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in an urbanizing world*

Wastewater Treatment and Monitoring in the Context of SDG Indicator 6.3.1

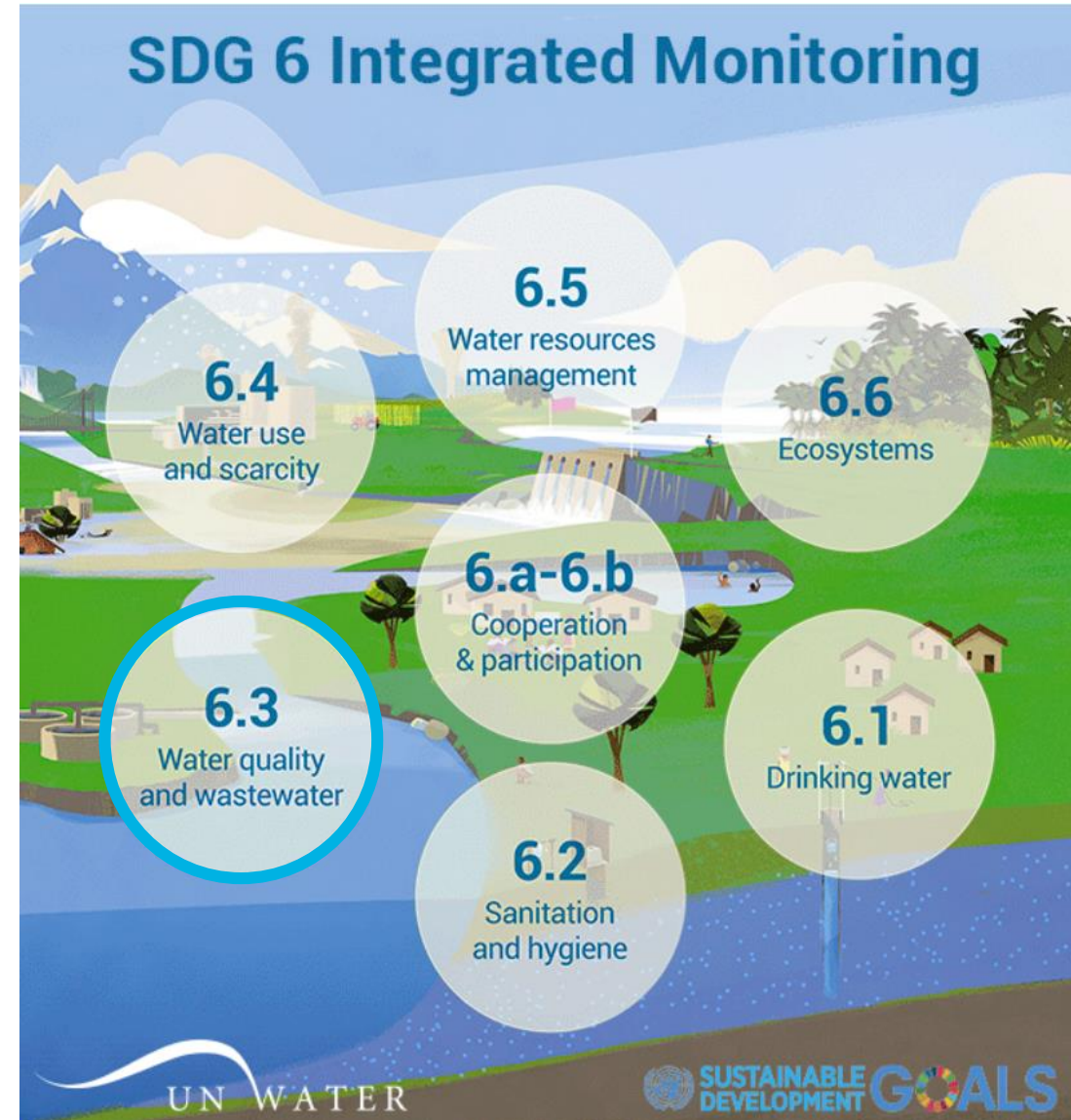
31st SuSanA Meeting – online

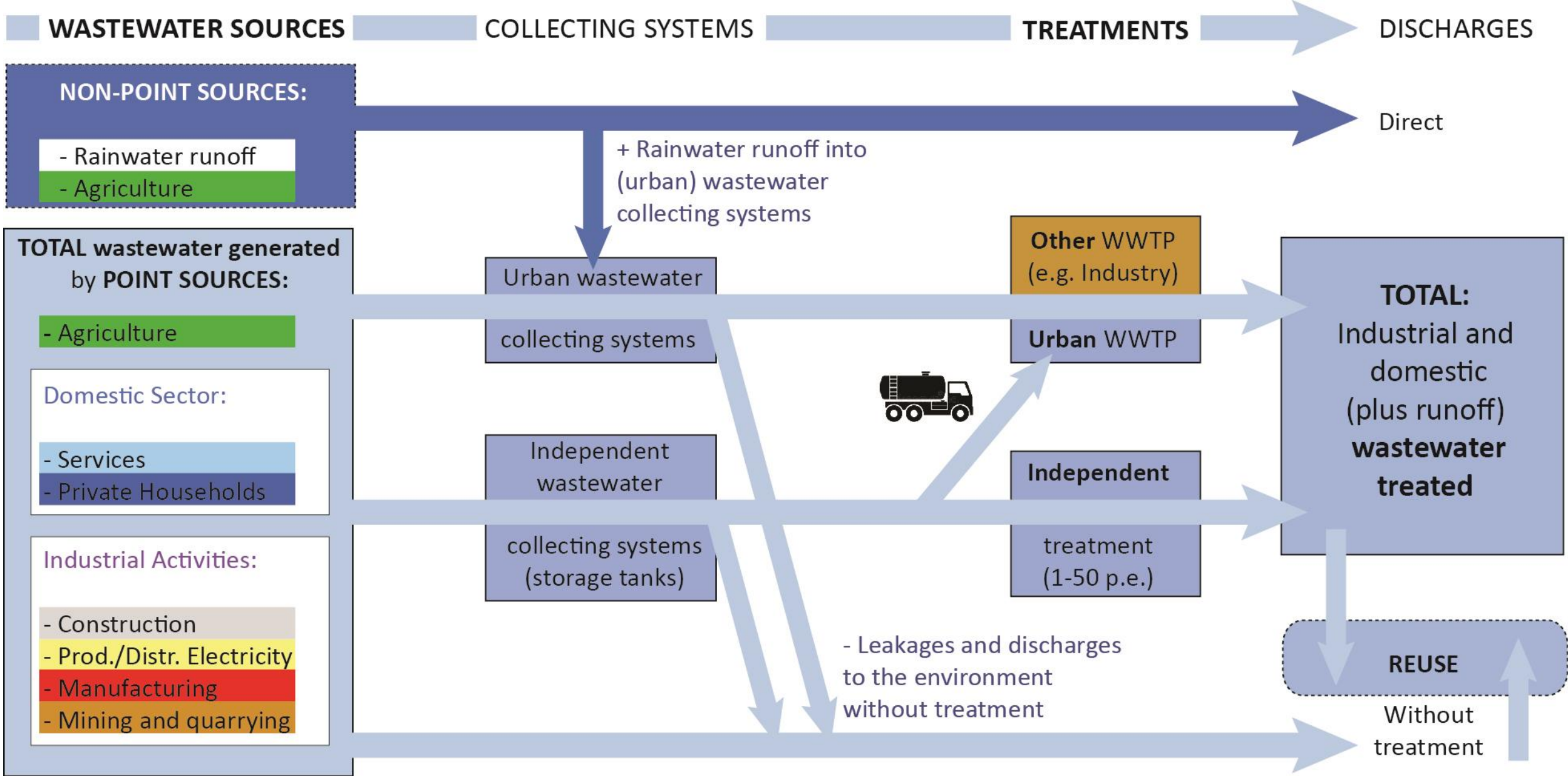
Presentation by: Florian Thevenon
Date: 16 August 2021

Target 6.3 indicators

“By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally”.

- Indicator 6.3.1 “Proportion of wastewater safely treated”
- Indicator 6.3.2 “Proportion of bodies of water with good ambient water quality”





Statistics on wastewater are based on official statistics supplied by **National Statistical Offices** and/or ministries of environment.

