UPGro 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

# (T-GroUP)

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- groundwater and the urban poor
- slums as complex adaptive systems

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# Groundwater and the urban poor

Inadequate (public) water services in slums in Sub-Saharan Africa (SSA)
Urban poor rely in part or in full on groundwater (Grönwall et al., 2010)






# Groundwater and the urban poor

From 2010 to 2050: urban population from 300 million to > 1 billion. Mostly slums.

Mixed groundwater use will remain, but:

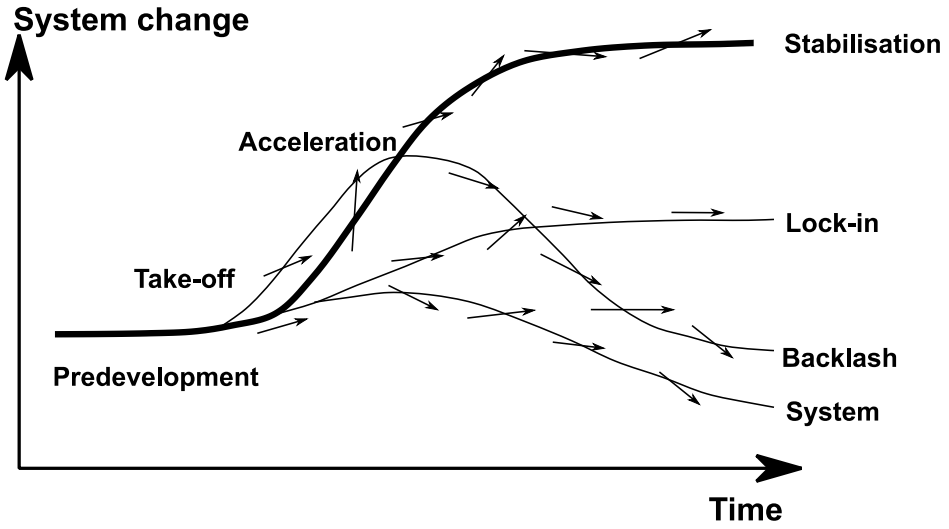
- good / safe quality groundwater is scarce;
- no institutions managing urban groundwater reserves;
- (un)sustainable (?).

How to move away from not managed unsustainable practices towards sustainable urban groundwater management, which takes the interests of slum dwellers into consideration??

# Slums as complex adaptive systems (CAS)

Characteristics of complex adaptive systems:

