UN-HABITAT's work on environment-related SDG indicators

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Joint Task Force on Environmental Statistics and Indicators

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SDG Goal 11.6

11 SUSTAINABLE CITIES AND COMMUNITIES

11.6 By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management

SDG Indicators
Metadata repository

11.6.1 % of urban solid waste regularly collected and with adequate final discharge with regards to the total waste generated by the city

Tier 2:
Indicator conceptually clear, established methodology and standards available but data are not regularly produced by countries.

Ongoing Work

- Indicator refinement
- Identification of existing data collection system in the United Nations
- First Expert Group Meeting inviting key academics and practitioners was held January 2017
- Proposal on sub-indicators
- Strengthening partnership with experts and stakeholders

Ongoing Work: Existing Data

**UN-Habitat's Urban Indicators Database Guidelines
Agenda Goal 11: "Reduce Urban Pollution"**

Indicator 3.6: solid waste disposal
Percentage of solid waste:
•disposed to sanitary landfill;
•incinerated and burned openly;
•disposed to open dump;
•recycled; and
•other.

Indicator 3.7: regular solid waste collection
Proportion of households enjoying weekly solid waste collection

Ongoing Work: Existing Data

	Drivers for solid waste management				Governance				
	Public health collection/ sweeping coverage (%)	Public health/ environment Controlled disposal/ incinerated of total disposed /incinerated (%)	Environmental control Waste captured by the waste system (%)	Resource management Materials prevented or recovered (%)	Inclusivity Degree of user-inclusivity	Degree of provider-inclusivity	Financial sustainability Population using and paying for collection as percentage of total population	Institutional coherence Degree of institutional coherence	
Adelaide	100%	100%	100%	54%	HIGH	HIGH	100%	HIGH	
Bamako	57%	0%	57%	85%	MEDIUM	MEDIUM	95%	LOW	
Belo Horizonte	95%	100%	100%	1%	HIGH	HIGH	85%	HIGH	
Bengaluru	70%	78%	90%	25%	MEDIUM	MEDIUM	40%	MEDIUM	
Canete	73%	81%	83%	12%	MEDIUM	HIGH	40%	HIGH	
Curepipe	100%	100%	100%	NA	LOW	LOW	0%	HIGH	
Delhi	90%	100%	76%	33%	HIGH	MEDIUM	0%	LOW	
Dhaka	55%	90%	56%	18%	MEDIUM	MEDIUM	80%	HIGH	
Ghorahi	46%	100%	88%	11%	MEDIUM	LOW	0%	MEDIUM	
Kunming	100%	100%	100%	NA	MEDIUM	MEDIUM	50%	HIGH	
Lusaka	45%	100%	63%	6%	MEDIUM	MEDIUM	100%	MEDIUM	
Managua	82%	100%	97%	19%	MEDIUM	LOW	10%	MEDIUM	
Moshi	61%	78%	90%	18%	MEDIUM	LOW	35%	MEDIUM	
Nairobi	65%	65%	70%	24%	MEDIUM	HIGH	45%	LOW	
Quezon City	99%	100%	99%	39%	MEDIUM	MEDIUM	20%	HIGH	
Rotterdam	100%	100%	100%	30%	HIGH	LOW	100%	HIGH	
San Francisco	100%	100%	100%	72%	HIGH	LOW	100%	HIGH	
Sousse	99%	100%	100%	6%	LOW	LOW	50%	MEDIUM	
Tompkins County	100%	100%	100%	61%	HIGH	MEDIUM	95%	HIGH	
Varna	100%	100%	100%	27%	LOW	LOW	100%	HIGH	
Average	82%	90%	88%	30%			57%		
Median	93%	100%	98%	25%			50%		

Table 3.2

Values of a short set of indicators in the reference cities (percentage).

There is more discussion on the indicators shown in this table in the introduction to the City Inserts (pages 41 to 45).

Note: NA = not available. Italics = estimated. Curepipe, Delhi, Ghorahi and Quezon City do not have a municipal waste fee. Belo Horizonte: 70% of slum populated was covered in 2008.