Variables for 6.3.1 reporting

WASTEWATER GENERATED BY:

Agriculture, forestry,
fishing

Mining and quarrying

Manufacturing

Electricity (excluding
cooling water)

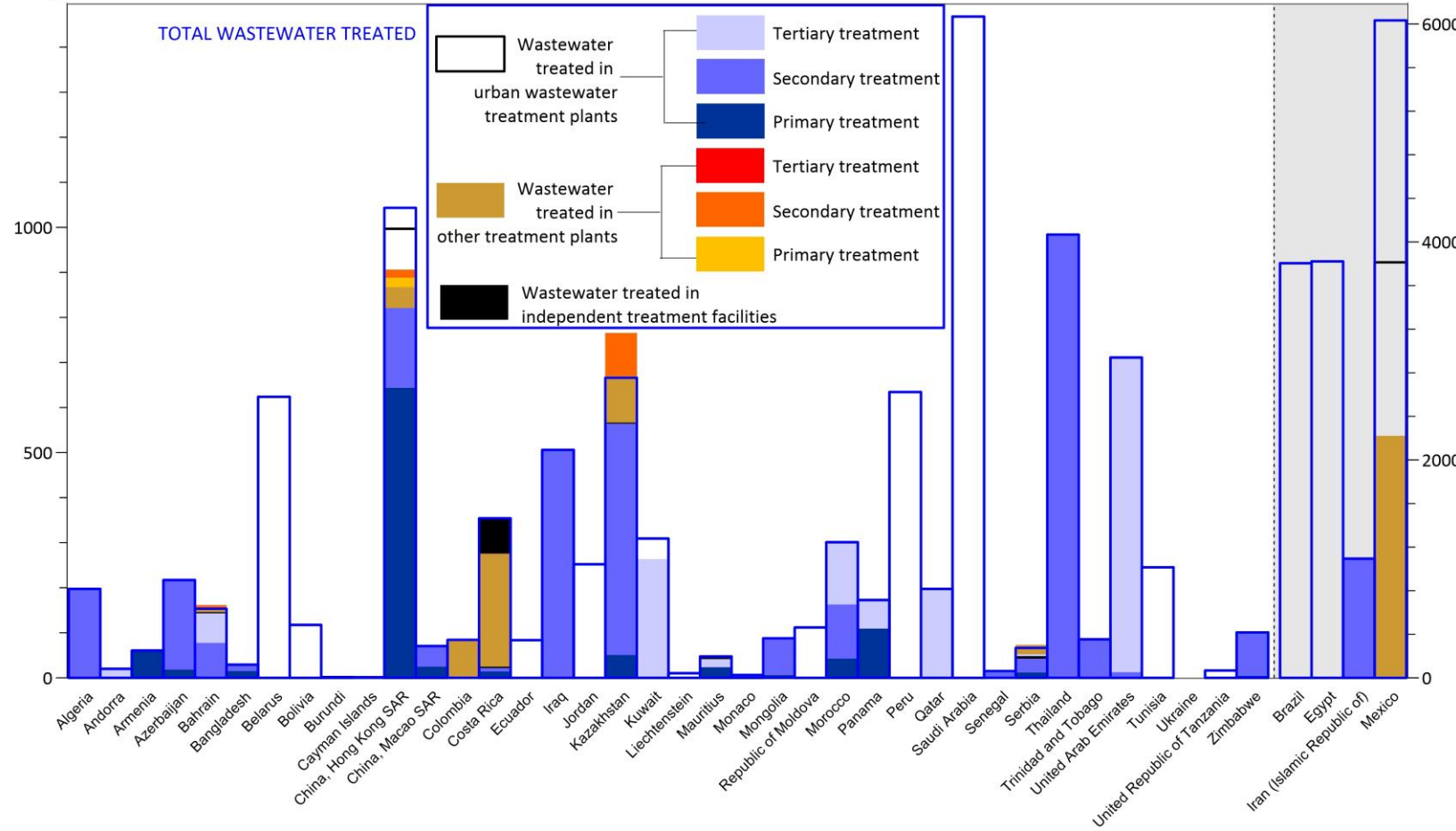
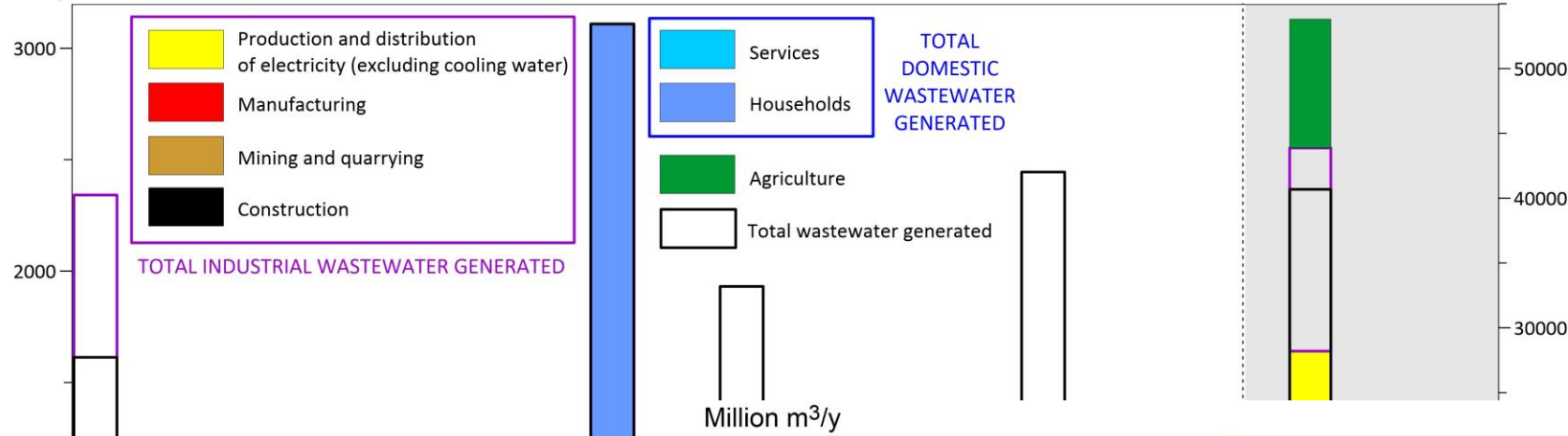
Construction

