Measuring Performance of Water and Sanitation Utilities

Session 4
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• Objectives of Water and Sanitation Utilities

• Ratios and Indicators Used to Evaluate Utility Performance against Objectives

• IBNET: Information for Utility Performance Benchmarking

• Exercise
Learning Objectives
Learning Objectives

1. To understand how to use ratios and indicators to more thoroughly understand a utility’s performance...

2. ...so as to identify risks that could impact the utility’s future performance and its cash flow …

3. ... and identify ways to improve performance and reduce risks
Objectives of Water and Sanitation Utilities
# Objectives of Water and Sanitation Utilities

1. **Accessibility**  
   Both potable water and a functioning sewage disposal system are easily accessible to as many people as possible.

2. **Safety**  
   The water supplied is safe to drink (potable), with appropriate sampling, testing, verification, and reporting systems in place.

   Sewage is safely collected and disposed of, protecting the community and the environment.

3. **Sufficiency**  
   People get a sufficient quantity of water at an adequate pressure.

4. **Reliability**  
   Water is continuously available, with minimum interruptions.

5. **Convenience**  
   Water is accessible to the home, school or business and there is easy access to a toilet.
# Objectives of Water and Sanitation Utilities

<table>
<thead>
<tr>
<th>Objective</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. Cost-effectiveness</td>
<td>Service is provided cost-effectively, that is, resources are used both effectively and efficiently</td>
</tr>
<tr>
<td>7. Financial Sustainability</td>
<td>Sufficient revenue and other income is available to operate, maintain and expand the assets to provide service and serviceability. Ideally this income should come from customer revenue although it is reasonable to use other income for growth capital.</td>
</tr>
<tr>
<td>8. Affordability</td>
<td>Poor households can afford sufficient water to meet at least basic needs</td>
</tr>
<tr>
<td>9. Responsiveness</td>
<td>Utility is responsive to customers – IT IS CUSTOMER FOCUSED</td>
</tr>
<tr>
<td>10. Transparency</td>
<td>Customers, regulators and other stakeholders have access to information on the utility’s activities, finances and performance</td>
</tr>
</tbody>
</table>
### Relationship between Objectives and Performance Indicators

<table>
<thead>
<tr>
<th>Objective</th>
<th>Performance Indicators</th>
</tr>
</thead>
</table>
| **1. Accessibility** | - Water coverage (population with water service/population in service area)  
                      - Sewerage coverage (population with sewerage service/population in service area)                                                                 |
| **2. Safety**   | - Does water quality meet standards?                                                                                                                                 |
| **3. Sufficiency** | - Sufficiency of production (liters of production per person in service area per day)  
                       - Sufficiency of consumption (average residential consumption of water [liters/person/day])                                                   |
| **4. Reliability** | - Average hours of service per day                                                                                                                                 |
| **5. Convenience** | - Type of access (improved vs. piped vs. piped to dwelling)                                                                                              |
## Relationship between Objectives and Performance Indicators

<table>
<thead>
<tr>
<th>Objective</th>
<th>Performance Indicators</th>
</tr>
</thead>
</table>
| 6. Cost-effectiveness | • NRW (NRW/total water produced, cubic meters/connection/day)  
• Collection efficiency (cash collected from customers/total billings)  
• Labor productivity (number of employees per 1000 connections) |
| 7. Financial Sustainability | • Operating cost ratio (operational revenues/operational cost) |
| 8. Affordability | • Percent of income spent on water (data from household surveys)  
• Standard “basic needs” bill / household income  
• Basic needs = 50 lpcd x number of people in household; work out bill from tariff schedule for that quantity of water |
| 9. Responsiveness | • Number of complaints/customer  
• Response to customer’s complaints |
| 10. Transparency | • Is drinking water quality data published? Independently verified?  
• Wastewater treatment results  
• Sewage flooding of homes |
Ratios and Indicators Used to Evaluate Utility Performance against Objectives

Coverage
Quality
Operating Efficiency
Financial Performance
Coverage
Water Coverage

