

Survey on household water use for its design in rapidly developing areas of the Hanoi City

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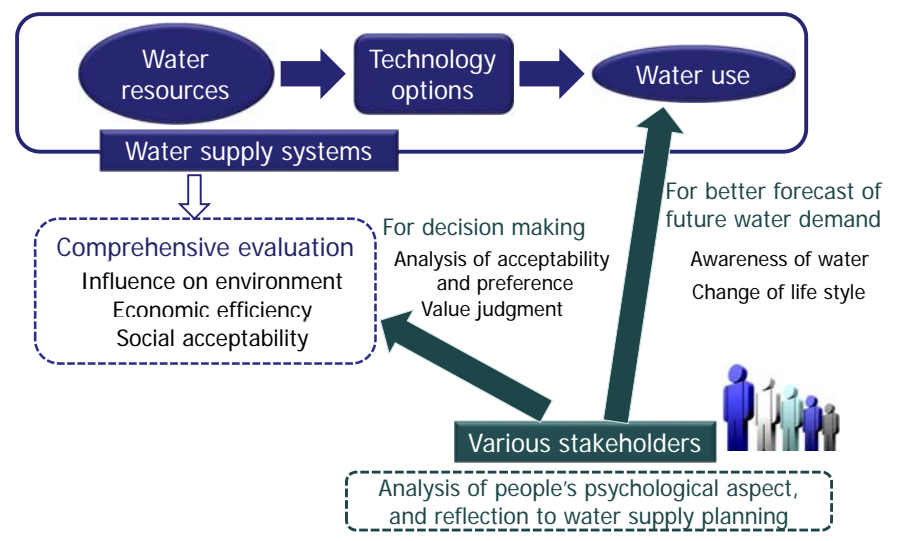
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Research questions

- How much do residents use water?
- How do they use water?
- How do they maintain their water system?
- How do they change their water use?
- What will be the appropriate options of water use in terms of their socioeconomic conditions and lifestyle?
- What will be the environmental consequences by installing these options?
- How do they accept these options, or what will be a preferable option for them?



Need to know the detailed information on water use, preferences and opinions of residents, and information on their community

Direct measurement of water use

- Meter installation for each tap in the fixed period
- Measurement of water use in each purpose
- Almost 60 households completed

For kitchen



For shower

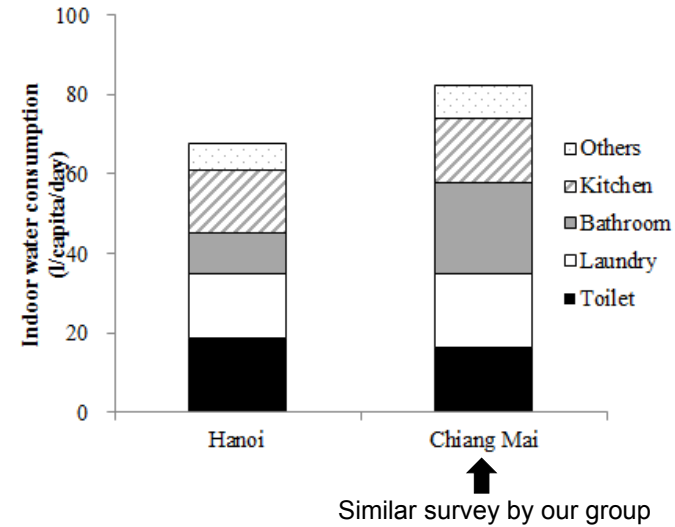




For flush toilet
Installation of a counter and measurement of flushing volume



For washing machine



Similar survey by our group

- Questions
 - Source of water
 - Equipments and its frequency to use
 - Way of water use
 - PoU treatment
 - Water bill
 - Household characteristics
- Developing iPad survey from paper-based one
 - Easy to show images
 - Easy for interviewers and interviewees
 - Attract more respondents

食器はどのようにして洗いますか？
Anh/chị rửa bát đĩa như thế nào?