UN-Habitat (2010) *Status of Solid Waste Management in the World Cities*

Ongoing Work: Existing Data

BAMAKO

Mali, West Africa, Africa

12°39'N, 8°0'W, approximately 350m above sea level

Modibo Keita (CEK), Erica Trauba (WASTE intern), Mandiou Gassama, Bakary Diallo and Mamadou Traoré (all of Cabinet d'Études Kala Saba, CEK, Bamako, Mali)

Some basic facts

The district of Bamako is situated in the Koulikoro region in southern Mali. It is the country's capital and largest city. It is made up of seven territorial collectivities that include six communes and the district mayor's office.

Topography: Niger River Valley surrounded by hills that extend from the Manding Mountains; there is a dry season from October to May, and a rainy season from June to September. Average rainfall: 919.3mm/year (the Malian weather service measures rainfall between 1 May and 31 October). Size of city/urban area: 267km². Population: 1,809,106 (2009 Census). Population density: 6331 persons/km² (city). Population growth rate (2008): 4.5%. Average household size: 6.7. The population is made up of 615,836 households that live in 85,728 concessions, or residential compounds. Human Development Index (2009): 0.371.
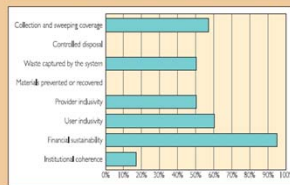
UN-Habitat (2010) *Status of Solid Waste Management in the World Cities*

Ongoing Work: Existing Data

UNSD/UNEP Questionnaire on environment statistics

Waste
- R1: Generation of Waste by Source
- R2: Management of Hazardous Waste
- R3: Management of Municipal Waste
- R4: Composition of Municipal Waste
- **R5: Management of Municipal Waste – City Data**
- R6: Supplementary information sheet

	1999	2001	2004	2006	2008	2010	2013
Total responses	49	62	68	78	83	83	81
Non-responses	119	115	90	85	88	89	92
Response rate (%)	29	35	43	48	49	48	47
Countries that received the Questionnaire	168	177	158	163	171	172	173

http://unstats.un.org/unsd/environment/questionnaire.htm

Defining Urban Waste

There is **no internationally agreed definition** of "urban waste"

Whether or not include sewage sludge and faecal sludge in the monitoring scope?

Whether or not include the following?
- Waste from healthcare facilities
- Industrial waste
- Agricultural waste
- Mining waste
- Construction and demolition waste
- End of life vehicles and
- WEEE (Waste Electrical and Electronic Equipment)

For practical purposes **"municipal waste" as a monitoring scope as it has internationally agreed definition** theoretically and practically?

Urban Waste: EGM Results

- Many participants responded that the **faecal sludge and sewage sludge should be excluded** from the monitoring scope by the indicator.

- Likewise many expressed that the **monitoring scope should focus on 'municipal solid waste'** because this has clear and internationally agreed definition both theoretically and practically.

- Although some argued WEEE (Waste Electrical and Electronic Equipment) should be included otherwise cannot be captured and monitored, UNEP Basel Convention Secretariat stated this is already addressed by Basel Convention.

For practical purposes 'municipal solid waste' and 'urban solid waste' are the same

Definition: Adequate Discharge

Current Definition:

Waste that is recycled **in regulated recycling facilities**, composted or incinerated in **regulated composting and incineration facilities and disposed in sanitary landfills in environmentally adequate ways**. It **excludes** informal sector waste handled in recycling, composting,

incineration **facilities that do not have necessary pollution control systems and labour safety standards** required by international guidelines or national and local legislations such as waste water treatment and air pollution prevention systems and provision of necessary equipment for workers. It also excludes solid waste that is incinerated and burned openly or disposed to open dump without leachate facility.
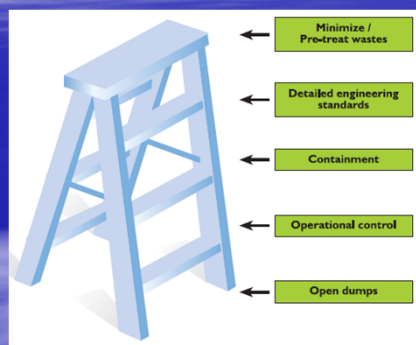
Adequate Discharge: EGM Results

- Most of the participants agreed that **current definition cannot capture the gradual improvement that usually occur in the solid waste management system.** With the current definition, the values in most of the developing countries will be **0%.** This discourages the decision makers to put efforts in achieving SDG 11.6.

