# Groundwater in urban slums

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SIWI

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Unlocking the Potential of Groundwater for the poor

T-GroUP

# Experimenting with practical Transition Groundwater management strategies for the Urban Poor in Sub-Saharan Africa

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# Potential in *ground*water for development through focus on the users

# Groundwater and the urban poor

- Inadequate (piped & public) water services in slums in Sub-Saharan Africa (SSA)
- 269M urban dwellers depend on wells as their
- principal source;
- Urban poor rely in part or in full on groundwater;
- Public standpipes, springs, private vendors, self-supply from own or shared wells, and/or NGO-run kiosks (Grönwall et al., 2010)

# Groundwater and the urban poor, cont'd

From 2010 to 2050: urban population from 300 million to > 1 billion. Mostly slums/informal areas – unplanned for.

Mixed groundwater use will remain, but:

- good / safe quality groundwater is scarce;
- no (or insufficient) institutions *managing* urban groundwater reserves (especially with regards to CC);
- (un)sustainable ?

How to move away from non-managed unsustainable practices towards sustainable urban groundwater management, which takes the interests of slum dwellers into consideration??

# Key question 1

What are the relationships (over time and within a defined area) between above-ground and below-ground systems? What changes have been decisive?

# Key question 2

Can Transition Management (TM) become a model for urban groundwater governance in Sub-Saharan Africa, and how can it be tailored and improved?

# Focus areas

3 slums or low-income areas
– our ‘urban laboratories’:

1. Sombetini slum (Arusha, Tan)
2. Dodowa (Accra, Gh)
3. Bwaise
   (Kampala, Ug)

# Characteristics of the focus areas

| Area | Population density | Average slum age | Land-use | Groundwater table | Geology | Current water supply |
|---|---|---|---|---|---|---|
| Bwaise (Kampala, Uganda) | High | >30 year | Mixed informal residential, and SMEs | Shallow (springs) | Laterites and alluvial sands on top of old basement | Springs, public supply standpipes |
| Unga Limited/Sombetini (Arusha, Tanzania) | Medium | 10-30 year | Same as above. | Intermediate (springs, wells) | Volcanic basalt and lahars | Springs, wells, public supply standpipes |
| Dodowa , the capital of Shai Osu-Doku District (Accra, Ghana) | Low | <10 year | Informal residential and peri-urban agriculture | Shallow (wells) | Fractured zone aquifers on top of old basement | Wells |