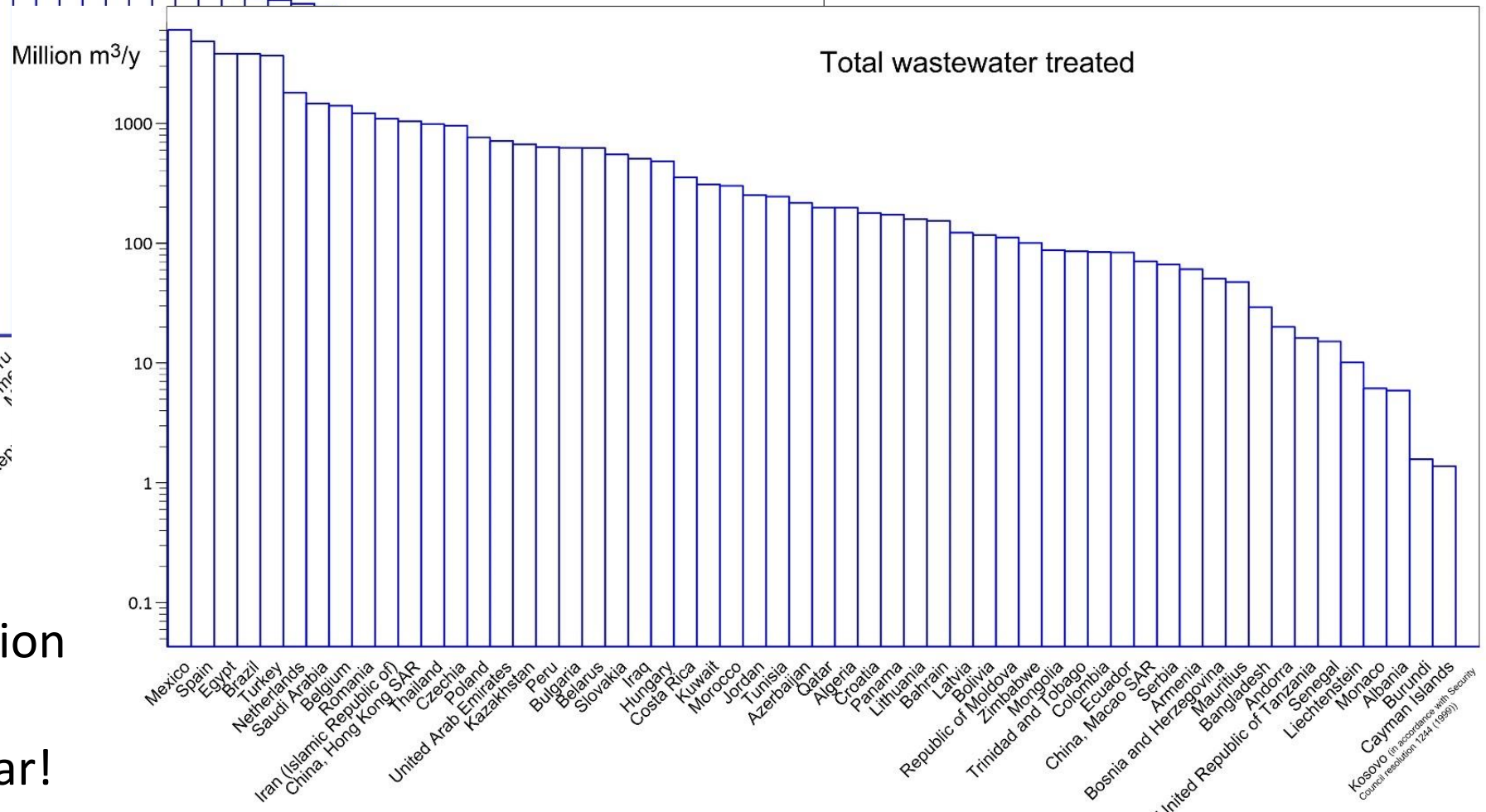
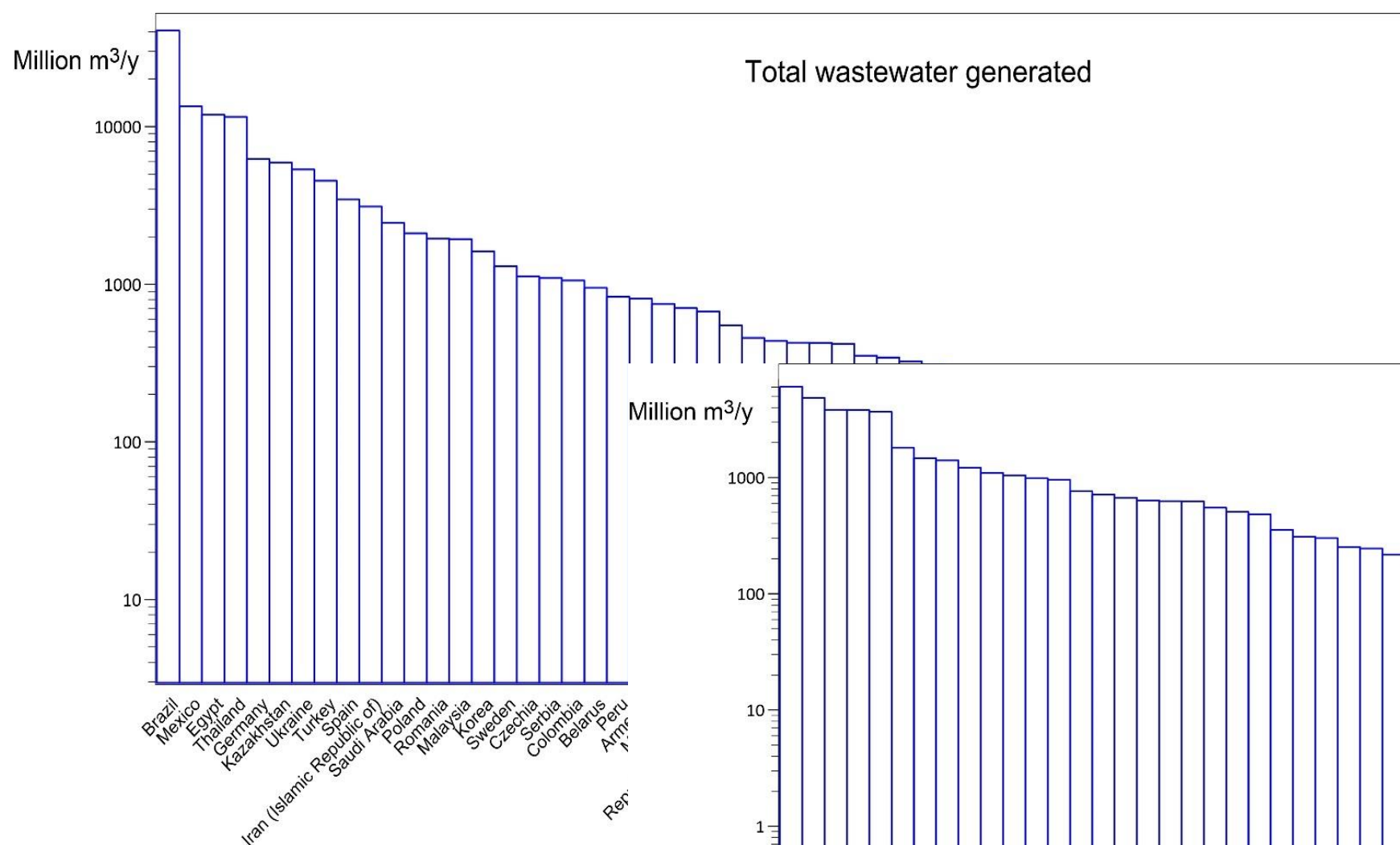
Other economic
activities (services)

Households

Section	Division	Description
A	01-03	Agriculture, forestry and fishing
B	05-09	Mining and quarrying
C	10-33	Manufacturing
D	35	Electricity, gas, steam and air conditioning supply
E	36-39	Water supply; sewerage, waste management
F	41-43	Construction
G	45-47	Wholesale and retail trade; repair of motor vehicles
H	49-53	Transportation and storage
I	55-56	Accommodation and food service activities
J	58-63	Information and communication
K	64-66	Financial and insurance activities
L	68	Real estate activities
M	69-75	Professional, scientific and technical activities
N	77-82	Administrative and support service activities
O	84	Public administration and defence; social security
P	85	Education
Q	86-88	Human health and social work activities
R	90-93	Arts, entertainment and recreation
S	94-96	Other service activities
T	97-98	Activities of households
U	99	Activities of extraterritorial organizations

