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UNIVERSITY OF TWENTE.

GLOBAL VISIBILITY AND LOCAL ACCOUNTABILITY

MAKING SENSE OUT OF SENSORS

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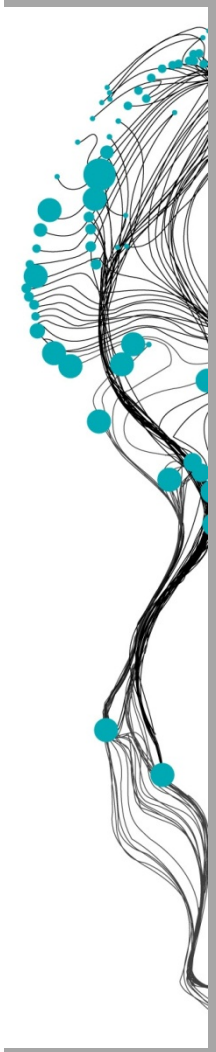
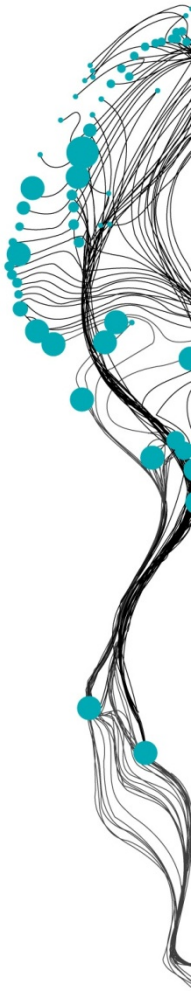
NORTH AND SOUTH CONFERENCE
ETH ZURICH, SWITZERLAND
NOVEMBER 10TH, 2011

ITC FACULTY OF GEO-INFORMATION SCIENCE AND EARTH OBSERVATION



OVERVIEW

1. What problems addressed?
2. Human sensor web as solution
3. Findings
4. Making sense of sensors
5. So what?
6. Recent developments



TANZANIA BACKGROUND

Two concurrent changes

- transition to a market economy makes ➔ free public service only one of the options for people to satisfy their needs
- Eastern Africa uptake of mobile applications:
  - banking M-Pesa,
  - texting on the quality of water services Daraja.org,
  - report on humanitarian crises like Ushahidi and human rights violations FrontlineSMS

WHAT PROBLEMS ADDRESSED?

- Water provision (not just water management)