- Also many agreed **'discharge' is a terminology in the waste water treatment area,** hence better definition **'adequate treatment and disposal'.**
-
- Some considered "e**nvironmental adequateness" should be looked at from the perspective of 'environmental impact'** rather than focusing on specific technology.

- **Terminology should be 'adequate treatment and disposal'**
- **Definition should be changed to be able to capture the gradual improvement of solid waste management.**
- **'Environmental adequacy' should be defined by the effect to the**
- **environment**

Progressive improvement & monitoring ladders

Minimize / Pre-treat wastes

Detailed engineering standards

Containment

Operational control

Open dumps

Stepwise progression controlling disposal
UN-Habitat (2010) *Status of Solid Waste Management in the World Citie*s

Methodology Development

WASTEAWARE Indicators (Wilson et al, 2015)

		Indicator name and definition	Extract from guidance notes in User Manual	
1	Public health - waste collection	**Waste Collection Coverage:** % households who have access to a reliable waste collection service	Waste collection coverage represents **the access that the population of a city have to a waste collection service,** including both formal municipal and informal sector services. A 'collection service' may be 'door to door' or by deposit into a community container. 'Collection' includes collection for recycling as well as for treatment and disposal (so includes e.g. collection of recyclables by itinerant waste buyers). 'Reliable' means regular - frequency will depend on local conditions and on any pre-separation of the waste.	11.6.1 scope
2	Environmental control - disposal	**Controlled treatment or disposal:** % of the total municipal solid waste destined for treatment or disposal which goes to either a state-of-the-art, engineered or 'controlled' treatment / disposal site	**The 'numerator' in this calculation is the total waste that is dealt with in a 'controlled' facility** (e.g for land disposal, composting or waste to energy). **The 'denominator' is the total solid waste destined for treatment or disposal** - that is the total waste generated less waste recycled or reused. Waste being accepted at a facility 'counts' towards this quantitative indicator if the facility has reached at least an intermediate level of control. To use land disposal as an example, and referring to the stepwise improvement of sites, both uncontrolled and semi-controlled sites would fall below the threshold, while controlled, engineered and full sanitary landfills would all count towards this indicator.	
3	Resource value - '3Rs' - Reduce, reuse, recycle	**Recycling rate:** % of total municipal solid waste generated that is recycled. Includes materials recycling and organics valorisation (composting, animal feed, anaerobic digestion).	Includes materials recycling and organics valorisation (composting, animal feed, anaerobic digestion). Includes the contribution from the 'informal' recycling sector as well as formal recycling as part of the solid waste management system. The total quantity collected for recycling should be adjusted downwards to allow for any materials that are subsequently rejected and sent for treatment or disposal.	12.5 scope

Merit of Wasteaware Indicators

- Designing the SDG indicator 11.6.1 to be disaggregated into sub-indicators would allow visualisation of gradual improvement in solid waste management particularly in developing countries.

- The first two of these sub-indicators could be provided by the Wasteaware benchmark indicators 1 (collection coverage) and 2 (controlled treatment or disposal).

- The Global Waste Management Outlook UNEP (2015) used the Wasteaware indicators for 39 cities to point out the huge progress that many developing countries have made in the last 10-15 years in improving collection coverage and controlled disposal rates.

- The Wasteaware user manual provides detailed guidance on definitions used and criteria for judging 'environmental appropriateness'.

- A third sub-indicator will be required, being the proportion of waste going to controlled treatment or disposal which meets the threshold for 'sustainable and environmentally sound management .
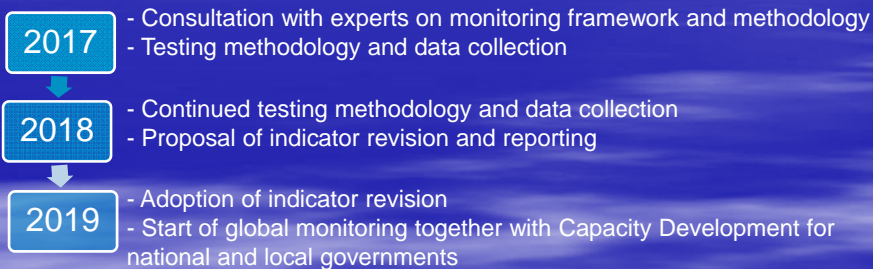
Challenges experienced :