Million m³/y



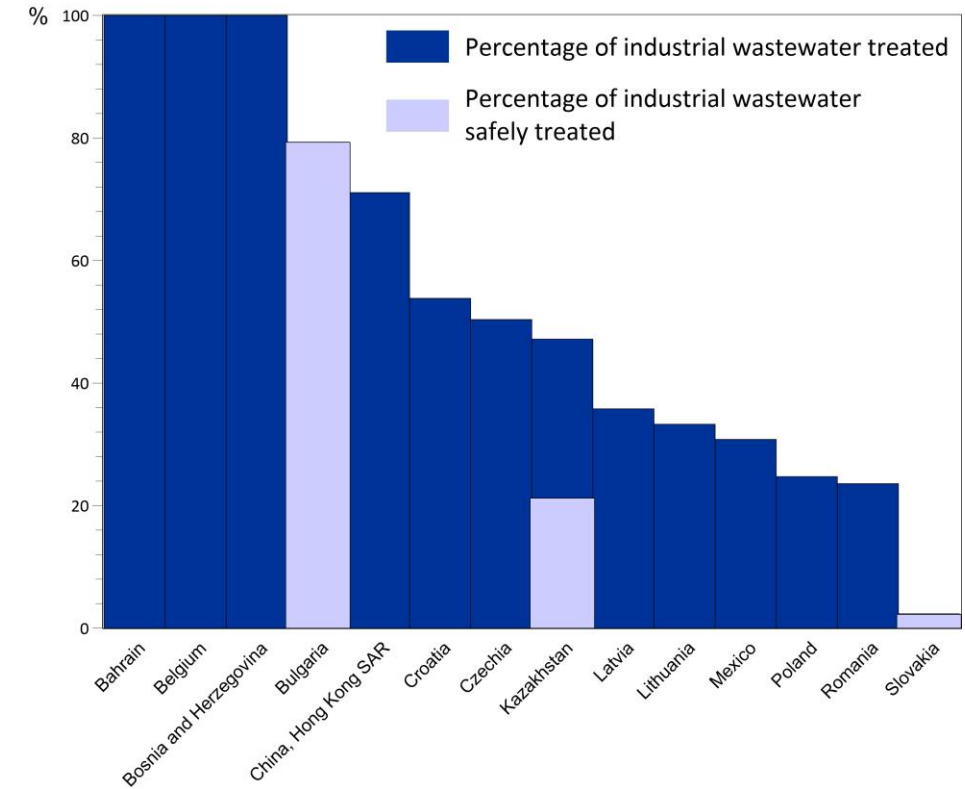
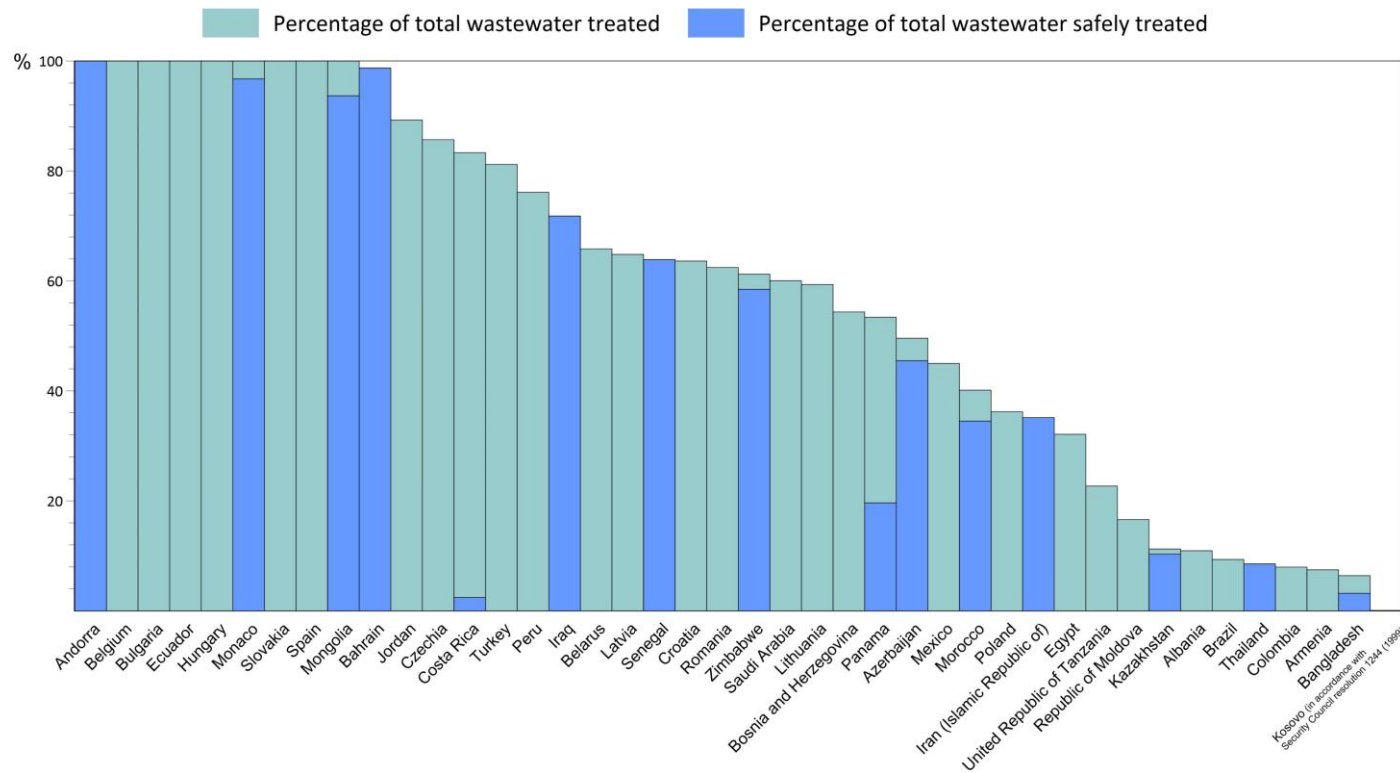


57 reporting countries
 20% of the global population
 41,600 million m³
 29 litres per capita per year!

Kosovo (in accordance with Security Council resolution 1244 (1999))

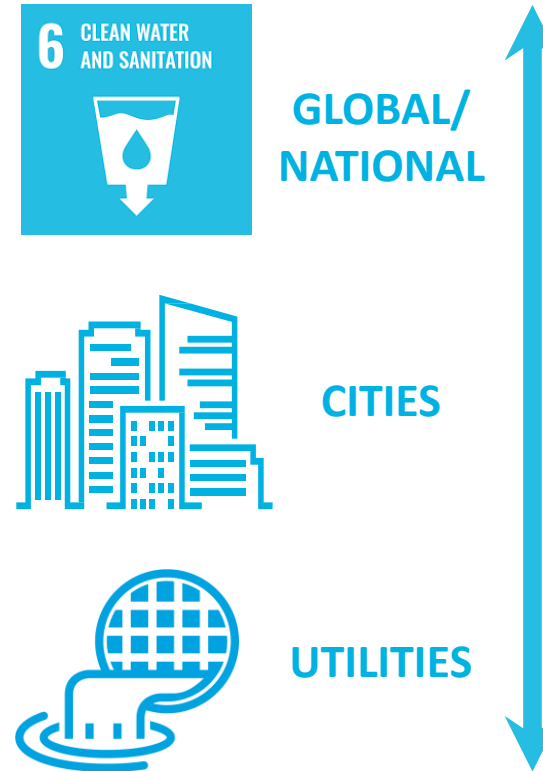
Total (2015): 32% received at least some treatment – 42 countries: 18% of the population

Industrial (2015): 30% received at least some treatment – 14 countries: 4% pop.



A standardised methodology for different levels

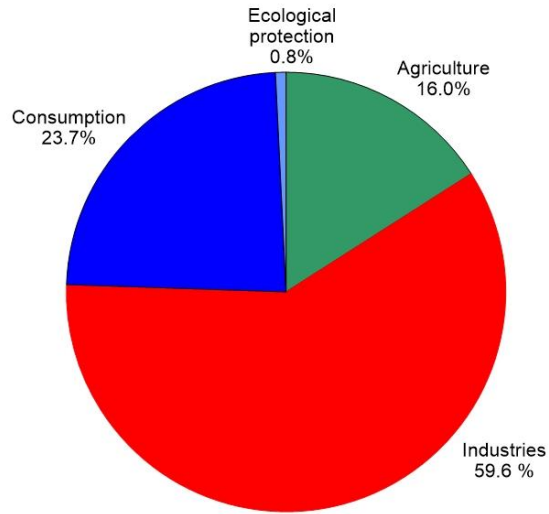
Promote sustainable and safe wastewater reuse management strategies and effective policies, to the benefit of the population health and the global environment, to respond to growing water demands, increasing water pollution loads and increasing climate change impacts on water resources management.



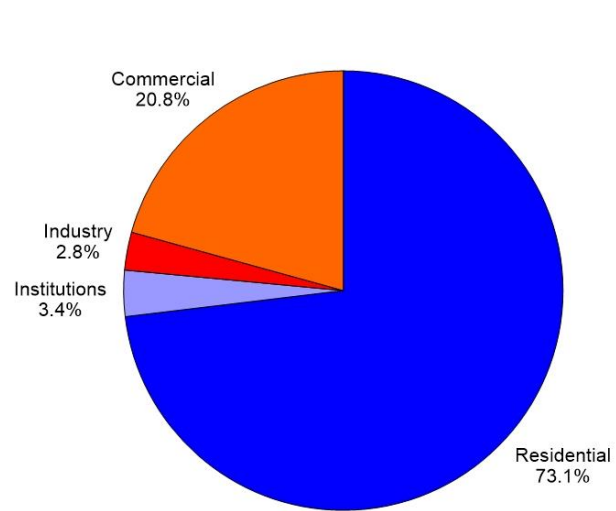
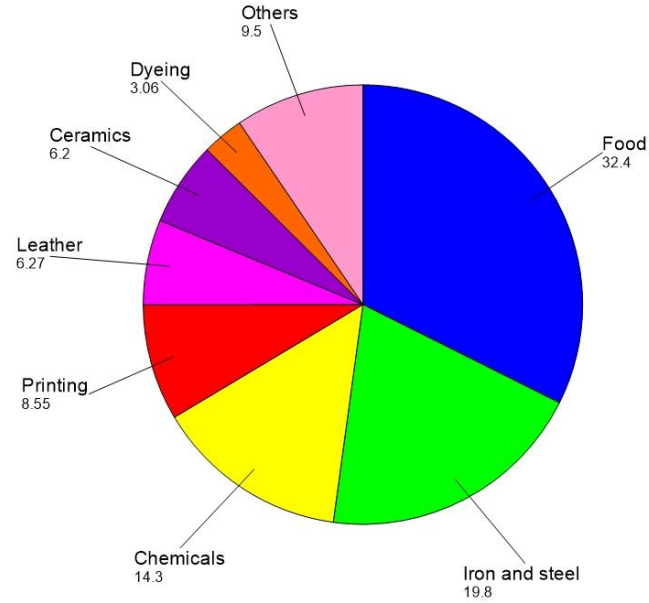
There are many reasons to improve wastewater data and information collection, and to integrate them into national and city development, by addressing real-city problems with practical solutions; with significant benefits for human health and economic development, as well as for the protection of aquatic ecosystems (services).