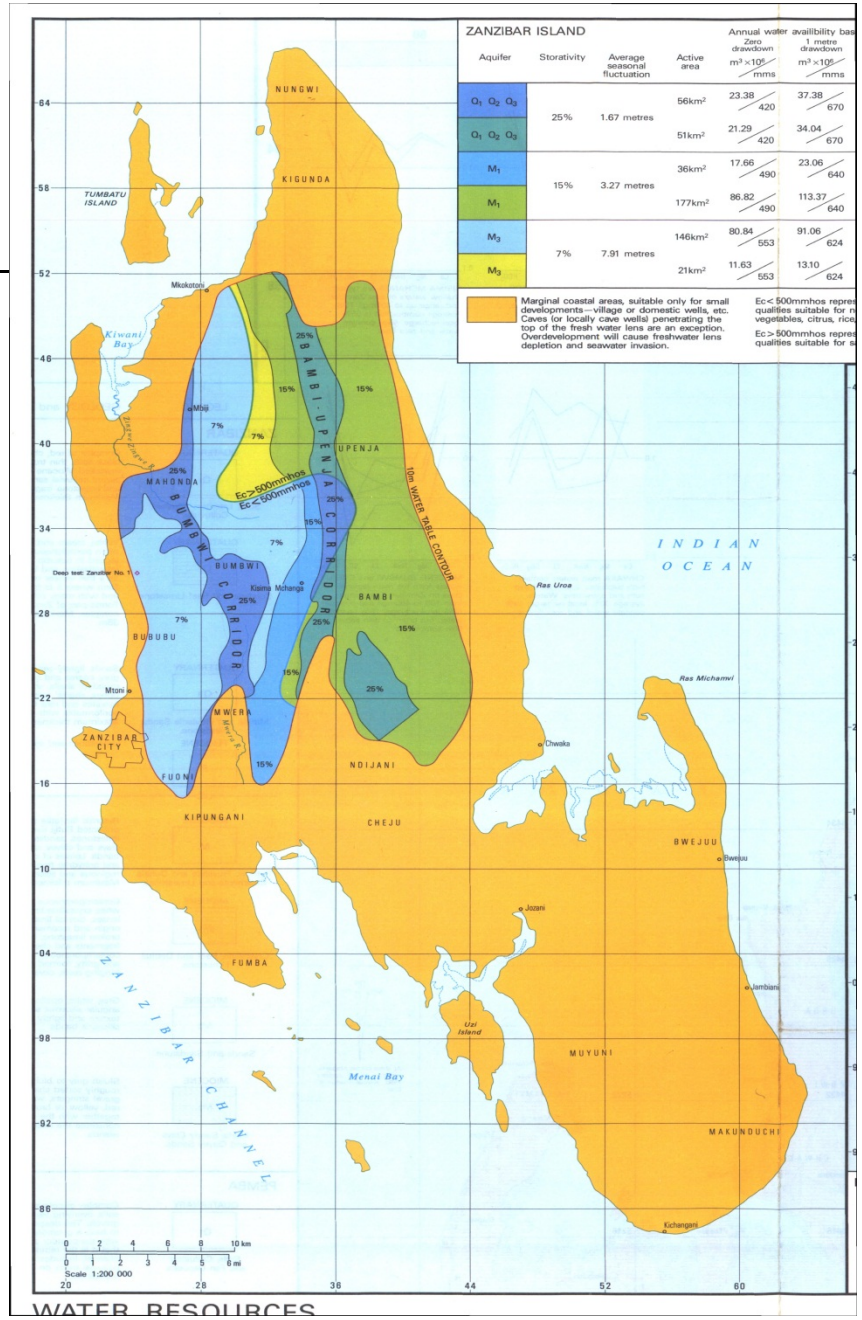
- Millennium Development Goals as indicators

WATER IN ZANZIBAR

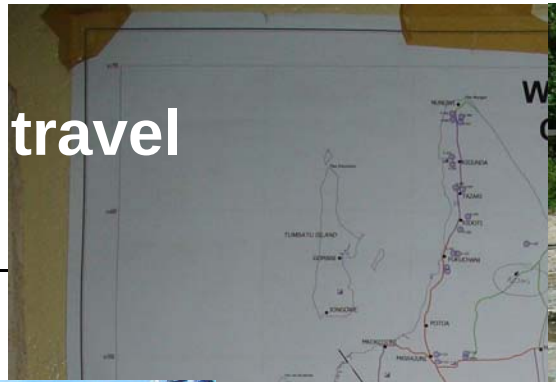
Most of the island is only suitable for small developments (little spring water)

Population grows steadily

Water distribution via a 40 years old system (5x population now)



Water has to travel differently…



…unexpected actors

MILLENNIUM DEVELOPMENT GOALS LIMITATIONS

1. **Are MDG data reliable?** Many countries have problems in producing adequate statistics

2. **What do MDGs measure?**

Example: is a water point in 100m radio a proxy for adequate water provision?

