GAMA Technical Group
Webinar

10th September 2015
#GAMAResilience
1. Welcome and introductions
2. Update to GAMA Technical Group - Rachael Kemp and Stephen Passmore
3. Local presentation??
4. Data and Model update and Use case development - Rembrandt Koppelaar
5. Discussion session
6. AOB
7. Next steps and Close

http://ecosequestrust.org/GAMA
Feedback: rachael.kemp@ecosequestrust.org
Skype: kemprachael

Finding the pathway to a resilient future for the Greater Accra Metropolitan Area (GAMA)

Forum
Join the discussion in the forum.

Resources
How resilience.io can build value into city regions – Animated short film.
resilience.io in Ghana – a short booklet explaining the resilience.io platform and its benefits.
Forum - http://ecosequestrust.org/GAMA
Forum - [http://ecosequestrust.org/GAMA](http://ecosequestrust.org/GAMA)

Log in with email address

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Greater Accra Metropolitan Area
WASH – TTG - Webinar

Use Case Development

IIER

London, September 2015
Rembrandt Koppelaar
Webinar contents

1. Data / Model update
2. Use Case Development Outline
3. Example use cases
4. Discussion
Update of GAMA boundaries & data

1. Accra Metropolitan Assembly (AMA)
2. Tema Metropolitan Assembly (TMA)
3. La Nkwantanang Madina Municipal Assembly (LANKA)
4. La Dade-Kotopon Municipal Assembly (LADMA)
5. Ledzorkuku Krowor Municipal Assembly (LEKMA)
6. Ga South Municipal Assembly
7. Ga East Municipal Assembly
8. Ga West Municipal Assembly
9. Ga Central Assembly
10. Adenta Municipal Assembly (ADMA)
11. Kpone Katamanso Municipal Assembly (KKMA)
12. Asheiman Municipal Assembly (ASHMA)
13. Awutu-Senya-East (KASOA)
14. Nsawam-Adoagyiri Municipal Assembly - ER (NAMA)
15. Akwapim South Municipal Assembly – ER (ASMA)
Raw/Source Water Flow calculation Overview (2010) – ‘000 m³/day

Raw Water Extraction + Treatment Weija / Kpong

- Water Pipeline system
  - Industrial use
  - Commercial
  - Institutional
  - Other unprotected sources*

Borehole/Well/Spring Extraction (Protected)

- Tanker/Vendor Water
  - Satchets
    - Bottled water
  - Domestic consumption – Non drinking water
  - Domestic consumption – Drinking water

Water flow in system

Water losses in transit

*Includes
- unprotected well
- unprotected Spring
- River/Stream
- Dugout/Pond/
- Lake/Dam/Canal
- Other

 tatsächliche Wassermengen in kilolitern (m³)
Example spatial distribution:

Domestic/Household Non-Drinking water consumption from non-GWCL sources (boreholes/wells/springs/rivers/streams) in m³ per day
Waste Water* Flow calculation overview (2010) – ‘000 m3/day

- **Sea/lagoon disposal**: 18km³
- **Institutional Waste Water Production**: 24km³
- **Domestic Waste Water Production**: 239km³
- **Waste water treatment**: 22km³
- **Industrial Waste Water Production**: 22km³
- **Commercial Waste Water Production**: 43km³
- **Sewage pipes**: 22.5km³
- **Into gutter via drain or thrown**: 17.8km³
- **Drain pipes into pit**: 123km³
- **Other local disposal**: 183.3km³
- **Disposal untreated into environment**: 95.5km³
- **Disposal treated into environment**: 0.9km³

*Excludes human liquid waste ~5783 m³/day
Example spatial distribution:

Waste water from Commercial activities/sources (services, retail, food prep, finance, hotels etc.) in m³ per day

Liquid Waste Production ~5783 m^3/day (1.16 litres urine cap/day, 0.33 kg faeces cap/day)

- **W.C.**
  - Public
  - Private
- **Soil seepage**
  - Public
  - Private
- **Pit latrines***
  - Public
  - Private
- **Cesspit Emptier Trucks**
- **Sewage pipes**
  - Public
  - Private
- **Septic Tanks**
- **Waste water treatment**
- **Sea/lagoon disposal**

*Includes pit latrines and Kumasi ventilated improved pit latrines (KVIP)
**includes bucket/pan latrines, plastic bag defecation, open defecation, other forms of dumping in local environment
Next few steps:

- Refine water and sanitation datasets
- Build first water demand and waste-water produced scenarios 5-20 years
- Improve detail in water demand calculations based on activities during the day (toilet use/ cooking/washing etc. )
- Incorporate waste-water treatment technologies to facilitate model calculation of interventions
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Use Case Outline - purpose

• A structured way to aid model development in a functional as close to application manner as possible.

• Thinking from the perspective of:
  • Local future users (for finalized version of tool)
  • Their needs/requirements
  • Model adaptation to needs/requirements
Use Case Outline – context/users

The use case context – challenge to address

• “Broad” → WASH sector in GAMA
• “Specific” → Technical pipe losses per MMA

Potential stakeholder/users

• WASH specialist/planners at MMAs
• Researchers at University of Ghana Legon
• Etc.
Use Case Outline - information

User information needs

- Example question of interest: How can technical water losses in pipelines be reduced?
- Example Indicator of interest: % delivery of potable water to households from treated water

Specific scenarios / model constraints

- Example scenario: District population, economy and water demand developments in 5-20 years
- Example constraint: Let model find best options, given certain criteria, for reduction in technical piped water losses → 30% reduction target over 20 years
Use Case Outline – use/usability

Model use

• Calculate potable water demands, raw water treatment needs, and delivery of water through current GWCL pipe network.

• Establish based on target reduction in technical losses based on current situation

Model outputs/representation/usability

• Produce a series of maps, charts, graphs displaying the quantitative/qualitative outcomes for the scenario period
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Example use case – context/users

The use case context – challenge to address

• Insufficient public toilets combined with lack of private toilet infrastructure, resulting at times in long public toilet queues
• Prevalence of unsanitary open defaecation

Potential stakeholder/users

• MMA water and sanitation unit specialists
Example use case - information

User information needs

- Example question of interest: What infrastructure is required to improve sanitation access?
- Example Indicator of interest: access to private toilet infrastructure, number of public toilets, time spent on queueing for public toilets

Specific scenarios / model constraints

- Example scenario: MMA population and sanitation infrastructure needs developments in 5-20 years
- Example constraint: Maximum time spent on queueing at public toilets < X minutes, X % of population with access to private toilets.
Example use case– use/usability

Model use

• Calculate use of public and private toilet systems throughout the day in the MMA, and time spent on queuing in public systems, using the activity simulation.

• Calculate liquid waste generated in public and private toilet systems, and via open defaecation and where it ends up.

• Calculate number of private and public toilets required to meet the desired constraints, and the cost of investment and operational use of toilets to maintain the new infrastructure

Model outputs/representation/usability

• Produce line graphs with changes in open defaecation liquid waste flows over time, bar charts of infrastructure capacity development, and cost figures thereof.
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Discussion

• Questions from GAMA Technical group?
Discussion

- What type of users do you think could benefit from the use of the WASH prototype model?
Discussion

• What set of targets and indicators would be functional as outputs of the WASH prototype model for these users?
Discussion

- Are there existing scenarios or on-the-ground projects that you are aware of which could be meaningful to incorporate for the use cases?
Thank you for your inputs

Koppelaar@iier.ch