Water Coverage, Selected Intermediate Cities in Latin America

Population with water service/population in service area
Sewerage Coverage

Sewerage Coverage, Selected Intermediate Cities in Latin America

<table>
<thead>
<tr>
<th>City</th>
<th>Sewerage Coverage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pto. Cortés (HN)</td>
<td>100%</td>
</tr>
<tr>
<td>Mar del Plata (AR)</td>
<td>93%</td>
</tr>
<tr>
<td>Quito (EC)</td>
<td>91%</td>
</tr>
<tr>
<td>Lima (PE)</td>
<td>90%</td>
</tr>
<tr>
<td>Guayaquil (EC)</td>
<td>86%</td>
</tr>
<tr>
<td>Arequipa (PE)</td>
<td>80%</td>
</tr>
<tr>
<td>Trujillo (PE)</td>
<td>77%</td>
</tr>
<tr>
<td>Piura (PE)</td>
<td>73%</td>
</tr>
<tr>
<td>Santa Marta (CO)</td>
<td>66%</td>
</tr>
<tr>
<td>Buenos Aires (AR)</td>
<td>59%</td>
</tr>
<tr>
<td>Panama (PA)</td>
<td>56%</td>
</tr>
<tr>
<td>San José (CR)</td>
<td>34%</td>
</tr>
<tr>
<td>Heredia (CR)</td>
<td>29%</td>
</tr>
</tbody>
</table>

population with sewerage service/population in service area
Quality

Water Quality
Service Quality
# Safety: Drinking Water Quality

<table>
<thead>
<tr>
<th>Score</th>
<th>Utility</th>
<th>Is drinking water quality data...</th>
<th>Does water quality...</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>...Published?</td>
<td>...Independently verified?</td>
</tr>
<tr>
<td>3</td>
<td>eThekwini</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>3</td>
<td>Lusaka*</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>3</td>
<td>Nyeri*</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>3</td>
<td>Tanga*</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>2</td>
<td>Aguas Maputo</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>2</td>
<td>DAWASCO*</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>2</td>
<td>Nairobi*</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>2</td>
<td>NWSC</td>
<td>Yes</td>
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</tr>
<tr>
<td>2</td>
<td>Mombasa*</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>1</td>
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<tr>
<td>1</td>
<td>ONEA</td>
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<td>No</td>
</tr>
<tr>
<td>0</td>
<td>Ghana WCL</td>
<td>No</td>
<td>Not disclosed</td>
</tr>
<tr>
<td>0</td>
<td>Hargeisa</td>
<td>No</td>
<td>Not disclosed</td>
</tr>
<tr>
<td>0</td>
<td>Kaduna</td>
<td>No</td>
<td>Not disclosed</td>
</tr>
<tr>
<td>0</td>
<td>Regideso</td>
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<td>Not disclosed</td>
</tr>
<tr>
<td>0</td>
<td>SEEN</td>
<td>No</td>
<td>Not disclosed</td>
</tr>
</tbody>
</table>
Reliability

Reliability, Selected Utilities in Africa

average hours of service per day

<table>
<thead>
<tr>
<th>Utility</th>
<th>Hours/day</th>
</tr>
</thead>
<tbody>
<tr>
<td>eThekwini</td>
<td>24</td>
</tr>
<tr>
<td>Nyeri</td>
<td>24</td>
</tr>
<tr>
<td>Tanga</td>
<td>24</td>
</tr>
<tr>
<td>SDE</td>
<td>23.5</td>
</tr>
<tr>
<td>ONEA</td>
<td>23</td>
</tr>
<tr>
<td>Hargeisa</td>
<td>22</td>
</tr>
<tr>
<td>Nairobi WSC</td>
<td>20</td>
</tr>
<tr>
<td>Lusaka WSC</td>
<td>20</td>
</tr>
<tr>
<td>NWSC</td>
<td>20</td>
</tr>
<tr>
<td>Ghana WCL</td>
<td>19</td>
</tr>
<tr>
<td>Agua Maputo</td>
<td>18</td>
</tr>
<tr>
<td>Kaduna State</td>
<td>17</td>
</tr>
<tr>
<td>Regideso</td>
<td>15</td>
</tr>
<tr>
<td>DAWASCO</td>
<td>11</td>
</tr>
<tr>
<td>MOWASCO</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>
Sufficiency

Sufficiency of Production, Selected Utilities in Africa

- eThekwini: 262 liters per person per day
- Nairobi WSC: 182 liters per person per day
- Maputo: 174 liters per person per day
- Lusaka WSC: 147 liters per person per day
- Nyeri: 125 liters per person per day
- Kaduna State: 118 liters per person per day
- Ghana WCL: 104 liters per person per day
- Tanga: 102 liters per person per day
- DAWASCO: 96 liters per person per day
- NWSC: 81 liters per person per day
- MOWASCO: 78 liters per person per day
- SEEN: 77 liters per person per day
- SDE: 74 liters per person per day
- ONEA: 48 liters per person per day
- Regideso: 42 liters per person per day
- Hargeisa: 19 liters per person per day