HUMAN SENSOR WEB AS SOLUTION

Inform and empower

Citizens monitor and report about service provision

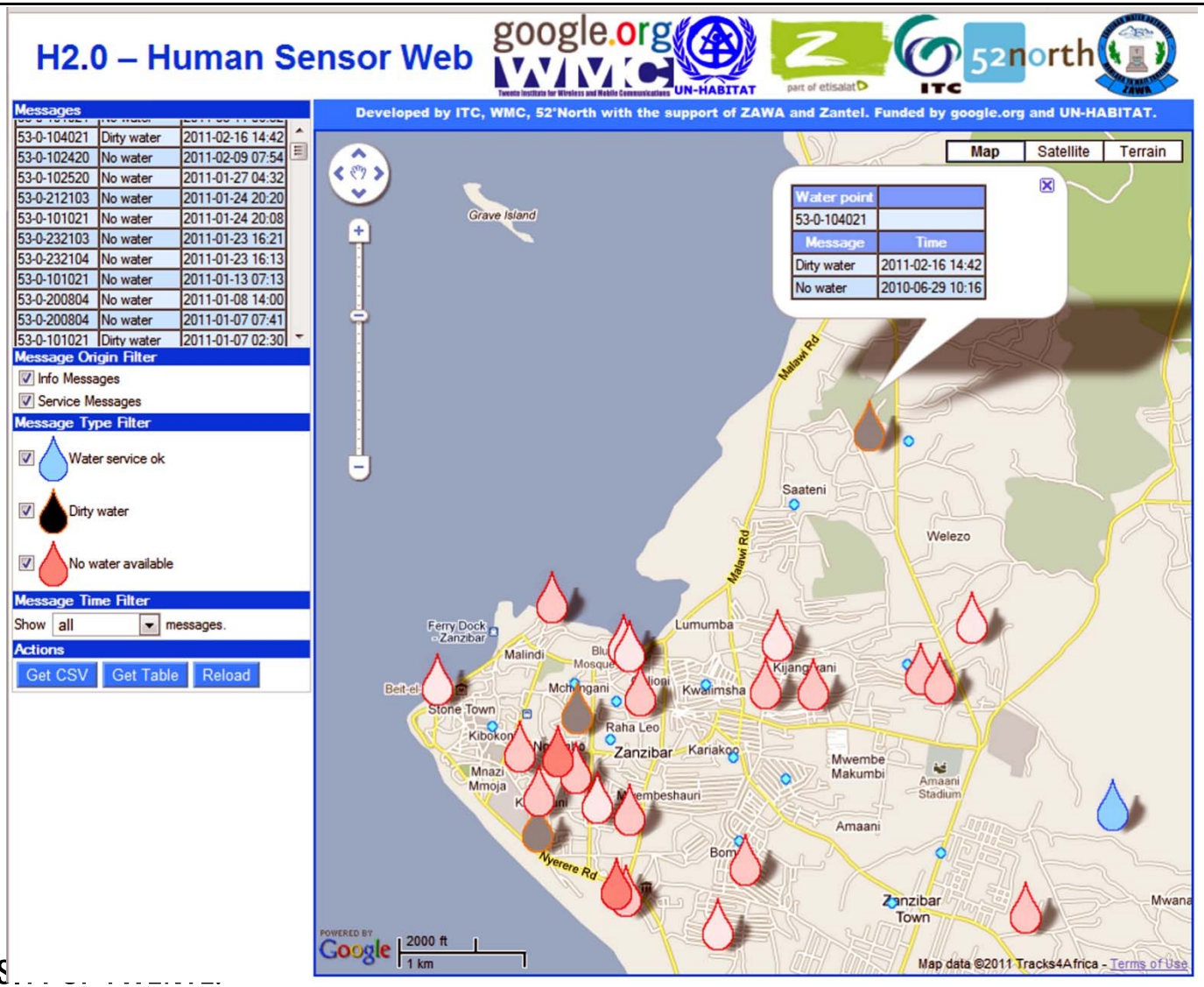
➔ bottom-up social indicator

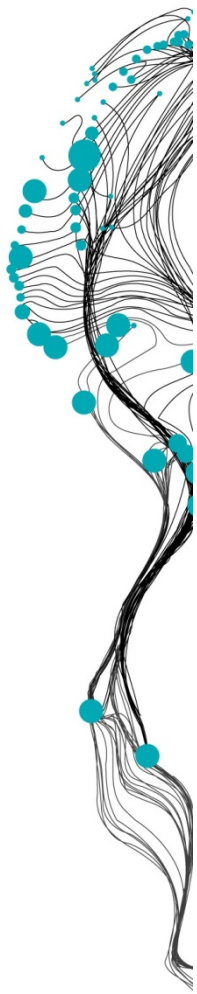
HSW is funded and executed (2009-2010) under the h2.0 initiative (www.h20initiative.org)