Image of iPad questionnaire

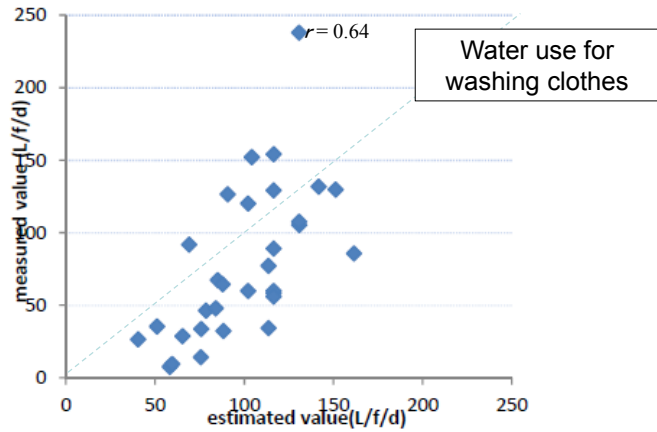


Source: Google map

- Meter installation and questionnaire (2011.3-7, 8)
 - Direct measurement of water use
 - Factors influence on water use
 - Possibility to estimate water use without meter installation
- ↓
- Questionnaire survey by iPad (2011.8)

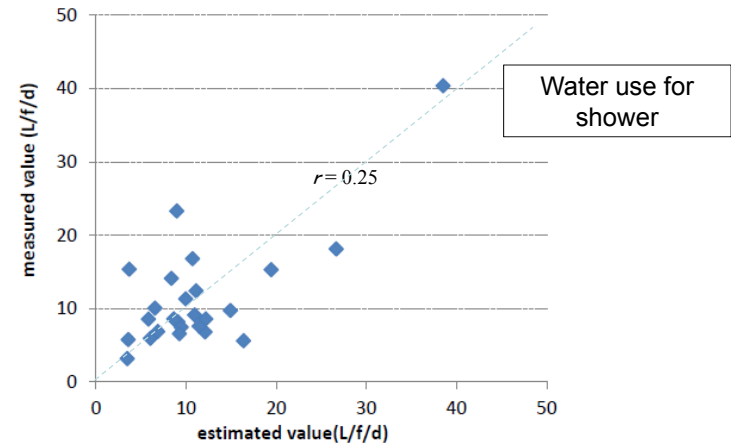
We can increase sampling size.

Measured vs. Estimated



We can roughly estimate the amount of water use for washing clothes by family size, amount of clothes for washing, frequency of washing.

Measured vs. Estimated



It seems to be difficult to estimate the amount of water use in shower by flow rate of tap, sex, way of using shower.

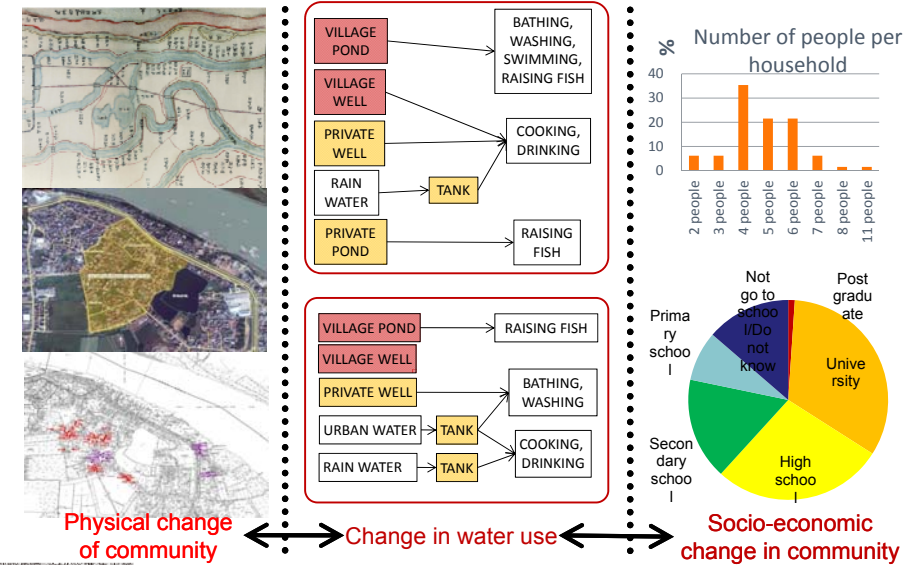
Difference within the city

3 communities for detailed survey, to see the differences in socio-economic background, water source, use and residents' opinion, for appropriate scenarios for each community.



- Gia Thuong – Bac Bien**
 - Higher income and education background
 - Mixed with original and new residents
 - Piped only >50%, piped+well >30%
- Thanh Tri**
 - Middle income and educational background
 - Urbanizing area since 2003
 - Piped only >65%, Piped+rainwater 20%
- Vinh Quynh**
 - Lower income and educational background
 - Piped only 10%, Rain+well 50%, ¼ household use rainwater

Change in community and its impact on water use



Future steps

- How much do residents use water?
- How do they use water?
- How do they maintain their water system?
- How do they change their water use?
- What will be the appropriate options of water use in terms of their socioeconomic conditions and lifestyle?
- What will be the environmental consequences by installing these options?
- How do they accept these options, or what will be a preferable option for them?



For appropriate planning on water use in rapidly-developing community and the city