Liters of production per person in service area per day
Sufficiency

Sufficiency of Consumption, Selected Utilities in Africa

Average residential consumption of water (liters/person/day)
Operating Efficiency
Non-Revenue Water

NRW, Selected Utilities in Africa

NRW / total water produced

- SEEN: 16%
- ONEA: 17%
- SDE: 20%
- Tanga: 22%
- Nyeri: 24%
- Hargeisa: 33%
- NWSC: 34%
- eThekwini: 39%
- Regideso: 41%
- Lusaka WSC: 42%
- Nairobi WSC: 42%
- Agua Maputo: 47%
- Kaduna State: 48%
- MOWASCO: 49%
- Ghana WCL: 53%
- DAWASCO: 57%
Collection Efficiency

Collection Efficiency, Selected Utilities in Africa

cash collected from customers/total billings

SEEN 116%
Hargeisa 103%
Lusaka WSC 101%
eThekwini 98%
ONEA 98%
Nyeri 97%
NWSC 96%
Agua Maputo 96%
DAWASCO 95%
Ghana WCL 95%
SDE 94%
MOWASCO 94%
Nairobi WSC 80%
Regideso 78%
Kaduna State 63%
Worimi 55%
Labor Productivity

Labor Productivity, Selected Utilities in Africa

number of employees per 1000 connections

Staff per 1,000 Connections

<table>
<thead>
<tr>
<th>SDE</th>
<th>ONEA</th>
<th>eThekwini</th>
<th>SEEN</th>
<th>Nyeri</th>
<th>Agua Maputo</th>
<th>Tanga</th>
<th>Nairobi WSC</th>
<th>NWSC</th>
<th>DAWASCO</th>
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<th>Lusaka WSC</th>
<th>Regideso</th>
<th>Kaduna State</th>
<th>Hargeisa</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>6</td>
<td>6</td>
<td>7</td>
<td>9</td>
<td>12</td>
<td>10</td>
<td>15</td>
<td>16</td>
</tr>
</tbody>
</table>
IBNET: Your Source of Information
Monitoring for Improved Service Provision

Water GP will help client governments establish and implement monitoring systems to improve resource allocation and service provision:

- International Benchmarking Network for Water and Wastewater Utilities (IBNET)
- Service provider benchmarking
- National-level monitoring
- Performance and Tariff databases
IBNET: Information Creates Demand for Better Services

- The World Standard for the water performance assessment
- Information from 140 countries, 4,000 water and sanitation utilities that serve >30% of the urban population of the developing world
- Key information tool for Governments, utilities and donors
- Tool for the performance improvement
- Tariff data from 178 countries and counting
- The Bank tool for assessing the governance of water services providers
IBNET Way Forward

Build IBNET into a key monitoring and decision instrument in water sector development:

• Systematic data collection and analysis.
• Development of adjusted and simplified data collection instruments
• Development combined scoring system
• Integration of the WSP IBNET and its performance tools into a day-to-day work with water utilities
• Instruments addressing poverty, energy efficiency and climate change
Example of Data Quality

- Water produced error 10% (old poorly calibrated production meters)
- Water consumed error 15% (partial metering)
- Unaccounted losses somewhere in between 4% and 40%

We think

Extreme high

Extreme low
Ratios Used to Evaluate Financial Performance
Virtuous Circle of Performance

1) O&M costs controlled
2) Make operational improvements
3) Generate cash or access finance to pay for network expansion, bulk water supply, etc.
4) Revenues increase
Affordability

- Percent of income spent on water (data from household surveys)
- Standard “basic needs” bill / household income
- Standard “basic needs” bill / household GDP
- Basic needs = 50 lpcd x number of people in household

For this, work out bill from tariff schedule for that quantity
Operating Cost Ratio

Operating Cost Ratio, Selected Utilities in Africa

operating revenues/operating costs
Be Careful Using Financial Data

- Use audited financial statements
- Review notes of financial statements
Be Careful Using Technical Data

• Technical data is may not be reviewed by auditor for accuracy, or consistency
• Internal controls needed to ensure quality of data may not be in place, or enforced
• Dates technical data gathered may not reconcile with financial statement information …
• Or, with other technical data obtained
Questions?
Exercise
Exercise

- Participants will form small teams and answer questions
- Participants will extract values and calculate ratios using the WSC Bahamas financial statements and technical data
Exercise

• What was WSC’s NRW % for 2011?
• Assuming WSC’s purchased water costs (hint: note 11) are all variable (i.e., the cost varies with the amount of water produced), how much would WSC’s purchase water costs decrease if NRW was decreased by 25%?
Thank You