Strong interlinkages between different indicators and need for joint monitoring

Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable		
Targets		**Indicator**
11.6	By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management.	**% of urban solid waste regularly collected and with adequate final discharge with regards to the total waste generated by the city**

Goal 12: Ensure sustainable consumption and production patterns		
Targets		**Indicator**
12.4	By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment.	**Treatment of waste, generation of hazardous waste, hazardous waste management, by type of treatment**
12.5	By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse.	**National recycling rate, tons of material recycled**
Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development		
	By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from landbased activities, including marine debris and nutrient pollution	**14.1.1 Index of coastal eutrophication and floating plastic debris density**

(Left side labels: UN-Habitat, UNEP)

Next Steps

Timeframe:

2017
- Consultation with experts on monitoring framework and methodology
- Testing methodology and data collection

2018
- Continued testing methodology and data collection
- Proposal of indicator revision and reporting

2019
- Adoption of indicator revision
- Start of global monitoring together with Capacity Development for national and local governments

SDG Target 6.3

"By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of <u>untreated wastewater</u> and substantially increasing recycling and <u>safe reuse</u> globally"

Indicators:

1.Proportion of ***wastewater safely treated***

2.(WHO/UNHABITAT/UNSD)

1.Proportion of bodies of water with good ambient water quality (UNEP)

Tier 2:
Indicator conceptually clear, established methodology and standards available but data are not regularly produced by countries.

17

Goal 6.3.1 Wastewater
Why has it been given priority by member states ?

- Approximately 80% of wastewater globally is discharged untreated

- 40% of world population is living in water stressed areas.

- At least 10% of the world population consumes wastewater irrigated food

- The extent is difficult to quantified due to the informal nature of the practice

Demand for reuse will grow

Bluewater scarcity by 2025
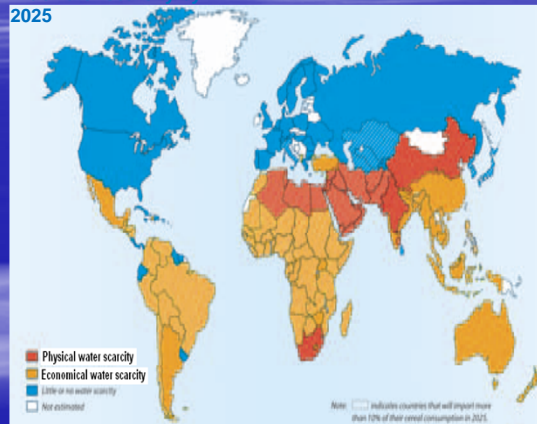
Drivers:

•Water and nutrient scarcity

•Population growth/ urbanisation leading to increasing demand for food in cities

•Sanitation Business Models

Physical water scarcity
Economical water scarcity
Little or no water scarcity
Not estimated

Note: indicates countries that will import more than 10% of their cereal consumption in 2025.

Wastewater contamination through illegal and toxic discharges

Bluewater scarcity by 2025

From:

•Domestic/Commercial wastewater

•Uncontrolled Industrial discharges

•Hazardous waste discharges

Why "Safely managed" or "Safely treated" MGD to SDG?

UNIMPROVED SANITATION FACILITIES

16%

IMPROVED SANITATION WITHOUT SEWER CONNECTIONS

28%

69%*

GROUPED: IMPROVED SANITATION (INCLUDING SEWER CONNECTIONS)