# Slums as complex adaptive systems (CAS)

**Characteristics**

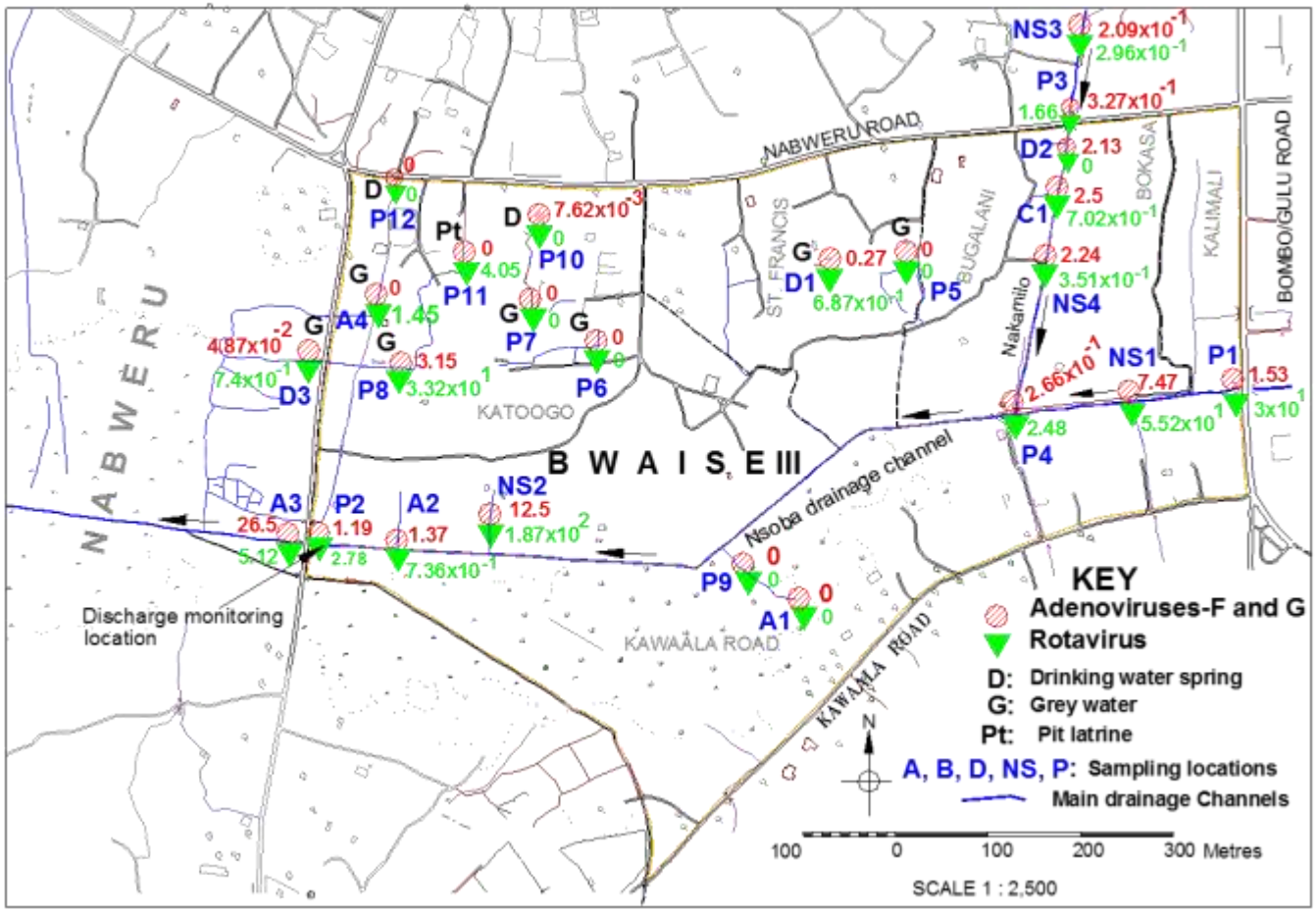
| | |
|---|---|
| Complex: | Many interacting 'dimensions' : social, political, legal, economical, religious, environmental, infrastructural, etc. |
| Self-organizing: | Emerge from elements making up the system |
| Adaptive: | Ability to change their behavior and adapt to new relationships |
| Dynamic: | Can undergo rapid and unpredictable transformations |
| Co-evolving: | Change and are changed by their environment |

# Systems above and below ground

Hydrogeology: drilling, aquifer characterization, network design, piezometer installation, automated monitoring (e.g. arduinos)

Groundwater quality: chemistry and viral pathogens, perhaps pharmaceuticals

# Selected viruses (gc/ml) Bwaise slum



# Governance and economics

- Management and governance, law and policy, social norms and power dynamics
- Economics: (qualitative and quantitative) surveys among users and producers of groundwater, formal or informal operators (households, informal and formal private water vendors, state-owned enterprises or utilities).

# Urban groundwater governance

- *Who gets groundwater, when and how?*
- Map actors and stakeholders at different levels, the processes for planning and decision making, the institutions, the norms and regulations…
- Evaluate the level of transparency, accountability, participation and integrity in decision making (criteria of good governance)

# Transition

*Shifts from one regime to another;*

*Structural change in the way a societal system operates. Long-term process (25-50 years)*

*resulting from a co-evolution of cultural, institutional, economical, ecological and technological processes and developments on various scales (multi-level)*

# Transition management

A social learning protocol aimed at making controlled and intentional changes in a societal CAS in order to create or spark a system change;

Recognized during SWITCH (www.switchurbanwater.eu)

Existing practical toolbox of participatory techniques;

Easy to include water governance issues;