| | |
|---|---|
| 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 |

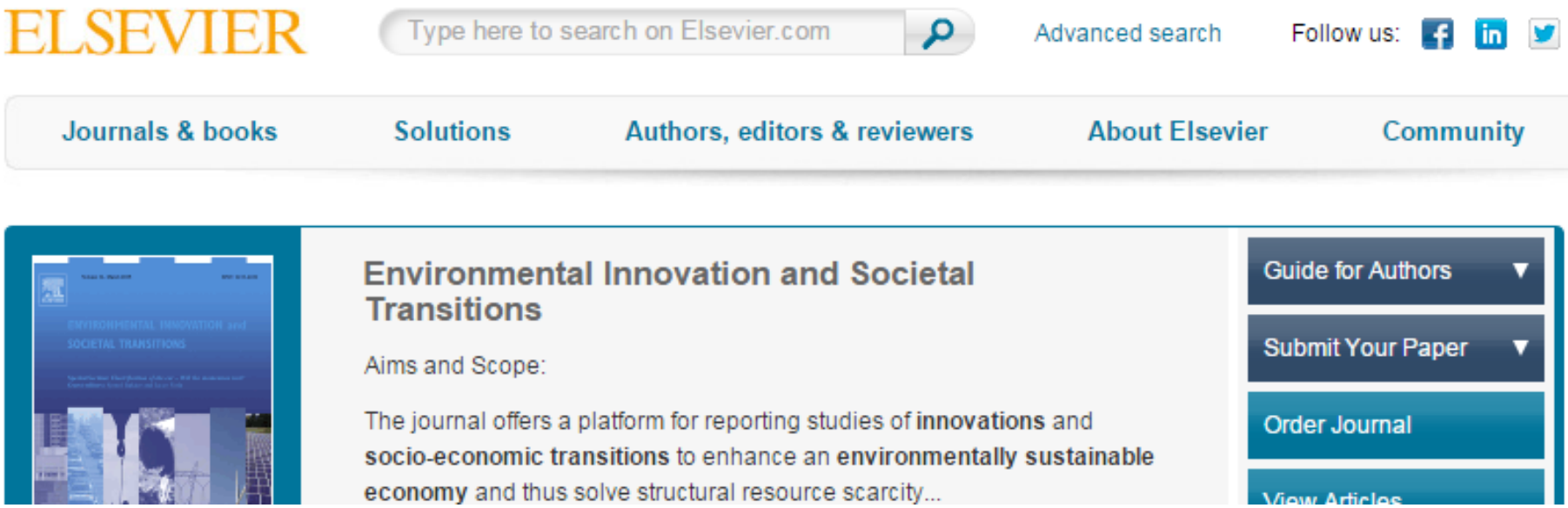


# Transition management

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

Not new. See: www.transitionsnetwork.org

Elsevier journal:




Recognized during SWITCH (www.switchurbanwater.eu); insufficient time to 'play' with it

# Transition management

•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 relations is poorly developed;

•Can TM become a model for urban groundwater governance?

# Key question(s)

Changes required to make transition towards sustainable groundwater management in urban SSA?

RQ1: Relations between 'below-ground' and 'above-ground' systems?

RQ2: Can TM be a suitable model for groundwater management and governance in urban SSA?

3 slum areas or ‘urban laboratories’:

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

# RQ1: Extended Systems Analysis - activities

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

Groundwater quality: chemistry and viral pathogens, perhaps pharmaceuticals

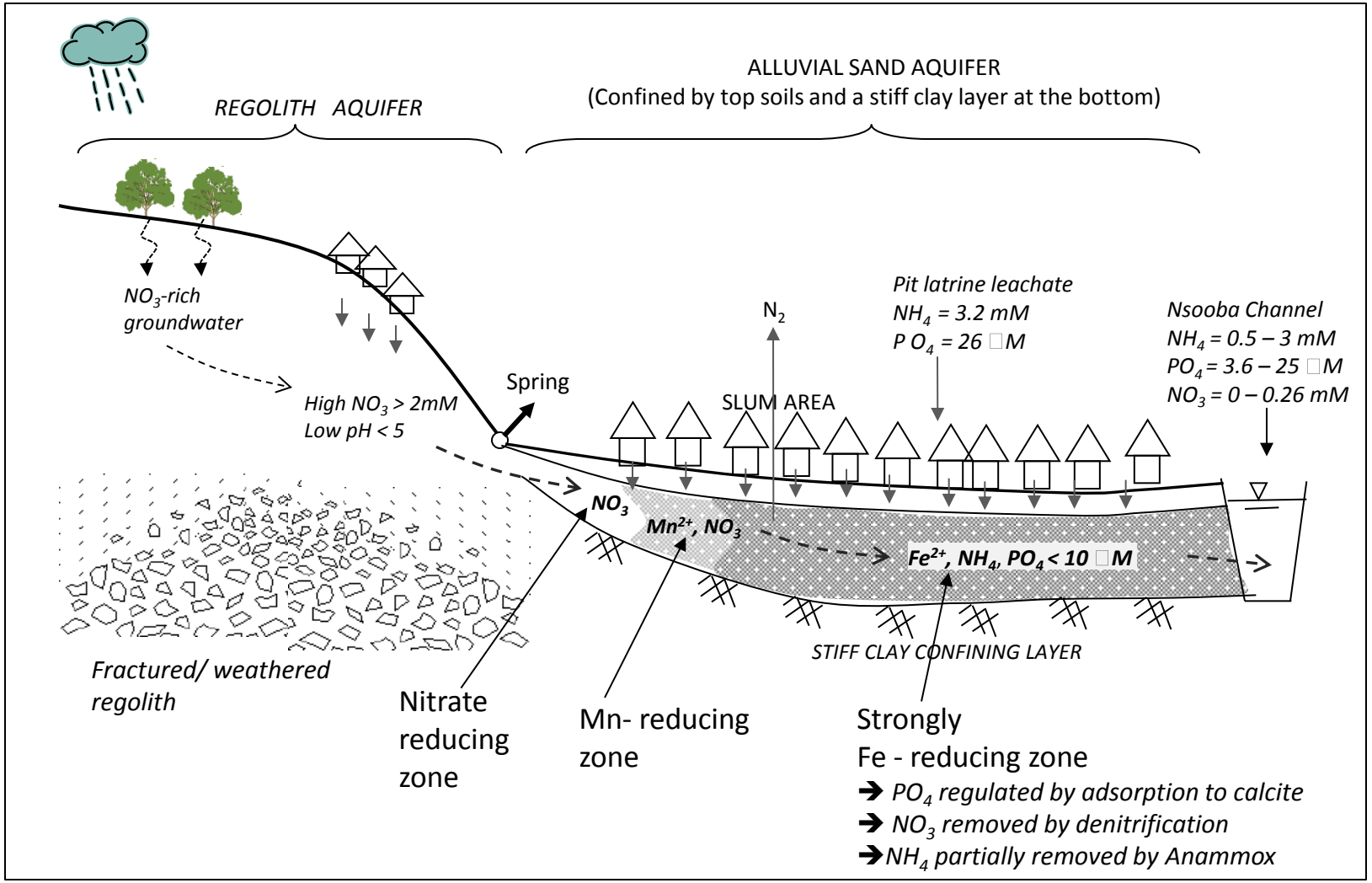
Water governance, legal issues, power dynamics: (qualitative) literature surveys, field observations, interviews with officials and users, focus group discussions, and multi-level institutional analyses and mapping