63%*

2014 WHO burden of disease for diarrhoea estimate

COMMUNITY SANITATION OR SEWER CONNECTIONS

HIGH

RISK TO HEALTH

LOW
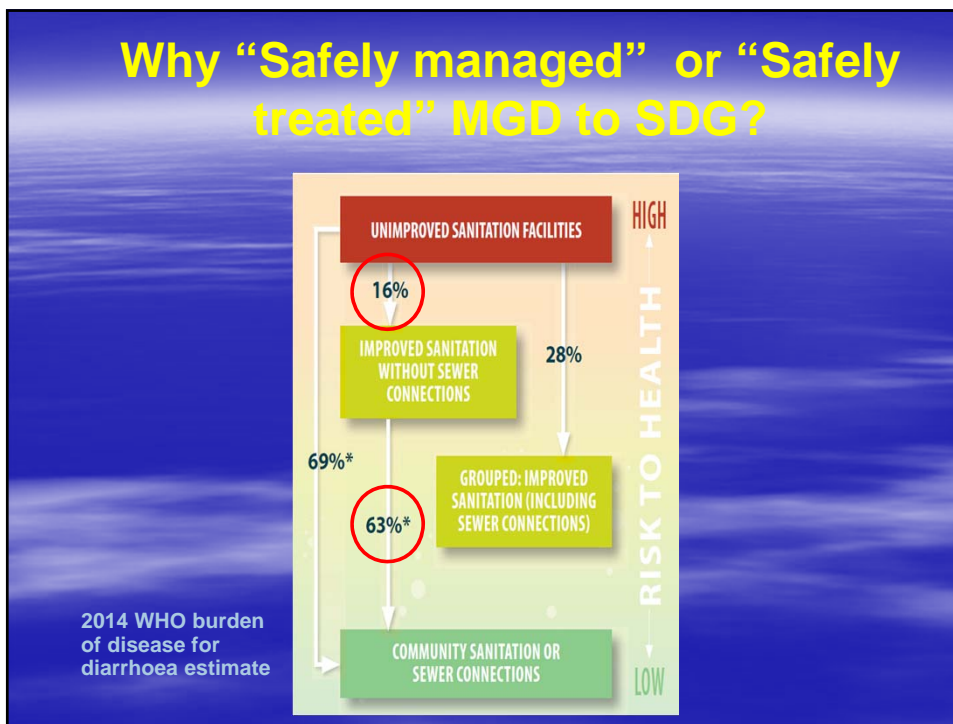
6.3 - Safely treated wastewater

Generation → Pre-treatment/On site treatment → Transport → Treatment at Centralised WWTP → Disposal/Reuse

Households

Economic activities

Non-Hazardous

Hazardous

Sewer

Municipal WWTP
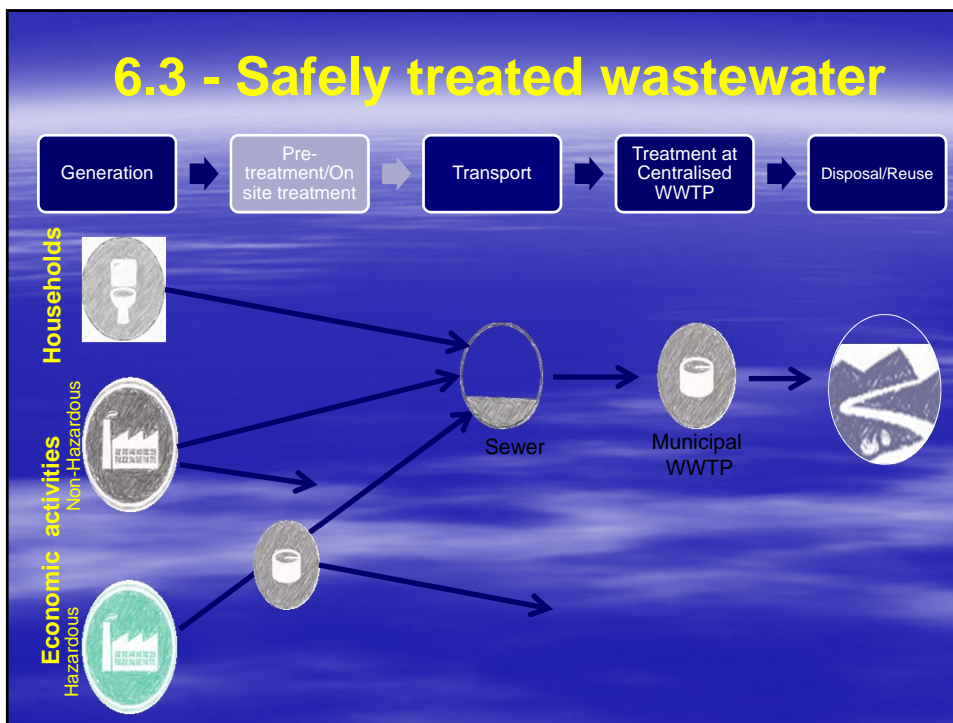
Links between Targets 6.2 and 6.3