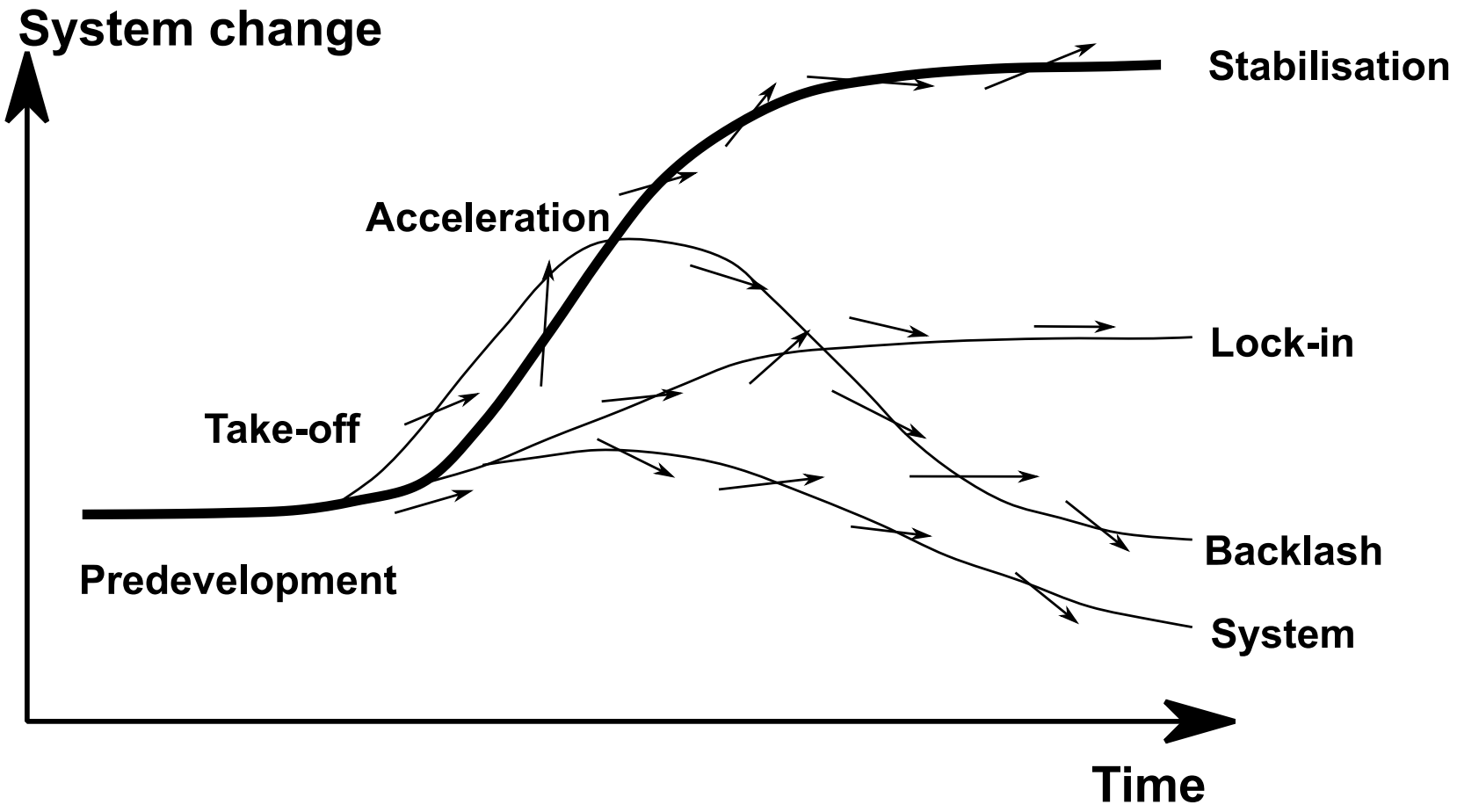
But:

Never applied to urban groundwater governance;

