Findings from an SFD for Durban

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Image from: https://snapflycook.wordpress.com/
Contents

- Overview of the System
- The Durban SFD
- The Service Delivery Analysis
- Weaknesses
- Key Points of Interest
- The Way Forward
Overview of the System

- **Onsite**
  - UD toilets → Buried on site / BSFL
  - VIP toilets → LaDePa
  - (VIP ablution blocks)
  - Flush toilets → Septic / conservancy tanks → Centralised treatment
  - (Pour flush → Soakaways)

- **Offsite**
  - Flush toilets → Centralised sewers
  - Ablution blocks → Centralised sewers
  - Flush toilets → Package plants
  - (Flush toilets → DEWATS)

Image from:
http://flickrhivemind.net/flickr_hvmnd.cgi?method=GET&page=3&photo_number=50&tag_mode=all&search_type=Tags&origininput=durban_sanitation&sorting=Interestingness&photo_type=250&noform=1&search_domain=Tags&sort=Interestingness&textinput=durban_sanitation
## Shit Flow Diagram Figures

### Sanitation type per dwelling

<table>
<thead>
<tr>
<th>Dwelling type</th>
<th>Total number of dwellings</th>
<th>Serviced with Urine Diversion Toilets</th>
<th>Within 200m of Ablution Block</th>
<th>Serviced with VIPs</th>
<th>Serviced with Septic Tanks &amp; PPs</th>
<th>Serviced with Waterborne Sanitation</th>
<th>Backlog in Sanitation Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Informal Settlements</td>
<td>265542</td>
<td>5194</td>
<td>111868</td>
<td></td>
<td></td>
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<tr>
<td>Informal Settlements - Formal Informal</td>
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<td></td>
<td></td>
<td></td>
<td>3096</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Backyard Shacks</td>
<td>48975</td>
<td></td>
<td></td>
<td></td>
<td>48975</td>
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<tr>
<td>Rural - Traditional</td>
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<td>77059</td>
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<td>26656</td>
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<td>Formal houses not in Rural area (A1)</td>
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<td>35000</td>
<td>99282</td>
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<td>Flats (B1)</td>
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<td></td>
<td></td>
<td></td>
<td>5147</td>
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</tr>
<tr>
<td>Total</td>
<td>945910</td>
<td>82253</td>
<td>111868</td>
<td>35000</td>
<td>105525</td>
<td>449661</td>
<td>159603</td>
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<td>Percentage</td>
<td>100%</td>
<td>9%</td>
<td>12%</td>
<td>4%</td>
<td>11%</td>
<td>48%</td>
<td>17%</td>
</tr>
</tbody>
</table>

### Population Proportion per dwelling type

<table>
<thead>
<tr>
<th>Dwelling type</th>
<th>People with UD</th>
<th>People with ablation</th>
<th>People with VIP</th>
<th>People with Septic or Package Plants</th>
<th>People with Waterborne to central</th>
<th>People Unserved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Informal Settlements</td>
<td>18698</td>
<td>402725</td>
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<td>55919</td>
<td>478609</td>
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<td>Informal Settlements - Formal Informal</td>
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<td>11951</td>
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<td>Backyard Shacks</td>
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<td></td>
<td></td>
<td>191003</td>
<td>133280</td>
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<tr>
<td>Rural - Traditional</td>
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<td></td>
<td></td>
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<tr>
<td>Formal houses not in Rural area (A1)</td>
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<td></td>
<td>1061222</td>
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<tr>
<td>Flats (B1)</td>
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<td></td>
<td>319653</td>
<td></td>
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<tr>
<td>Formal houses in Rural area</td>
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<td>23934</td>
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<tr>
<td>Total</td>
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<td>402725</td>
<td>135100</td>
<td>409113</td>
<td>1627796</td>
<td>611889</td>
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<tr>
<td>Percentage</td>
<td>11%</td>
<td>11%</td>
<td>4%</td>
<td>11%</td>
<td>45%</td>
<td>17%</td>
</tr>
</tbody>
</table>
Shit Flow Diagram (SFD), Durban

Variable nr : % of flow

Key:
- Safely managed
- Unsaftely managed

Containment
- 57% Offsite sanitation
- 42% Onsite sanitation
- 1% Open defecation

Emptying
- 1% WW contained decentralised (offsite)
- 56% WW contained centralised (offsite)
- 26% FS contained (onsite)
- 16% FS not contained (onsite)
- 1% Open defecation

Transport
- FS contained - not emptied
- FS emptied
- FS not contained - not emptied

Treatment
- WW delivered to decentralised treatment
- WW delivered to centralised treatment
- WW not delivered to treatment
- WW treated
- WW not treated