- 6.3.1 "Proportion of wastewater safely treated"
- Common elements
  - Mass/flow approach
  - Onsite and off-site treatment

- Differences
  - 6.2 includes open defecation and unimproved
  - 6.3 includes households and economic activities (pretreatment of hazardous wastewater)
  - 6.3 includes more on treatment relevant for reuse

23

Aligned to UNSC approved…
✓**International Recommendations for Water Statistics (IWRS),**
✓**System of Environmental Economic Accounting (SEEA)**
  - Treatment Categories
  - definitions and methods for emissions to water

➤Onsite safe management comes from 6.2.1 (tier I)
➤Industrial/commercial wastewater estimated from inventories of industries (ISIC rev4). Unless verified through audited compliance records, the waste generated will be considered **untreated**
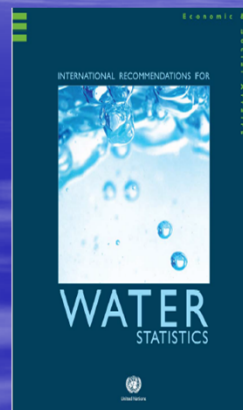
Challenges of wastewater monitoring

- Wastewater «safetly treated» is a critically complex indicator

- Comprises Domestic, Commercial, Industrial (hazardous and non-hazardous) components, both sewered and from on-site.

- Some places still use combined sewerage

- Difficulties with definitions «collected» «treated» «generated»

- Combining domestic, commercial and industrial into one %

Safely treated: Target 6.3.1: Definition of effluent quality standards

Biochemical Oxygen Demand: BOD5 [mg/L]
Chemical Oxygen Demand: COD [mg/L]
Total Suspended Solids: TSS [mg/L]

Total Nitrogen: N_{tot} [mg/L]
Total Phosphorus: P_{tot} [mg/L]

Esherichia coli: E.coli [MPN/100ml]
Total Coliforms: TC [MPN/100ml]
Faecal Coliforms: FC [MPN/100ml]
Faecal Streptococci: FS [MPN/100ml]

Fat, Oil, Grease: FOG [mg/L]
Dissolved Oxygen: DO [mg/L]
Nitrogen: as NH_4-N (Ammonium) [mg/L]
Nitrate: NO_3-N [mg/L]
Phosphate: PO_4-P [mg/L]
Chlorine: free total residual chlorine [mg/L]
Fluoride: F [mg/L]

Arsenic: As [mg/L]

Biochemical standards

Eutrophication standards

Microbiological standards

Chemical standards

Minimum Recommended Standards

26

Generated/Collected/Treated

- Generated
  - (Use of 6.2 data) for domestic
  - Water supplied non-domestic with correction factor
- Collected
  - Arrivals of flow at treatment facilities (issues with ingress/egress in sewers)
- Treated
  - Plant effluents compliance with national standards (due consideration to compliance for remote locations)

Treatment Domestic/Commercial: Inventory of all WWTP performance

Wadis & Rivers = 1
Marine = 2
Groundwater = 3
Reuse = 4

Passes all stds — 4.1
Fails 1/3 stds — 84.8
Fails 2/3 stds — 96.7
Fails all stds — 2.4

% safetly treated

Calculating 6.3 - economic activities

Discharge consent inventory

Industry type/water use	Size of Industry/effluent generated	Discharge to:	Hazardous/Non-hazardous	Discharge Compliance*
All establishments	By effluent flow, water consumption, or employees	Sewer / environment	ISIC , Red List or local EPA permit	Yes / No