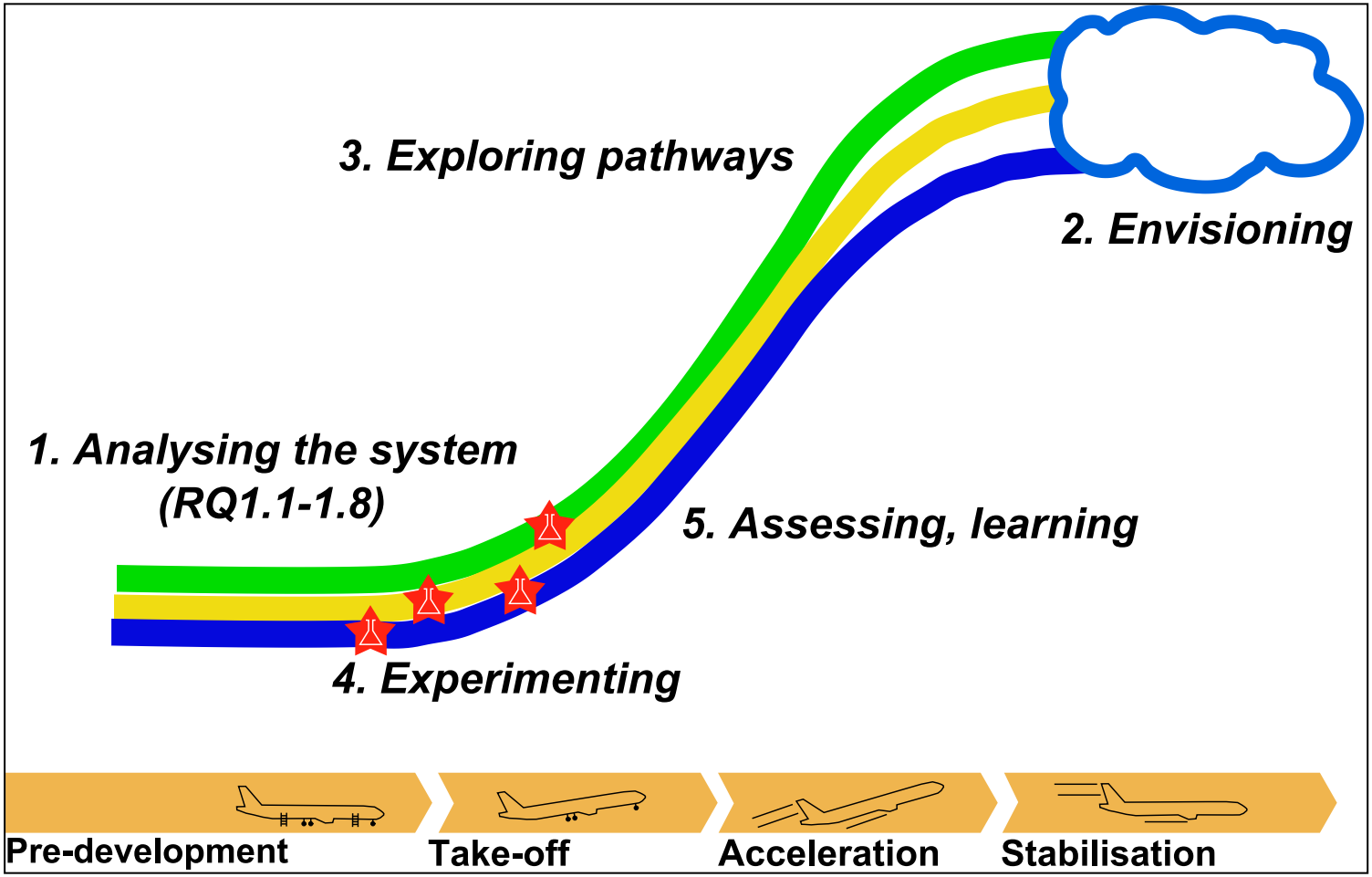
Never applied to SSA;