Drinking water consumption by sectors

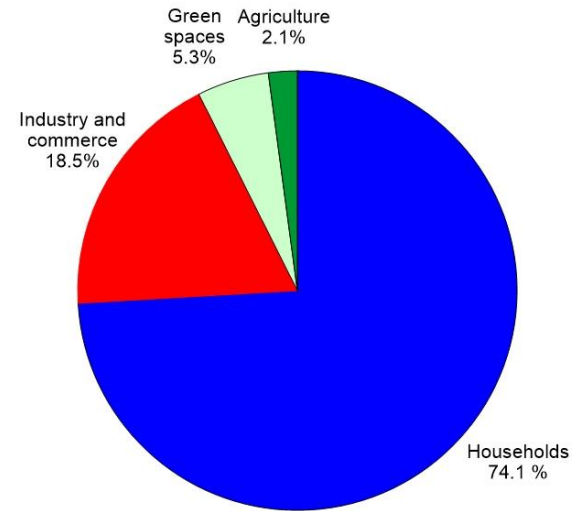
Shanghai: 10'340 Million m³ in 2018



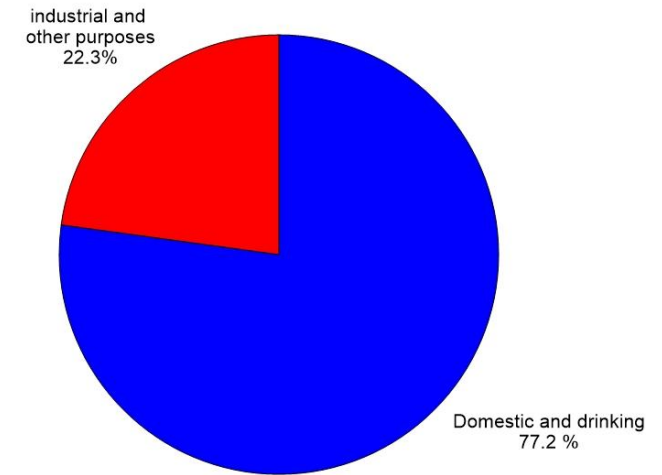
Tokyo: 6 Million m³ of industrial water supply 2017-2019