Google.org and UN-habitat

SIMPLE SOLUTION: BILLBOARDS AND A SERVER

DATA ANONYMIZED AND PUBLIC



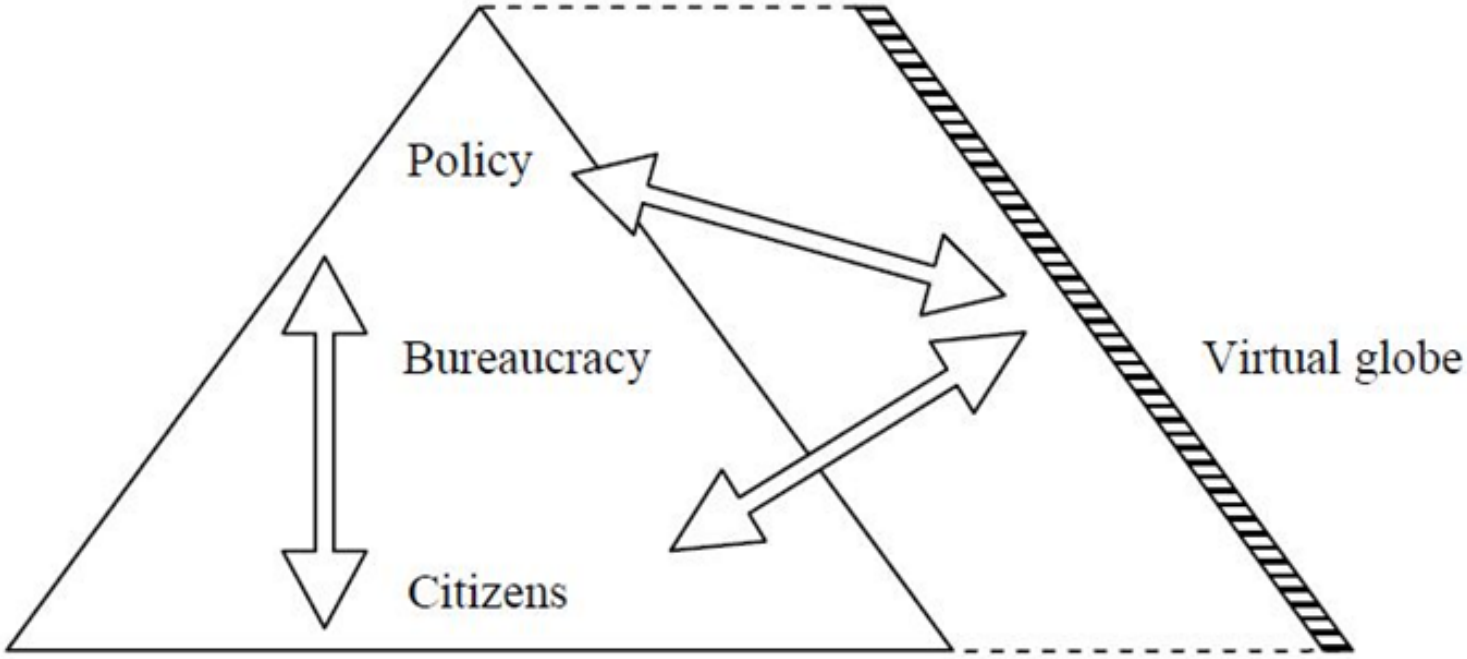


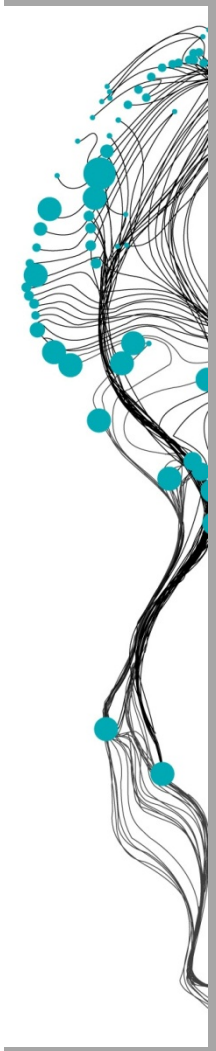
CLOUD AND CROWD - INTERNET SERVICES AND PLATFORMS

- Remote sensing (about natural resources)
- Participatory sensing (about people's needs and perceptions)
- Opportunistic sensing (next?)

Ex: Google flu trends

A MIRROR OF E-GOV





FINDINGS

Designed sequence of HSW use steps:

1. Individual reports problem
2. System logs the report
3. System responds to individual about message reception
4. System assesses validity of report
5. Valid report is visualized on HSW website
6. System broadcasts (sms) a warning about service problem to subscribers and the service provider

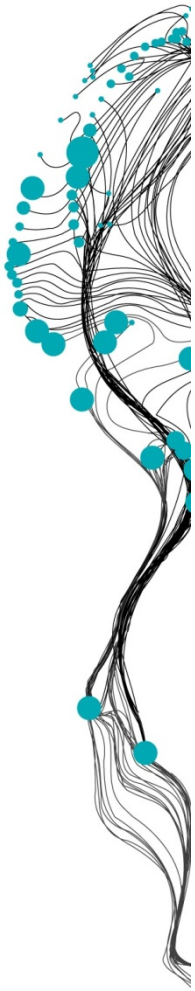
How is it in practice?

UNFORESEEN STAKEHOLDERS AND UNPLANNED CONSEQUENCES

- Mismatch water collection / phone ownership

- Delays

- Difficult to remember geo-codes



- Low trust in the water authority