Framework of power dynamics poorly developed

# TM cycle in an S-curve



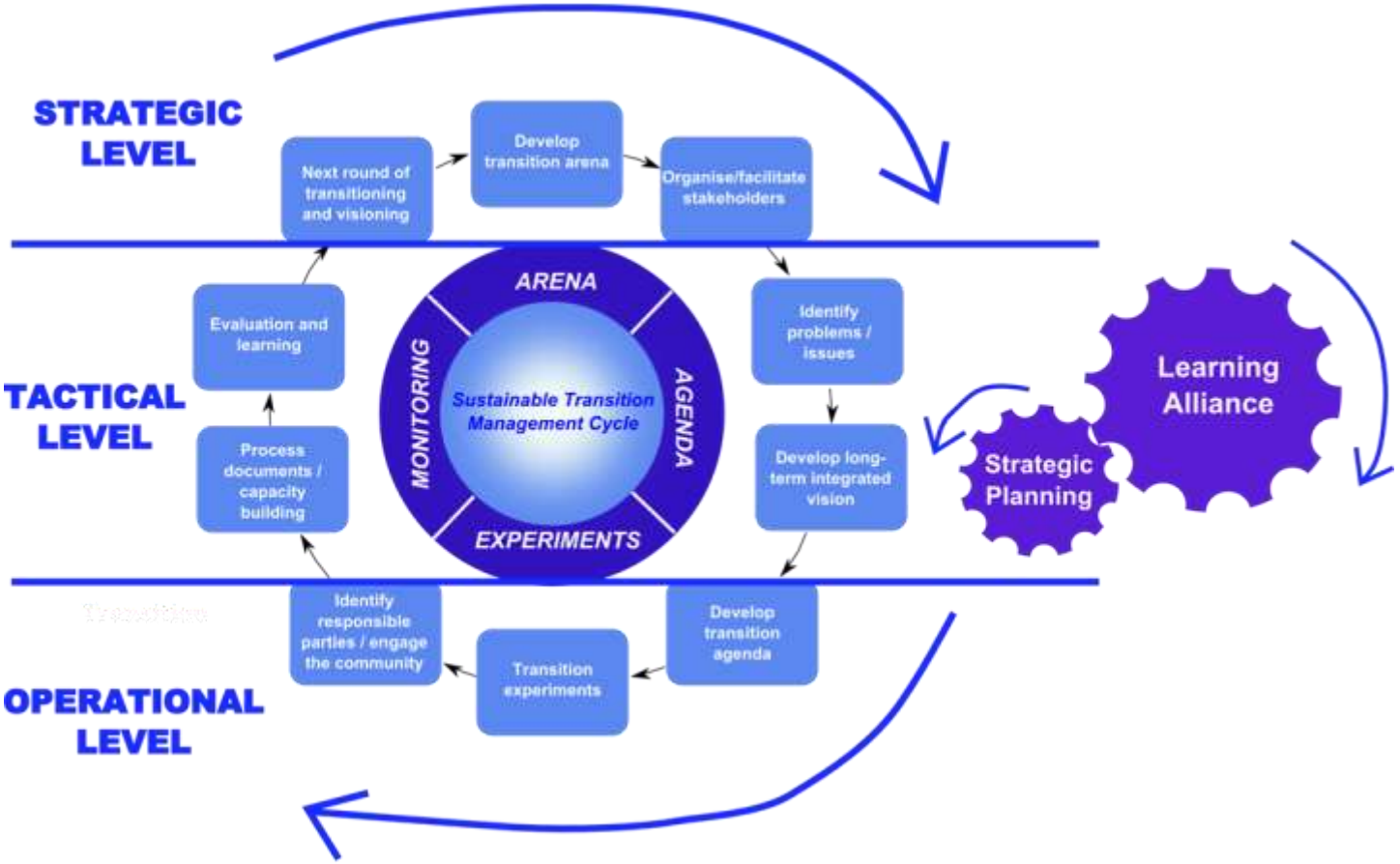
# Who is doing this?
## *The Learning Alliance*



# Characteristics of the Learning Alliance

- 10-15 people;
- Multi-sectoral, multi-level urban frontrunners;
- Will use information gathered in 1st phase;
- Learn from each other's knowledge and perspectives (social learning);
- Integration of ideas into set of transition experiments

# TM activities




Action-oriented research: carry out the social learning protocol

# Learning has already begun…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# Thank you!

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