TORONTO: 327 Million m³ in 2019

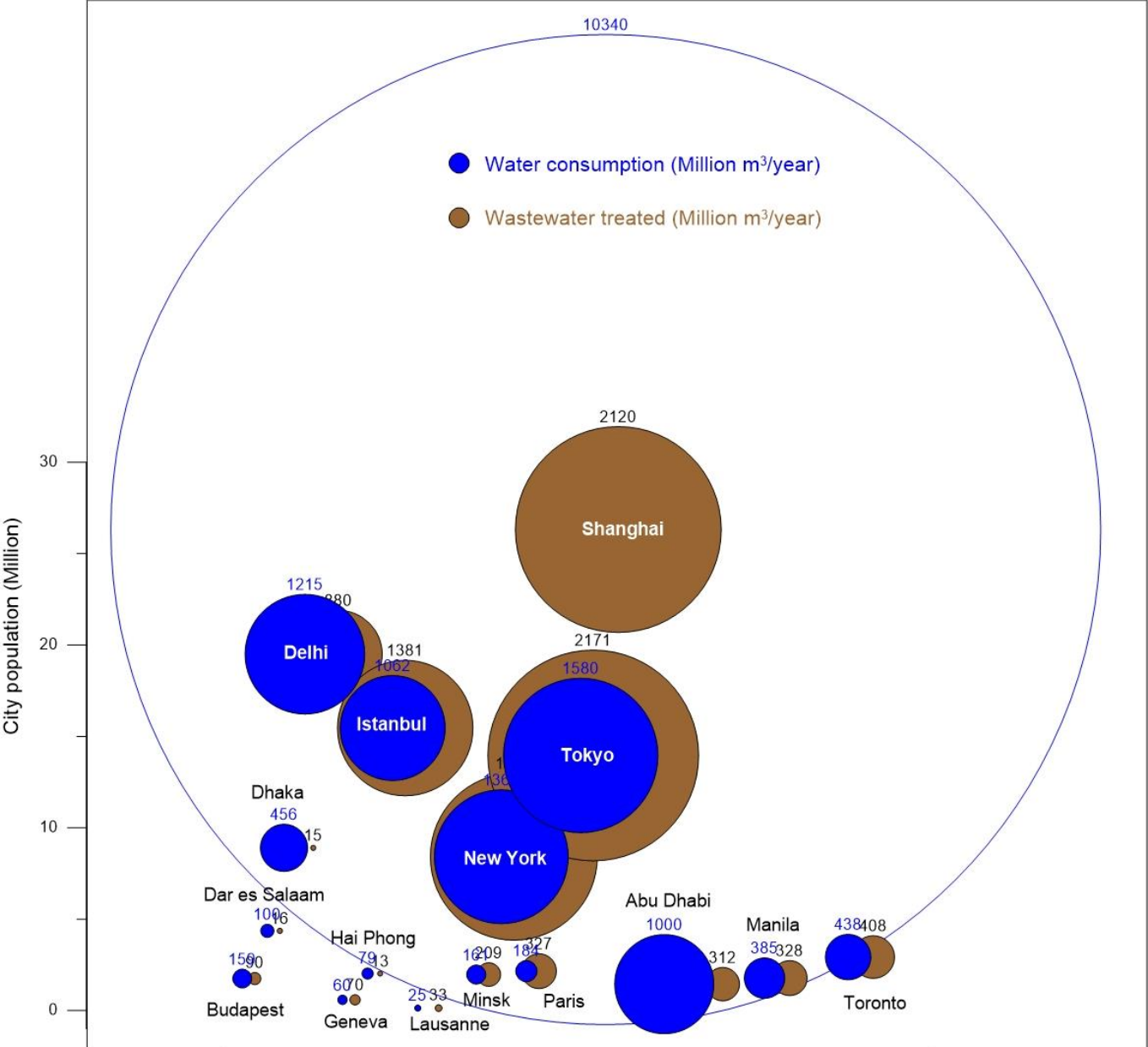


GENEVA (State): 60 Million m³



MINSK: 161 Million m³ in 2018

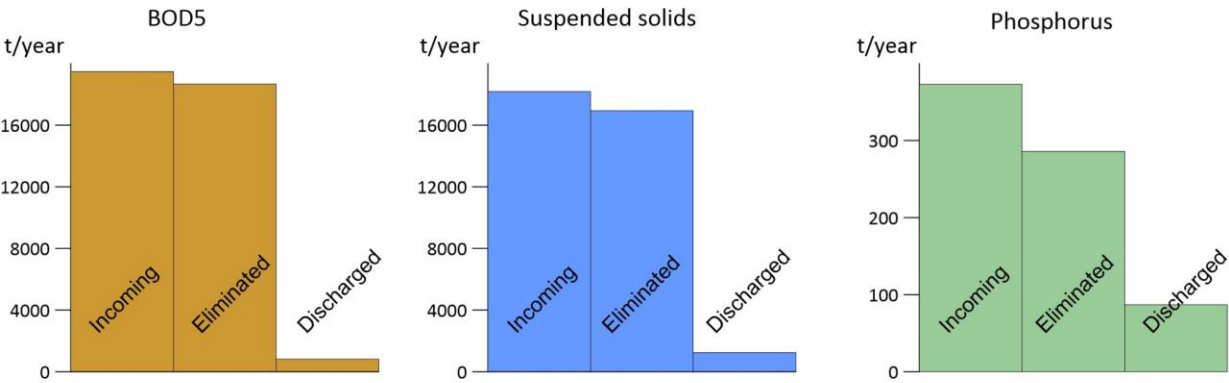
Water & wastewater data at city level



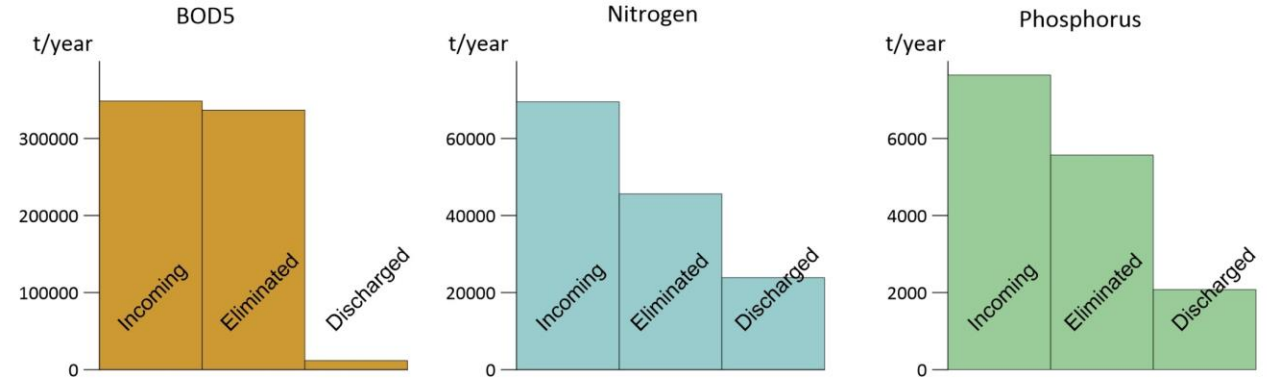
Monitoring the pollutants eliminated/discharged



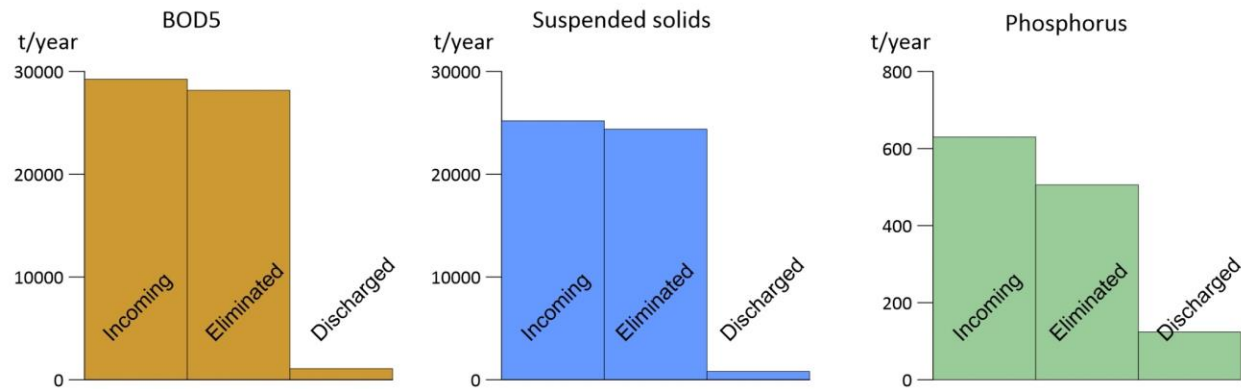
GENEVA



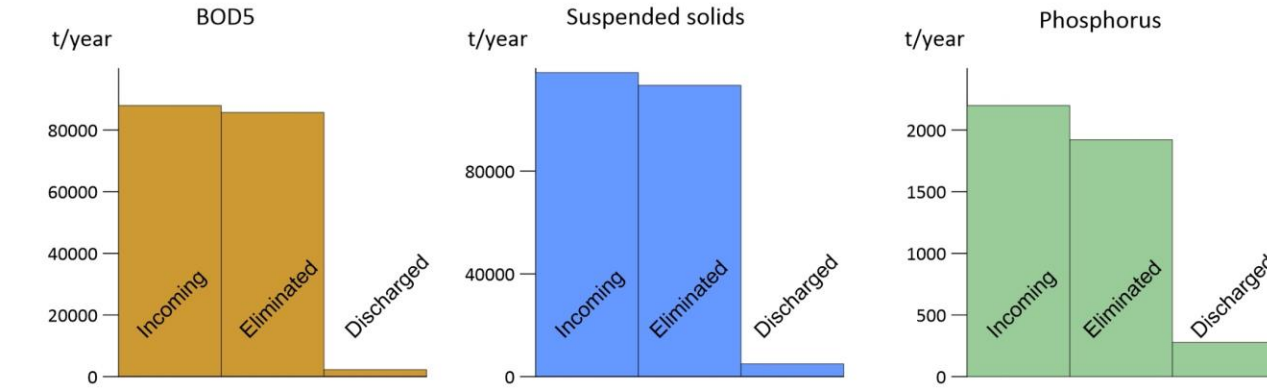
TOKYO



BUDAPEST



TORONTO



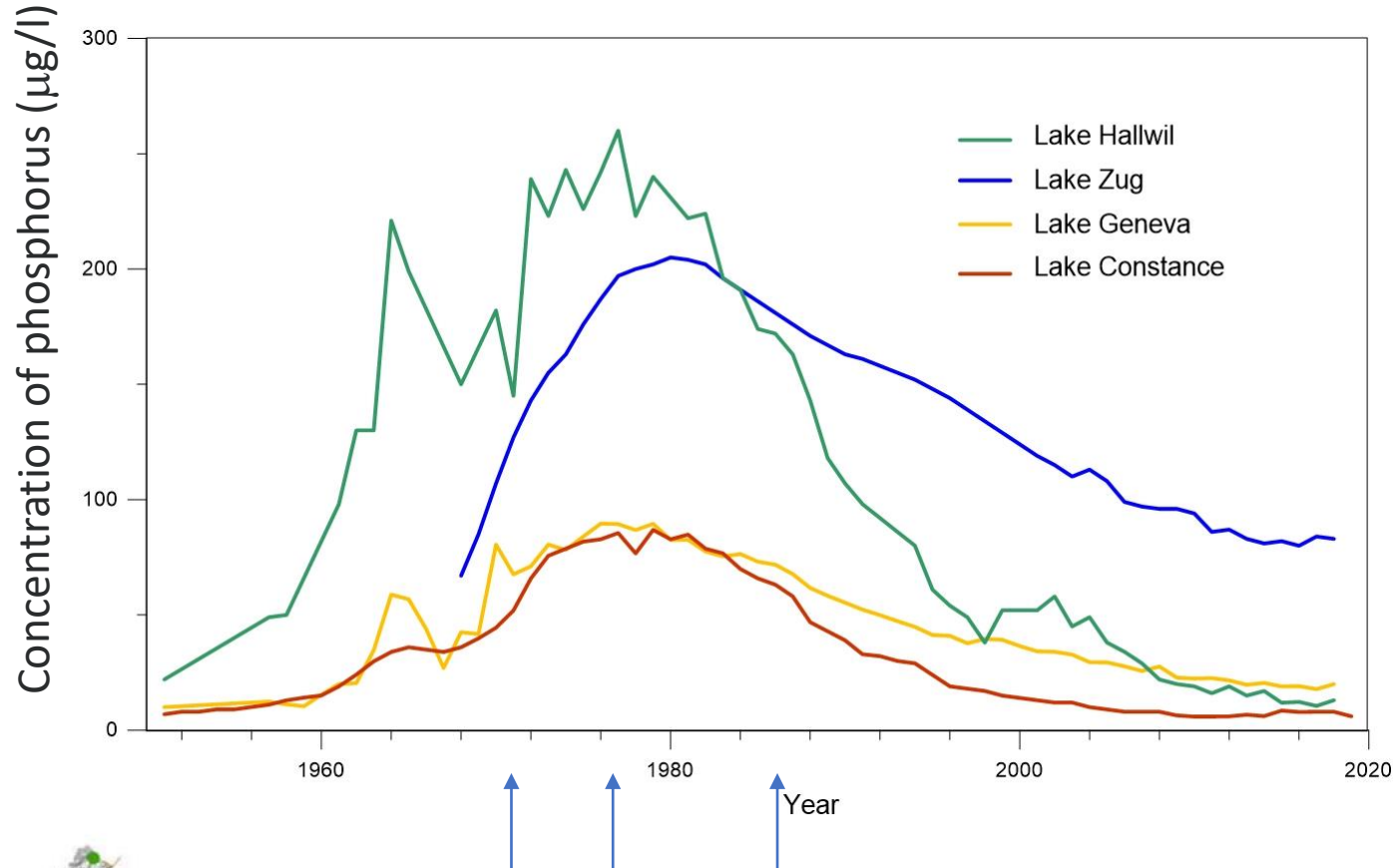
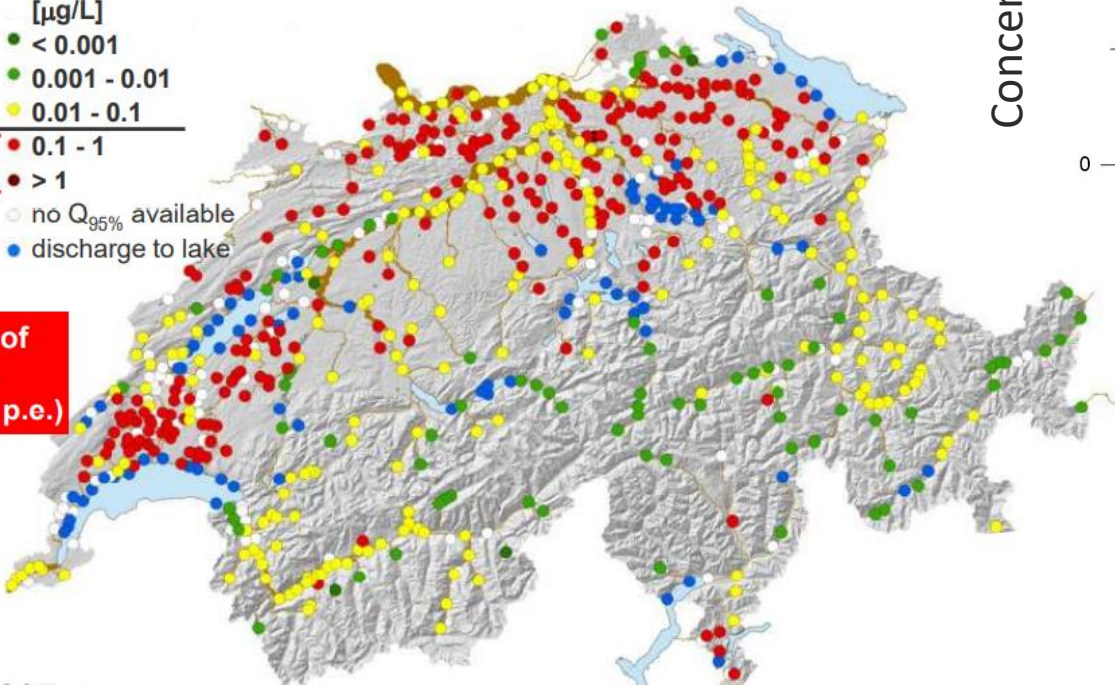
Wastewater treatment impact on water bodies (632)