  - Concern in exposing phone number (fix water fees not paid)
- Articulate SMS vs. machine readable ones
- Shehas as community gatekeepers
- Costs

MAKING SENSE OF SENSORS

Monitoring what?

	Humans inactive on report	Humans actives on report (human sensors)
Humans inactive on water usages	Water availability	Disaster management (for example in case of floods)
Humans active on water usages	Water consumption (water meter)	Water needs (actual stage)

DATA QUALITY

HSW data is NOT a proxy for water availability

➔ Validation of what?

Depends on stakeholders and actual uses

ORGANIZATIONAL MISMATCH MATRIX

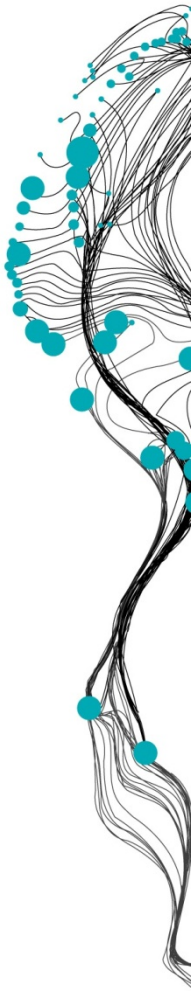
	Basis for action	Expected outcomes
Public sector	Formal legitimation and duty of service delivery	Gaining/keeping consensus
Human sensor web designers	Local and immediate people's need (lack of water here and now)	Policy changes (water management)
People and HSW users	Complex interrelated problems (work, family relations, rights...)	Local and immediate

SO WHAT?