Treatment Industrial/Hazardous:Inventory of all industrial discharges to sewer

Type of industry	ISIC code	Effluent Q m3/dg	Pretreat	Discharge WWTP	TDS	TSS	COD	pH	Complia	Proportion of f
Carbonated and bottled water	1104	400	ASP		3281.6	291.8	4311.3	7.53	N	6.11 tds
Power Generation	3510	250	EVAP		2035.6	8.5	25.7	8	Y	0.08
Fruit juice manufacturing	1030	50			1641.4	28.6	882.2	7.45	Y	0.02
Textile manufacturing	1311	100			629.7	102.8	944.8	8.2	N	0.03 HAZcod
Beer and malt drinks	1103	90			1054	54.8	333.3	9	Y	0.03
Whiskey and sweet drinks	1101	10			657.1	25.93	76.14	7.83	Y	0.00
Dairy	1050	7	ASP		1022.5	135.2	375.8	8.1	Y	0.00
Dairy	1050	40	ASP		2672.7	345.3	2037	7.84	N	0.01 codtds
Dairy	1050	5	ASP		1062.3	71.6	52.6	8.58	Y	0.00
Ice cream and biscuits	1071	10			1908.5	1496.9	3653.8	6.9	N	0.00 codtds
Sesame products	1071	60			1065.9	6.4	130.1	7.67	Y	0.02
Potato and corn chips	1030	120			641.1	1110.2	904.5	7.3	Y	0.04
Filling and refining edible oil	1040	10	ASP		1692.1	20.7	50.9	8.2	Y	0.00
Food industry	1071	25			1236.4	51.3	405.3	7.3	Y	0.01
Juice manufacturing	1030	2			515.3	28.7	327	8.4	Y	0.02
Juice manufacturing	1030	2			2304	63.7	3331.3	8.3	N	0.02 codtds
Meat Processing	1010	5	Yes		3244.2	1105.1	18189	7.29	N	0.04 codtds
Metal Processing	2592	50	ph adj.		1498.3	81.6	46.2	8.2	N	0.42 HAZ
Pharmaceutical manufacturing	2100	30			637.1	353.4	650	7.57	N	0.41 HAZ
Food industry	1050	100	ASP		3732.1	1217.7	7071.1	6.7	N	0.84 codtds
Dairy	1050	200	ASP		1150	85.3	1041.5	7.53	Y	1.69
Pharmaceutical manufacturing	2100	5			525.8	31.7	1231.7	8.32	N	0.07 HAZ
Pharmaceutical manufacturing	2100	35	ASP		988.4	73	484.7	7.48	N	0.30 HAZ

			Flows NOT complying
Total volume industrial WW	1606	m3/day	
Total volume discharged NON compliance industrial	777	m3/day	
Total volume discharged NON compliant Hazar	220	m3/day	
% Safetly treated industrial waste (overall)	52		
% Safetly treated industrial (hazardous)	86		

Trade offs in each treatment definitions

- Country relevance to national standards vs international comparability

- Data availability – pragmatic short term of strategic long term: The monitoring ladder

- Investment signals – what "counts" is what gets funded?

Next steps

- Currently reopening JMP file to recalculate for 6.3.1 (domestic proportion only)

- Computing estimates for commercial, industrial (including hazardous) based on exisiting data or modelled approaches

- Establish catalogue of national standards

- Combine all sources compute % safely treated and circulate for ratification by member states

- Data analysis target completion by September 2017

- Baseline and narrative report by Feb 2018.

Conclusions 1 on 11.6

- **Data completeness and data quality remain a challenge** (in particular for developing countries)

- For practical purposes "urban waste" and "municipal waste" are the same.**Estimation of 'uncollected waste'** could be a challenge in terms of quality.

- Primary data collection and validation may best should be done at **municipal/city level**.

- Capacity at city level needs to be build **to ensure consistency** of interpretation of methodology. However **national also very important**

Conclusions 2 on 6.3.1

- Maximise the use of existing data: much utility and regulatory data can be used with adequate verification

- Some additional work to be done on definitions and treatment standards

- Recognise that significant threats exist if we focus exclusively on domestic wastewater

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- Reuse, although not "quantified" in target 6.3 does not stop countries from further opportunities for wastewater reuse (Wastewater Reuse Effectivness Index)

- UNHabitat and WHO are happy to support members states In the region
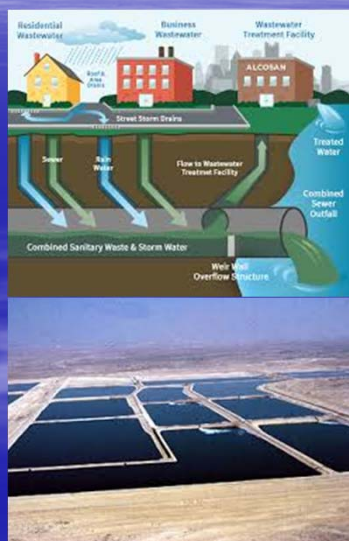
Thank you for your attention !

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Joint Task Force on Environmental Statistics and Indicators
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