End-use/disposal
- FS treated
- FS not treated

74% WW delivered to treatment

Key:
- Safely managed
- Unsaftely managed
<table>
<thead>
<tr>
<th>City</th>
<th>Country</th>
<th>Proportion of population using sanitation type</th>
<th>Treated (Safe)</th>
<th>Main contributor to treated</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>OD</td>
<td>On-site</td>
<td>Off-site (sewered)</td>
</tr>
<tr>
<td>Dakar</td>
<td>Senegal</td>
<td>2%</td>
<td>73%</td>
<td>25%</td>
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<tr>
<td>Moshi</td>
<td>Tanzania</td>
<td>2%</td>
<td>81%</td>
<td>17%</td>
</tr>
<tr>
<td>Nakuru</td>
<td>Kenya</td>
<td>1%</td>
<td>78%</td>
<td>28%</td>
</tr>
<tr>
<td>Kampala</td>
<td>Uganda</td>
<td>1%</td>
<td>90%</td>
<td>9%</td>
</tr>
<tr>
<td>Dar es Salaam</td>
<td>Tanzania</td>
<td>1%</td>
<td>90%</td>
<td>9%</td>
</tr>
<tr>
<td>Maputo</td>
<td>Mozambique</td>
<td>1%</td>
<td>89%</td>
<td>10%</td>
</tr>
<tr>
<td>Kumasi</td>
<td>Ghana</td>
<td>3%</td>
<td>93%</td>
<td>4%</td>
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<tr>
<td>Durban</td>
<td>South Africa</td>
<td>1%</td>
<td>42%</td>
<td>57%</td>
</tr>
</tbody>
</table>

Comparison of SFDs across Africa

Data from SuSanA SFD Promotion Initiative Documents
### Comparison with other SFDs

<table>
<thead>
<tr>
<th>City</th>
<th>Country</th>
<th>Proportion of population using sanitation type</th>
<th>Treated (Safe)</th>
<th>Main contributor to treated</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>OD</td>
<td>On-site</td>
<td>Off-site (sewered)</td>
</tr>
<tr>
<td>Nashik</td>
<td>India</td>
<td>4%</td>
<td>54%</td>
<td>42%</td>
</tr>
<tr>
<td>Nonthaburi</td>
<td>Thailand</td>
<td>0%</td>
<td>100%</td>
<td>0%</td>
</tr>
<tr>
<td>Durban</td>
<td>South Africa</td>
<td>1%</td>
<td>42%</td>
<td>57%</td>
</tr>
</tbody>
</table>

Data from SuSanA SFD Promotion Initiative Documents
Shit Flow Diagram (SFD), Durban

Key:
- Green: Safely managed
- Red: Unsafely managed

1% WW contained decentralised (offsite)
54% WW delivered to centralised treatment
FS not contained (onsite)
FS not contained (onsite)
Open defecation

74% FS not treated

56% WW contained centralised (offsite)

2% WW not delivered to treatment

48% FS treated

8% FS contained - not emptied
8% FS emptied

18% FS not treated

1% FS contained - not emptied
8% FS not emptied

7% FS not treated

57% Offsite sanitation
42% Onsite sanitation

1% Open defecation
26% FS contained (onsite)
Summary of the Service Delivery Analysis

- Separate Policy and Legislation for sanitation
- Sanitation defined as more than simply toilets
- Goals in place for sanitation development
  - National and Municipal level
- Plans to
  - Increase treatment capacity
  - Introduce reuse of FS
  - Increase reuse of UD FS
  - Provide temporary services
  - Increase UD toilet mapping
- Relationship with private package plant and septic tank companies improving

Potential Problem areas:
- Growing no. of sewer connections without focus goals on sewer maintenance
- Bottleneck at EIA stage
- All services reactive rather than proactive

Weaknesses in the Results

- Transport by sewers
  - Blockages estimation:
    - 60ML/d sewer trunk
    - 140 blockages per day
    - 4 to 24 hours to respond

- Details on the sludge treatment

- Proportion of WW treated
  - Centralised WWTW
    - Green Drop Report
  - Package Plants
    - Top ten meeting standards

- Proportion of FS treated at WWTW

Weaknesses in the Results

- Unserved Sanitation choices
  - Divided by informal or rural dwellings
- Means of measuring unserved homes
- No interviews with:
  - social services for public view
  - Septic tank services
  - Pit emptying contractors
  - Sludge treatment operators

Key Points of Interest
The Way Forward

- Confirm areas of weakness in my research
  - Proportion delivered to the treatment works
- Decision-support tool
  - Confirm need for reducing backlog
  - Need for sewer maintenance
  - Need for pelletizing sludge
- Part of the global awareness project

Image from: https://www.travelground.com/blog/daycationing-in-durban/
Acknowledgements

- Chris Buckley from PRG
- eThekwini Water and Sanitation
- Lars Schoebitz from Eawag
Thank you

Image from: https://snapflycook.wordpress.com/
SFD that has been completed for the initial WSP study for Nashik, India
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SFD that has been completed for the initial WSP study for Maputo, Mozambique
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Image from SuSanA SFD Promotion Initiative Documents
SFD that has been reviewed and finalised for Moshi, Tanzania

Image from SuSanA SFD Promotion Initiative Documents
SFD that has been reviewed and finalised for Nakuru, Kenya
SFD that has been completed for the initial WSP study for Kampala, Uganda

Image from SuSanA SFD Promotion Initiative Documents
SFD that has been reviewed and finalised for Kumasi, Ghana

Image from SuSanA SFD Promotion Initiative Documents
SFD that has been completed for the initial WSP study for Dakar, Senegal