How cities manage waste all over the planet: A global overview through Wasteaware benchmark cities indicators

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CERRY: Circular Economy & Resource Recovery
University Theme on Cities, Sustainable Societies and Infrastructure
Future trends in waste quantities in low-income cities

**Factor 1** World population growth

**Factor 2** Urbanisation – megacities (2030: 40 megacities – 32 in Global South)

**Factor 3** Waste per capita increase with development (GNI, GDP, HDI, etc.)


Background to indicators system

ISWM Framework

Acknowledgements of co-developers: refer to the paper
‘Wasteaware’ benchmark indicators for integrated sustainable waste management in cities

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https://doi.org/10.1016/j.wasman.2014.10.006
<table>
<thead>
<tr>
<th>No.</th>
<th>Category</th>
<th>Indicator</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Public health – Waste collection</td>
<td>Collection coverage</td>
<td>82%</td>
</tr>
<tr>
<td>1Q</td>
<td>Environmental control – waste treatment and disposal</td>
<td>Quality of waste collection service</td>
<td>M/H</td>
</tr>
<tr>
<td>2</td>
<td>Environmental control – waste treatment and disposal</td>
<td>Controlled disposal</td>
<td>0%</td>
</tr>
<tr>
<td>2Q</td>
<td>Environmental quality of waste treatment and disposal</td>
<td>Environmental quality of waste treatment and disposal</td>
<td>L/M</td>
</tr>
<tr>
<td>3</td>
<td>3Rs – reduce, reuse and recycling</td>
<td>Recycling rate</td>
<td>&lt; 5%</td>
</tr>
<tr>
<td>3Q</td>
<td>3Rs – reduce, reuse and recycling</td>
<td>Quality of 3Rs provision</td>
<td>L/M</td>
</tr>
</tbody>
</table>

**Coverage:** both physical and governance aspects

**Indicators comprise:** 4 quantitative + 8 composite qualitative

**Global applicability:** both ‘South’ & ‘North’

**Visualise relative performance:** using ‘Traffic lights’ system

**Ready to use:** tested in 50 cities in all 6 inhabited continents
New standardised MFA for cities covering informal recycling sector

CVORR project: Complex Value Optimisation for Resource Recovery
Acceptability – application to date

- **Comprehensive** benchmarking system
- **Standardised** methodology
- **World-wide coverage:** accommodates for low income country realities
- **Awards:** Academic paper wins 2015 ISWA Publication Award and CIWM 2014-15 James Jackson Medal for major contributions to solid waste management.
- **Adopted by:** Data in UNEP/ISWA Global Waste Management Outlook
Municipal Waste Volumes per Capita Rise With Income

Proper municipal waste disposal is a public health and environmental priority as urban populations grow. City residents without regular refuse collection services risk exposure to contaminants that spread into soil, streets, and water. Uncontrolled dumpsites taint water tables and release airborne toxins as unsanctified refuse is burned. Global municipal waste data show that per capita volumes tend to rise with average income levels but negative impacts lessen as wealthier cities improve waste processing systems. While some cities in lower-income countries have expanded collection coverage, many still lag in proper waste processing—or controlled disposal. Collection in Lahore, Pakistan covers 7.7 percent of the population but only 18 percent of collections go to a controlled disposal facility. Lusaka, Zambia has 63 percent coverage and a 45 percent rate of controlled disposal. Recycling rates reach relatively high levels in some lower-income countries, often due to informal recycling networks.

Wasteaware: benchmark cites indicators: Web-portal about to be launched
Basic reporting customisable interface
### Traffic-light' colour coding for each indicator

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<table>
<thead>
<tr>
<th>Physical components</th>
<th>Benchmark indicator</th>
<th>Buenos Aires</th>
<th>Nairobi</th>
<th>Rotterdam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public health – waste collection</td>
<td>1.1 Waste collection coverage (% households)</td>
<td>96</td>
<td>52</td>
<td>100</td>
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<tr>
<td></td>
<td>1.2 Waste captured by solid waste management and recycling system (% wt.)</td>
<td>93</td>
<td>60</td>
<td>100</td>
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<tr>
<td></td>
<td>1C Quality of waste collection and street cleaning service (%)</td>
<td>67</td>
<td>29</td>
<td>92</td>
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<tr>
<td>Environmental control – disposal</td>
<td>2A Control treatment and/or disposal (%wt.)</td>
<td>97</td>
<td>0</td>
<td>100</td>
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<tr>
<td></td>
<td>2E Quality of environmental protection in waste treatment and disposal</td>
<td>71</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>Resource value – 3Rs: reduce, reuse, recycling</td>
<td>3T Recycling rate (%wt.)</td>
<td>8</td>
<td>30</td>
<td>23</td>
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<tr>
<td></td>
<td>3R Quality of 3Rs – reduce, reuse, recycle (%)</td>
<td>29</td>
<td>21</td>
<td>71</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Governance factors</th>
<th>Benchmark indicator</th>
<th>Buenos Aires</th>
<th>Nairobi</th>
<th>Rotterdam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degree of user and provider inclusivity</td>
<td>4U Degree of user inclusivity (%)</td>
<td>54</td>
<td>42</td>
<td>88</td>
</tr>
<tr>
<td></td>
<td>4F Degree of provider inclusivity (%)</td>
<td>65</td>
<td>55</td>
<td>90</td>
</tr>
<tr>
<td>Degree of financial sustainability</td>
<td>5F Degree of financial sustainability (%)</td>
<td>58</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>Sound institutions and proactive policies</td>
<td>6N Adequacy of national framework for solid waste management (SWM) (%)</td>
<td>50</td>
<td>46</td>
<td>92</td>
</tr>
<tr>
<td></td>
<td>6L Degree of local institutional coherence (%)</td>
<td>63</td>
<td>42</td>
<td>96</td>
</tr>
</tbody>
</table>
Cities dataset: Economic development vs. population
Waste collection coverage

Chart options

X axis values
GNI/capita (USD)

Y axis values
Waste collection coverage

Performance
- Low
- Low-Medium
- Medium
- Medium-High
- High
Wasteaware: informal recycling dominates around the world…
Recycling quality
Forthcoming tool to be developed

NEW!

Waste Flow Diagrams: Solid waste to marine litter in cities
Thank you for listening!

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