Anti-inflammatory drug (diclofenac) concentrations in rivers at minimal river flow

- [$\mu\text{g/L}$]
- < 0.001
- 0.001 - 0.01
- 0.01 - 0.1
- 0.1 - 1
- > 1
- no $Q_{95\%}$ available
- discharge to lake

downstream of 224 WWTPs (30% of total p.e.)



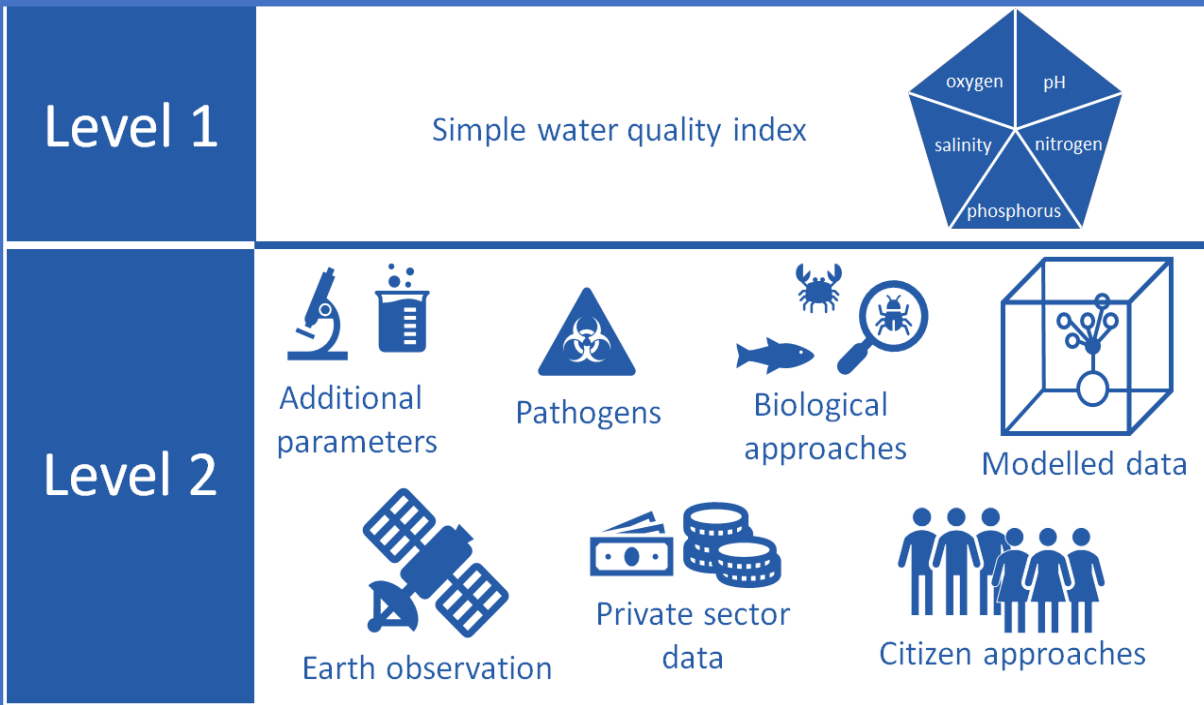
WWTPs, P precipitation, ban P in laundry detergents

Parameters for indicator 6.3.2 reporting

Parameter group	Parameter	River	Lake	Groundwater
Oxygen	Dissolved oxygen	x	x	
	Biological oxygen demand, Chemical oxygen demand	x		
Salinity	Electrical conductivity	x	x	x
	Salinity, Total dissolved solids			
Nitrogen*	Total oxidised nitrogen			
	Total nitrogen, Nitrite, Ammoniacal nitrogen	x	x	
	Nitrate**			
Phosphorous*	Orthophosphate	x	x	
	Total phosphorous			
Acidification	pH	x	x	

Level 2 data:

- Earth observation
- Citizen-derived data
- Biological approaches
- Additional parameters (e.g. heavy metals, pesticides, pharmaceuticals)



* Countries should include the fractions of N and P which are most relevant in the national context