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).

Integration of above and below ground systems

Developments in 20-50 years time

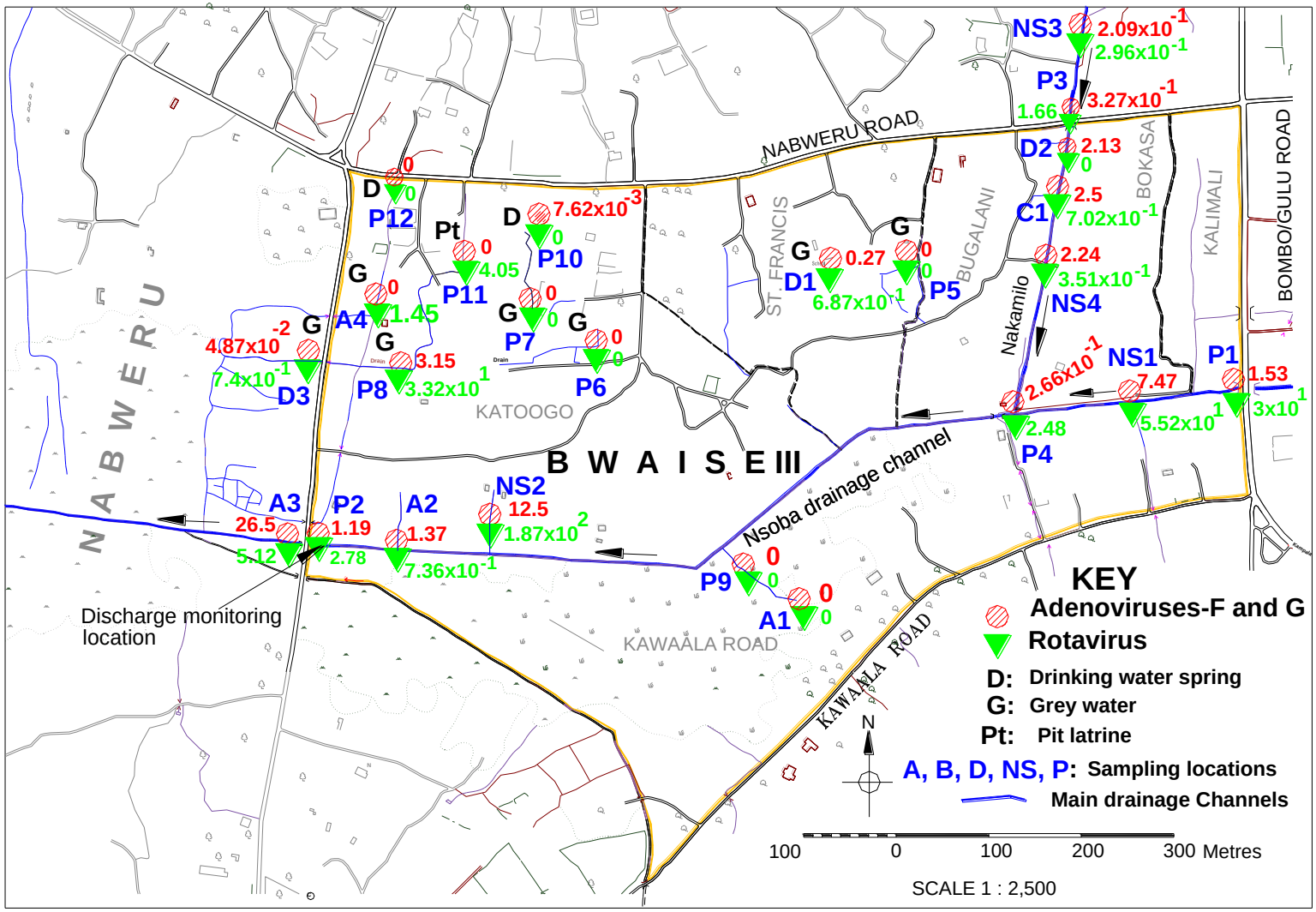
# Shallow groundwater flow and hydrochemistry in Bwaise slum






