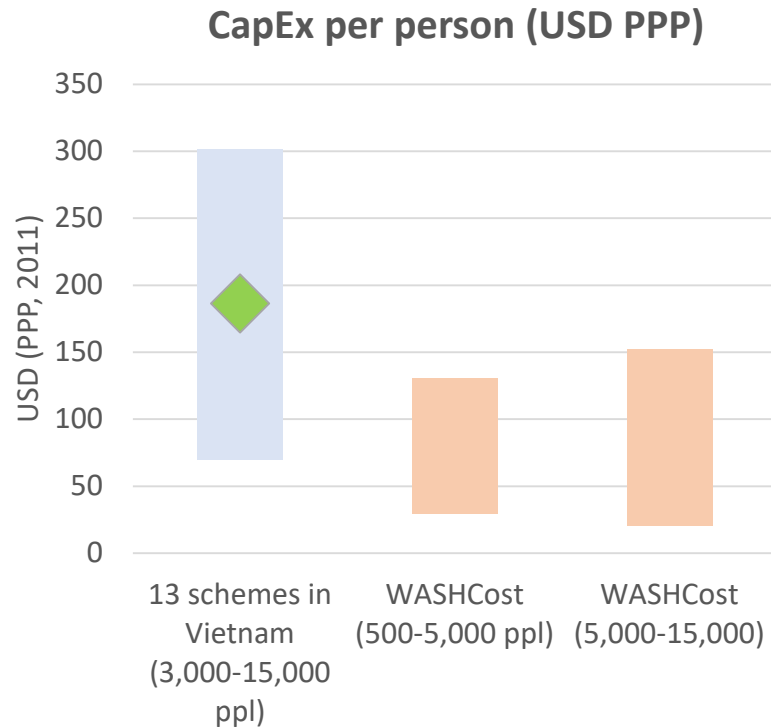


# Seasonal variability of water consumption affects both expenditures and revenues in the South



Profit margin lower in rainy season: demand declines more than costs

# CapEx and OpEx higher than WASHCost benchmarks, but CapManEx is lower



Note: Cost estimates per capita for Vietnam assume 4 people per household. WASHCost estimates based on ranges presented in WASHCost Infosheet 1 (2012) <https://www.ircwash.org/sites/default/files/IRC-2012-Providing.pdf>



# Conclusions

- Preliminary results suggest:
  - Historical CapEx of \$287 (\$104-450) per household connection
  - OpEx of \$0.16 (\$0.05-0.42) per m<sup>3</sup>, or \$21 (\$12-34) per connection per year
  - CapManEx, interest and taxes increase recurrent costs by 15-25%
- Key determinants of OpEx include climate, water source, and size of system
  - Electricity and labour key cost drivers
- Results to inform policies/regulation, business planning (e.g. tariffs), and support mechanisms
- Collecting high quality cost data on rural water services is challenging





Thank you



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