** Nitrate is suggested for groundwater due to associated human health risks

Take home messages

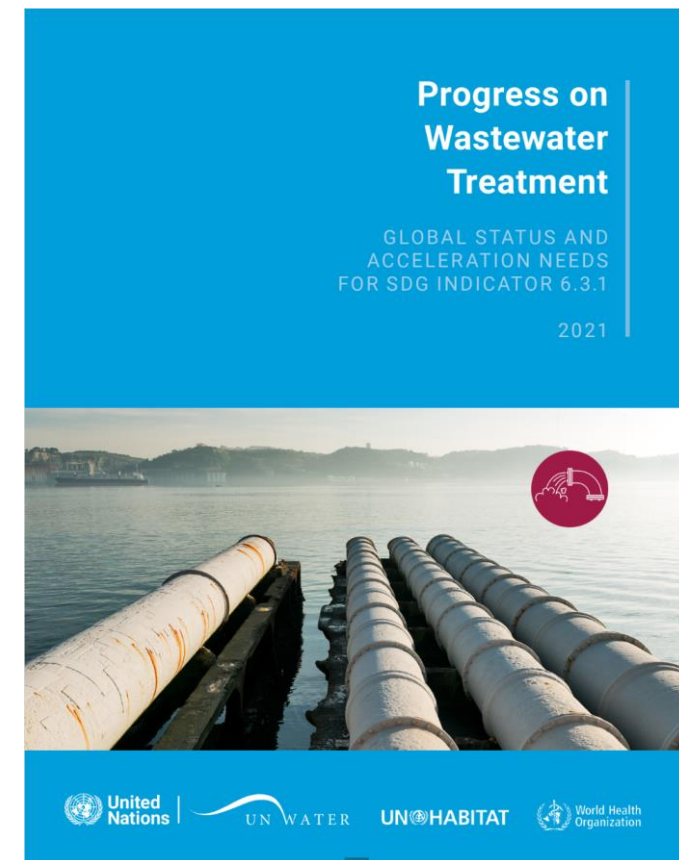
- To assess the flow of (non-) domestic wastewater generated & treated.
- To stimulate considerable progress in wastewater management/knowledge, even if it oversimplifies some technical realities (harmonization process for standardized data).
- To provide estimates on the quantities of organic substances (N, P) and parameters (BOD, COD).
- Monitoring wastewater generated by different economic activities may prompt stricter enforcement of pollution laws and discharge permits (polluter pays principle implementation).
- To provide necessary and timely information to decision makers and stakeholders to make informed decision to accelerate progress towards reducing water pollution, minimizing release of hazardous chemicals and increasing wastewater treatment and safe reuse.
- **Lack of accurate data reporting on wastewater volumes generated and treated, especially industrial, highlighting the challenges of complexity, cost and aggregation at national levels.**

References and links

UNSD: https://unstats.un.org/unsd/envstats/country_files

Eurostat: <https://ec.europa.eu/eurostat/web/environment/water>

OECD: https://stats.oecd.org/index.aspx?DataSetCode=water_treat



Time [10/34] +

10 values displayed

Drag and drop here for breakdown

Geopolitical entity (reporting) [35/35]

35 values displayed

Drag and drop here for breakdown

Time frequency: Annual

▼ Sewage sludge production and disposal (online data code: ENV_WW_SPD)
Source of data: Eurostat

Table

Line

Bar

Map

↓↑	TIME	2009 ↓	2010 ↓	2011 ↓	2012 ↓	2013 ↓						
GEO	↓											
Belgium		:	176.3	:	:	:	:	:	:	:	:	:
Bulgaria		39.4	49.8	51.4	59.3	60.3	54.9	57.4	65.8	68.6	:	:
Czechia		107.2	196.3	217.9	263.3	260.1	238.59	210.24	206.71	223.27	228.22	:
Denmark		:	141	:	:	:	:	:	:	:	:	:
Germany (until 1990 former territory of the FRG)		1 49.9	1 893.643	1 946.286	1 848.854	1 808.648	1 802.988	1 803.087	1 794.443	:	:	:
Estonia		21.8	18.8	18.3	21.7	18.8	20.34	19.14	18.34	:	:	:
Ireland		06.8	90	85.7	72.429	64.546	53.543	58.387	56.018	58.773	:	:
Greece		51.5	:	147	118.615	113.044	116.109	119.768	119.768	:	:	:
Spain		105.1	1 355.1	1 331.6	1 233.4	1 122.6	1 131.6	1 152.6	1 174.4	:	:	:
France		:	1 025	1 022	1 043	909	1 059	1 238	1 006	1 174	:	:
Croatia		29.6	30.3	31	16.951	16.015	16.306 (b)	17.937	19.72	17.6	19.23	:
Italy		:	1 102.7	:	:	:	:	:	:	:	:	:
Cyprus		9.2	7.083	6.815	6.533	6.123	6.16	6.695	7.408	7.166	8.406	:
Latvia		.679	21.388	19.757	20.114	22.816	22.079	21.922	25.923	24.94	24.591	:
Lithuania		:	51.307	51.83	45.087	41.433	40.712	44.454	44.422	42.488	44.192	:
Luxembourg		:	9.7	:	7.7	:	:	9.156	8.918 (e)	8.618 (e)	:	:
Hungary		49.3	170.34	168.33	160.6	170.469	163.116	172.007	215.078	264.713	217.842	:
Malta		0.82 (b)	1.24	6.06 (b)	10.5	9.64	8.5	8.44	10.77	10.3	8.28	:
Netherlands		150.1	351	350.8	346.4	339.1	345	354.6	347.6	:	341.03 (p)	:
Austria		:	262.8	:	266.3	:	239.044	:	237.938	:	234.481	:
Poland		163.3	526.7	519.2	533.3	540.3	556	568	568.329	584.454	583.07	:
Portugal		144.3	:	:	338.8	:	85.892	:	119.17	:	:	:
Romania		20.5	82.1	114.1	85.4	172.8	192.33	210.45	240.41	283.34	247.76	:
Slovenia		27.3	30.1	26.8	26.2	27.2	28.3	29.1	32.8	36.7	38.1	:
Slovakia		108.58	54.76	58.72	58.71	57.43	56.88	56.24	53.05	54.52	55.93	:
Finland		149	142.7	140.9	141.2	95.2	115.7	146	:	:	:	:
Sweden		112.4	203.5	200.1	207.5	207.9	200.5	197.5	204.3	205.6	210.9	:
Iceland		:	:	:	:	:	:	:	:	:	:	:
Norway		:	:	:	:	:	:	:	:	:	147.6	:

Wastewater treatment plant parameters [5/7] +

Search by label

Sludge production - total

SLP

Sludge disposal - total

SLD

Sludge disposal - agricultural use

SLD_AGR

Sludge disposal - compost and other applications

SLD_COMP

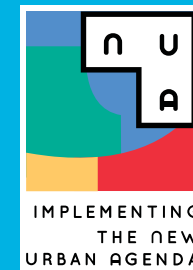
Sludge disposal - landfill

SLD_LAND

countryName	variableID	variableName	year	dataSource	dataSourceName	value	unitID	UnitName
Albania	160	Sewage sludge production (dry matter)	2015	59	UNSD	915,4000244	15	1000s of tonnes
Algeria	160	Sewage sludge production (dry matter)	2015	59	UNSD	54	15	1000s of tonnes
Andorra	160	Sewage sludge production (dry matter)	2015	59	UNSD	1,419999957	15	1000s of tonnes
Bahrain	160	Sewage sludge production (dry matter)	2015	59	UNSD	6,199999809	15	1000s of tonnes
Burundi	160	Sewage sludge production (dry matter)	2015	59	UNSD	3000	15	1000s of tonnes
Cayman Islands	160	Sewage sludge production (dry matter)	2015	59	UNSD	0	15	1000s of tonnes
China, Hong Kong Special Administrat	160	Sewage sludge production (dry matter)	2015	59	UNSD	381,3981628	15	1000s of tonnes
Iran (Islamic Republic of)	160	Sewage sludge production (dry matter)	2015	59	UNSD	2,630000114	15	1000s of tonnes
Iraq	160	Sewage sludge production (dry matter)	2015	59	UNSD	28	15	1000s of tonnes
Kuwait	160	Sewage sludge production (dry matter)	2015	59	UNSD	895602	15	1000s of tonnes
Liechtenstein	160	Sewage sludge production (dry matter)	2015	59	UNSD	1,15199995	15	1000s of tonnes
China, Macao Special Administrativ	160	Sewage sludge production (dry matter)	2015	59	UNSD	2,140000105	15	1000s of tonnes
Mauritius	160	Sewage sludge production (dry matter)	2015	59	UNSD	4,599999905	15	1000s of tonnes
Monaco	160	Sewage sludge production (dry matter)	2015	59	UNSD	1,991000056	15	1000s of tonnes
Republic of Moldova	160	Sewage sludge production (dry matter)	2015	59	UNSD	99	15	1000s of tonnes
Qatar	160	Sewage sludge production (dry matter)	2015	59	UNSD	40	15	1000s of tonnes
Senegal	160	Sewage sludge production (dry matter)	2015	59	UNSD	0,01159	15	1000s of tonnes
Serbia	160	Sewage sludge production (dry matter)	2015	59	UNSD	14316,91406	15	1000s of tonnes
Singapore	160	Sewage sludge production (dry matter)	2015	59	UNSD	67	15	1000s of tonnes
Zimbabwe	160	Sewage sludge production (dry matter)	2015	59	UNSD	7,610000134	15	1000s of tonnes
United Arab Emirates	160	Sewage sludge production (dry matter)	2015	59	UNSD	125,5	15	1000s of tonnes
Ukraine	160	Sewage sludge production (dry matter)	2015	59	UNSD	1489	15	1000s of tonnes

Thank you

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