The main functionality of HSW is

assessment of public service needs

rather than an assessment of service functionality



NEW DOMAINS FOR RESEARCH AND PRACTICE

Needs and perceptions ➔ IT4D beyond natural resources

Relevance for:

- urban planning (sensing citizens)
- Infrastructures management (better grasp on actual use)

OPEN QUESTIONS

- Do HSWs bring more universalism in service provision on empowerment of who speaks louder?

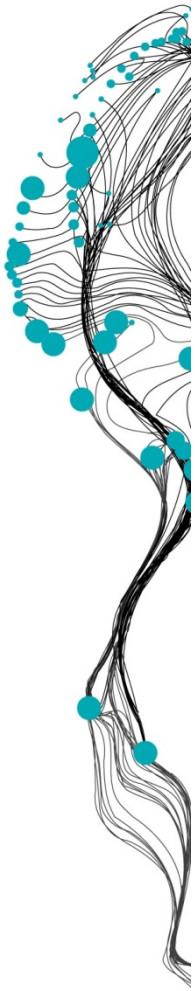
- New domains and agenda setting effects?

RECENT DEVELOPMENTS

SENSING, interesting for:

- Heterogeneity of data → need to be context specific
- Actual situations of globalization

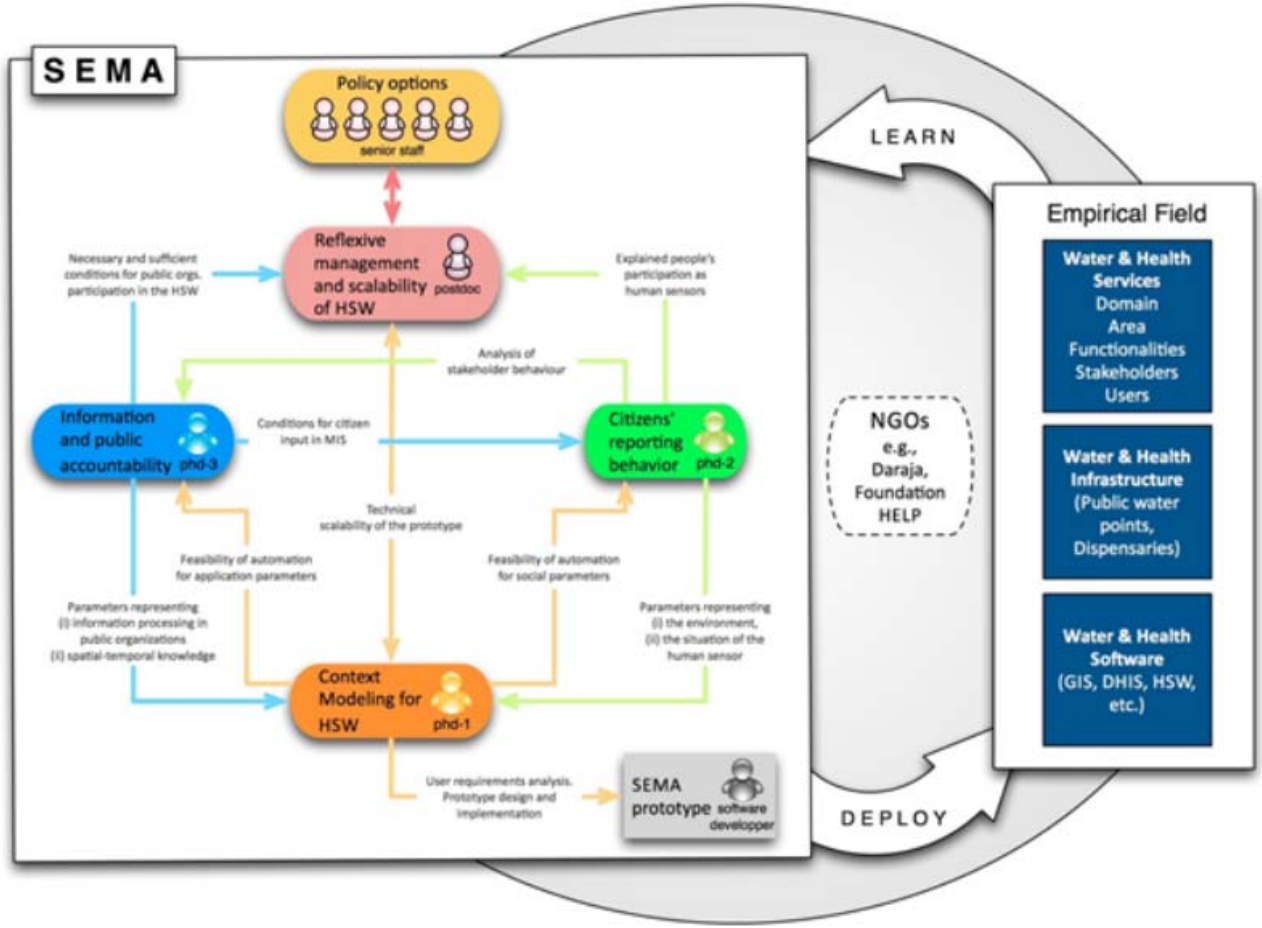
- "Sensors Empowerment and Accountability" (NWO funded project)
- Citizens Observatories (FP7 proposal)
- FET / complexity, FP7?

