KAMPALA'S PLAUSIBLE URBAN FLOODING FUTURES: BUILDING INSIGHTS THROUGH INTEGRATED COLLABORATIVE MODELING

RICHARD SLIUZAS
Floods in Kampala: all citizens are stakeholders
Kampala Capital City Authority and detailed study area
Methodology

Urban Growth

- Topographic drains, soil data & images
- Urban growth scenario models
- Land cover (trend, high growth)

Flood Modelling

- Land cover (current)
- Rainfall DEM & soil data
- SuDS Options 1..n
- Runoff & flood Model (openLISEM)

Scenarios and stakeholder discourse

- GIS spatial analysis
- Current Flood Levels
- Future Flood Levels
- Flood Levels SuDS
- Indicators & Impact Evaluation
SOME IMPORTANT ISSUES IN KAMPALA

- Complexity:
  - Institutional (multi-actor, overlapping mandates, resource constraints)
  - Substantive (natural and built environments)

- (Spatial) data issues:
  - Spatial-temporal coverage
  - Completeness
  - Accuracy
  - Gaps: soils, rainfall
  - Drainage Master Plan 2002 outdated
Kampala Rainfall data: filling the gaps
SOIL PROPERTY DETERMINATION AND MAPPING
SOURCE: ROSSITER.

Landform segments:
- 0
- plateau
- lower slope (glacis)
- swamp
- swamp margin
- upper slope
- shoulder

Kilometers

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Scenario 1:10 year with improved primary drain
(snapshot of model run showing flooded area after 3 hours rainfall)
## Set of scenarios developed and discussed with stakeholders.

<table>
<thead>
<tr>
<th>Drainage and planning options</th>
<th>Development Conditions</th>
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<tbody>
<tr>
<td></td>
<td>Current state</td>
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<tr>
<td><strong>Baseline - unimproved drainage and current state of development</strong></td>
<td>Scenario 0 Baseline</td>
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<td><strong>Primary - improved primary drain clean secondary drains</strong></td>
<td>Scenario 1 Primary</td>
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<tr>
<td><strong>Grass - secondary drains are grassed waterways</strong></td>
<td>Scenario 2a Grass</td>
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<td><strong>Zone – remove buildings from flood zone replace with grass.</strong></td>
<td>Scenario 2b Zone</td>
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<td><strong>House – 15,000 house owners increase grassed areas to improve water infiltration on their plots.</strong></td>
<td>Scenario 6b Trend-House</td>
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SPATIAL VISUALIZATION AND INDICATORS

KDMP improvement
STAKEHOLDER ENGAGEMENT CRITICAL
CONCLUSIONS

- Better (spatial) information is available, relationships are more explicitly identified through calibration & validation
- Scenario approach allows insights into possible futures to be obtained – options for intervention can be modelled and evaluated.
- Ability to display dynamics of flooding to stakeholders has added a new dimension to stakeholder discussions.
- Need for iterative approach – new knowledge requires modelling updates
- Already improved solid waste management has been taken up by local and city government actors to reduce flooding in Bwaise.
- Need to reorient the basis for urban planning and design and engage key land owners, developers and other agents
THANKS FOR YOUR ATTENTION

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