**(Nyenje et al., 2013; -, 2014; -, 2014a; -, 2015)**

# Selected viruses (gc/ml) Bwaise slum

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(Katukiza et al., 2013 b)

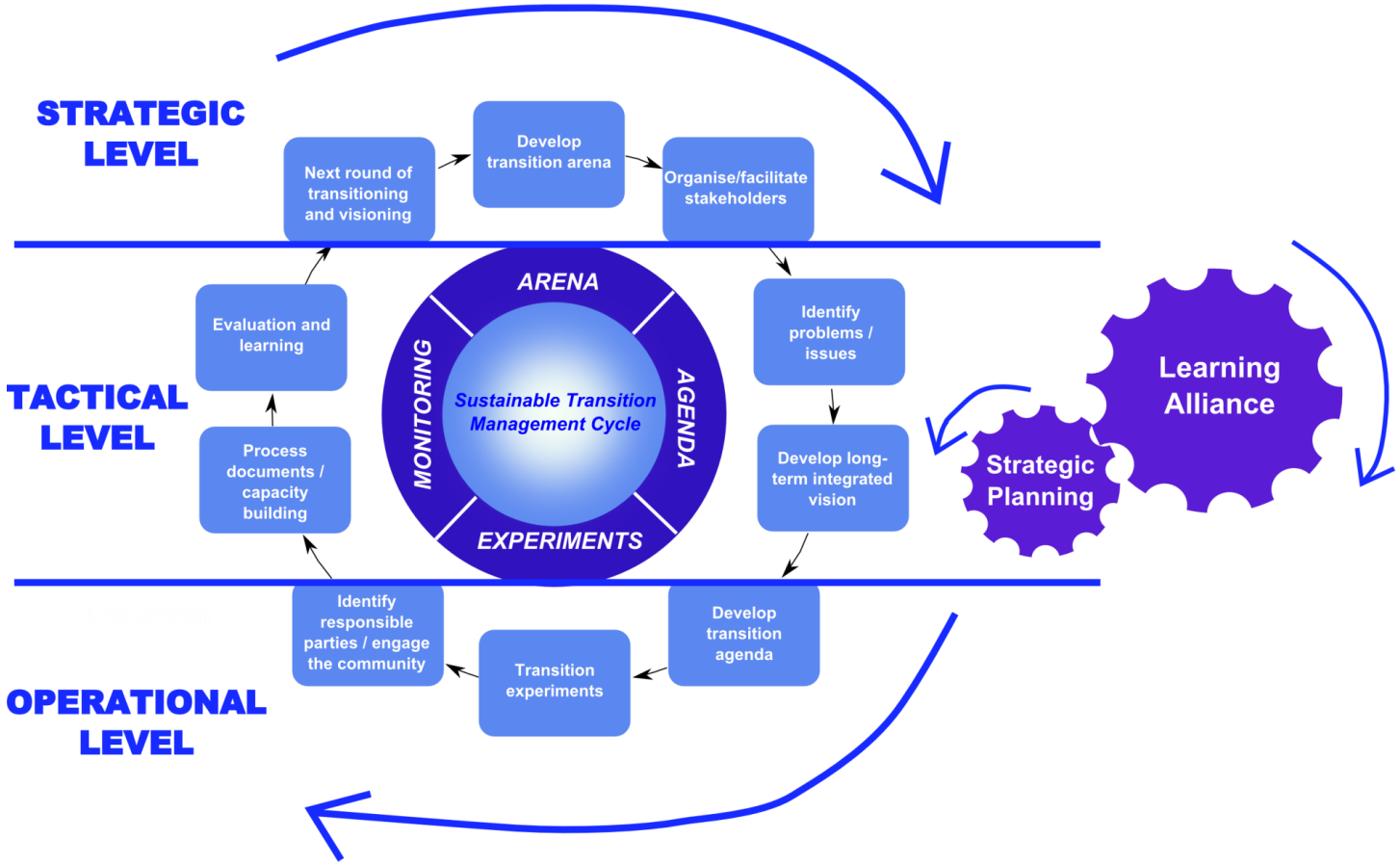
# Outcomes of RQ1

New science:
1. Urban groundwater dynamics.
2. Depth specific pollution patterns.
3. Dynamics of pathogens and indicators.
4. Current groundwater governance practices.