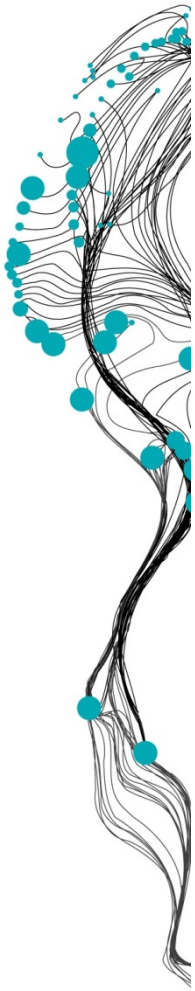


SEMA

Scaling as:

- Outreach (national?)
- Cross domain (public health - Medicine provision)


SEMA
Policy options
senior staff
Reflexive management and scalability of HSW
postdoc
Necessary and sufficient conditions for public orgs. participation in the HSW
Explained people's participation as human sensors
Analysis of stakeholder behaviour
Information and public accountability
phd-3
Conditions for citizen input in MIS
Citizens' reporting behavior
phd-2
Technical scalability of the prototype
Feasibility of automation for application parameters
Feasibility of automation for social parameters
Parameters representing (i) information processing in public organizations (ii) spatial-temporal knowledge
Parameters representing (i) the environment, (ii) the situation of the human sensor
Context Modeling for HSW
phd-1
User requirements analysis. Prototype design and implementation
SEMA prototype
software developper
LEARN
DEPLOY
NGOs e.g., Daraja, Foundation HELP
Empirical Field
Water & Health Services Domain Area Functionalities Stakeholders Users
Water & Health Infrastructure (Public water points, Dispensaries)
Water & Health Software (GIS, DHIS, HSW, etc.)



TRUST

Via IT

How does HSW intersect trustworthy relations? How to manage it?

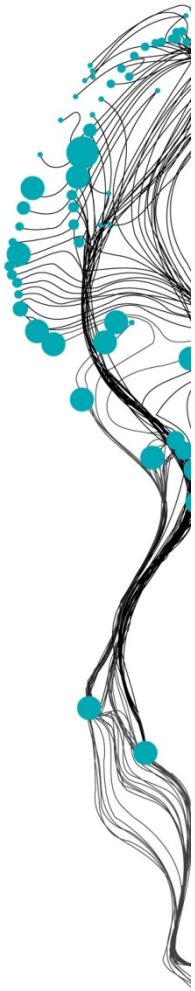
-Selfregulation

-Formal organizations

-Automatic ranking

In IT

Does (mis)trust in orgs (WA, mobie carrier…) translate to the HSW?



THANK YOU

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