Water Supply and Demand Situation in GAMA.

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www.iwmi.org
Managing Water at the Urban-Rural Interface: The key to climate change resilient cities

Introduction

Research Objective

Methodology: Development of Scenarios

Findings
Need for scenarios in water planning

• Urbanization and the expansion of development and economic activities exert pressure on available water resources:
  - *(Non-Climatic drivers)*: population growth $\times$ per capita water demand

• Rainfall and Temperature changes *(Climatic drivers)* affect water availability and water use
Need for scenarios in water planning

• We cannot predict with certainty these parameters: we can only make assumptions

  1. Non-Climatic Drivers
     • Population (*GSS*, 2002)
     • *Per Capita Water Demand* (*GWCL*, 2006; *Adank et al.*, 2011)

  2. Climatic Drivers
     • Precipitation change
     • Temperature change
## Scenarios Of Development

### Non-Climatic Drivers

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>GAR</td>
<td>541,933</td>
<td>903,447</td>
<td>1,431,099</td>
<td>2,905,726</td>
<td>3,909,764</td>
</tr>
<tr>
<td></td>
<td>5.1%</td>
<td>3.3%</td>
<td>4.4%</td>
<td>2.8%**</td>
<td></td>
</tr>
<tr>
<td>GAMA</td>
<td>449,430</td>
<td>804,834</td>
<td>1,296,470</td>
<td>2,715,805</td>
<td>Not Available</td>
</tr>
<tr>
<td></td>
<td>5.8%</td>
<td>3.4%</td>
<td>4.6%</td>
<td></td>
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</tr>
</tbody>
</table>

**Source:** GSS, 1995; 2002; 2005; 2010  **|**  **Provisional**
Some Findings
Water Demand

Domestic Water Demand scenarios (MCM/yr) (popxlpcd)

- Year 2000: 2,713,805
- 2.8%
- 4.6%
- 5.8%
- x 60lpdc
- x 90lpdc
- x 120lpdc

- 4.99M
- 15.94M
- 3.65M
- 6.38M

* Population graph not to scale *
## Water Supply

<table>
<thead>
<tr>
<th>Source</th>
<th>2010</th>
<th>2013</th>
<th>2030</th>
<th>TOTAL (Cumulative)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weija</td>
<td>54 MGD</td>
<td>?</td>
<td>54 MGD</td>
<td></td>
</tr>
<tr>
<td>Volta</td>
<td>40 MGD</td>
<td>40 MGD</td>
<td>?</td>
<td>80 MGD</td>
</tr>
<tr>
<td>GW</td>
<td>0.43 MGD</td>
<td>?</td>
<td>0.43 MGD</td>
<td></td>
</tr>
<tr>
<td>TOTAL (Cumulative)</td>
<td>96.4 MGD</td>
<td>134.4 MGD</td>
<td>?</td>
<td>134.4 MGD</td>
</tr>
</tbody>
</table>

| | 0.43 MCM/day | 0.61 MCM/day | 0.61 MCM/day |
| | 157 MCM/yr   | 223 MCM/yr   | 223 MCM/yr   |

Physical Loss: 25-30%
Water Supply Situation (MCM/yr)

Current Situation

Future Situation

Improving water and land resources management for food, livelihoods and nature
Supply – Demand Situation

Water Supply/ Demand Scenarios (MCM/yr) (lpcdxpop)

- Demand
- Supply

Year: 2010, 2015, 2020, 2025, 2030

Scenarios:
- Low Scenario
- Moderate Scenario
- High Scenario
- Current Water Supply
- Future Additions
Supply – Demand GAP Situation

Domestic Water Demand scenarios (MCM/yr) (lpcdpop)

- Low population x High Consumption
- High population x Low Consumption
- Low population x Moderate Consumption
### Scenarios Of Development

#### Climatic Drivers

<table>
<thead>
<tr>
<th>Precipitation Change</th>
<th>Temperature Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low (L)</td>
<td>Low (L)</td>
</tr>
<tr>
<td>Low (L)</td>
<td>LoLo (Low)</td>
</tr>
<tr>
<td>Moderate (M)</td>
<td>MoLo</td>
</tr>
<tr>
<td>High (H)</td>
<td>HiLo</td>
</tr>
</tbody>
</table>
Findings/Conclusion

1. Planned water supply development is inadequate to meet the minimum water demand in Accra.
   1. Addition water supply development necessary (but where?)
   2. Need for investment
2. A shift in any driver of the non-climatic factors will increase the supply-demand GAP of Accra.
3. People seem to be managing the GAP through various strategies
   1. Buffer storage
   2. Study adaption to the supply-demand GAP to give pointers on adaption to Climate change.
4. Water saving and management measures with respect to high water consumer (Rich or industries) can contribute to bridging the GAP.
   1. Identify high water users and see relevant measures
   2. Future increase in water consumption should be managed

5. The high physical losses if controlled can contribute to bridging the GAP

6. Different policy instruments to reduce water consumption
   1. Pricing mechanism (Pro-poor)
   2. Legislation for water saving devices
Thank You!
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   1. **Addition water supply development necessary**
      (but where?)
   2. Need for investment
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Addition water supply development
(WHERE?)

<table>
<thead>
<tr>
<th>Weija Abstraction</th>
<th>91.3MCM/yr</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>% Flow</td>
<td>33</td>
<td></td>
</tr>
<tr>
<td>CC Impact</td>
<td>10% reduction</td>
<td></td>
</tr>
<tr>
<td>% flow under CC</td>
<td>40%</td>
<td></td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Kpong Abstraction</th>
<th>65.7MCM/yr</th>
<th>(Annual flow of 24BCM/yr under dry CC scenario)</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Flow</td>
<td>0.3</td>
<td></td>
</tr>
<tr>
<td>CC Impact</td>
<td>&lt;5%</td>
<td></td>
</tr>
<tr>
<td>% flow under CC</td>
<td></td>
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</table>

Densu must maintain a buffer capacity for climate responsive planning purposes implying that future water abstractions could focus more on the Lower Volta and other rivers such as the Pra.
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   2. Need for investment

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