5. Water related power dynamics.
6. Slum water economics.
7. Analysis of relations and effects.
8. Comparison between Ghana, Uganda, and Tanzania.
9. Future prediction (20-50 years from now).

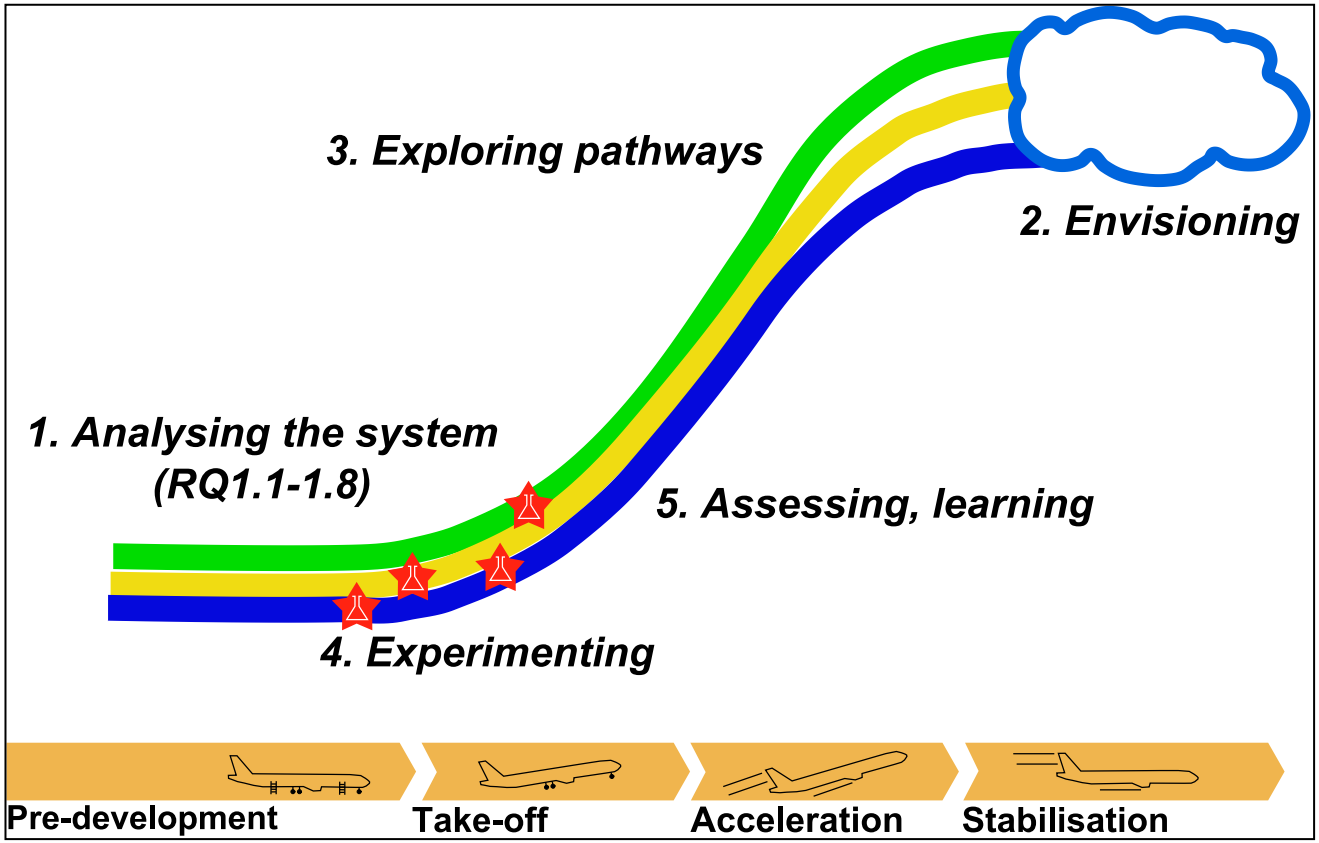
Open-access peer reviewed articles, course materials, policy briefs, and presentations at conferences through regional networks like Waternet, ASKNet, and AGW-Net, etc..

# RQ2: TM - activities

Action-oriented research: carry out the social learning protocol



# TM cycle in an S-curve




Q: Who is doing this? A: The Learning Alliance.

# Characteristics of the Learning Alliance

- 10-15 people;
- Multi-sectoral, multi-level urban frontrunners;
- Carry out the TM wheel or protocol;
- Will use information from RQ1;
- Learn from each other's knowledge and perspectives (social learning);
- Integration of ideas into set of transition experiments;
- Carry out transition experiments and learn from them;
- Systemic thinking.

# RQ2: Important outcomes

New science:

1. How to compose an effective Learning Alliance?
2. Social learning processes in the Learning Alliances (related to e.g. long term vision, transition narrative,  transition agenda, etc.).
3. Key transition experiments.
4. Results of the TM process in Urban Laboratories.
5. Comparison of the TM process between ULs.
6. Critical review of the applicability of TM in groundwater related problems in slums in SSA.
7. Can TM be a new groundwater governance model?

# RQ2: Important outcomes

Practical methodology manuals on:

1) Systems analysis,
2) Actor analysis,
3) Visioning,
4) Transition narrative,
5) Transition agenda,
6) From vision to action: carrying out transition experiments,
7) Monitoring transition experiments.

# Planning and project set-up

**Planning:**
RQ1: Yr 1, yr 2, yr 3 (part of)
RQ2: Yr 2 (part of), yr 3, yr 4

**LTTs:**

| | |
|---|---|
| Dodowa: | Lutterodt, Oduro-Kwarteng, Saka |
| Arusha: | Komakech, Machunda, Nelson |
| Kampala: | Nyenje, Isoke, Twinomucunguzi, Kulabako, Kansiime |

**Expert Teams:**

| | |
|---|---|
| Hydrogeology: | Lutterodt, Nyenje, Kulabako, Kansiime, Foppen |
| Pathogen (transport): | Lutterodt, Van de Vossenberg, Foppen |
| Governance: | Kooy, Grönwall, Komakech |
| Economics: | Oduro-Kwarteng, Isoke, Van Dijk |
| Transitioning: | Nastar, Olsson |

| | |
|---|---|
| **Project partners:** | 5 (Dodowa), 5 (Arusha), 6 (Kampala) |
| **Sub-contractors**: | Van Dijk, LTT support, drilling companies |