FRAMEWORK FOR THE DEVELOPMENT OF ENVIRONMENT STATISTICS (FDES 2013)

MANUAL ON THE BSES: WASTEWATER STATISTICS

Session One: Environment Statistics Toolbox

Seventh Meeting of the Expert Group on Environment Statistics, New York 10-19 November 2020

United Nations Statistics Division

Outline

- Draft version presented at 2019 EGES
- Status of each part of the methodology sheet
- Observations, questions to audience and next steps

Manual of the Basic Set of Environment Statistics of the FDES 2013

Wastewater Statistics

(Topics 3.2.1: Generation and pollutant content of wastewater
3.2.2: Collection and treatment of wastewater
3.2.3: Discharge of wastewater to the environment)

Elaborated by the Environment Statistics Section of the United Nations Statistics Division, in collaboration with the Expert Group on Environment Statistics

Draft version presented at 2019 EGES

- A much less advanced draft from the current version was presented by UNSD at the 2019 EGES.
- Group work at the 2019 EGES following its presentation to plenary informed how to advance the draft. This is documented in the 2019 EGES Final Report.
- UNSD has since advanced the draft internally and circulated to 2020 EGES members earlier this year.
- Teleconferences with OECD, Eurostat, FAO, UN-HABITAT have informed its content.

2019 EGES Final Report: https://unstats.un.org/unsd/environment/FDES/EGES6/Final%20report.pdf

Status: 1. Scope

Sub-component 3.2: Generation and Management of Wastewater

Topic	Statistics and Related Information (**Bold Text - Core Set/Tier 1**; Regular Text - Tier 2; *Italicized Text - Tier 3*)		Category of Measurement	Potential Aggregations and Scales	Methodological Guidance
Topic 3.2.1: Generation and pollutant content of wastewater	a.	**Volume of wastewater generated**	Volume	▪ By ISIC economic activity ▪ By tourists ▪ National ▪ Sub-national	▪ UNSD: IRWS ▪ ISIC Rev. 4, Section E, Divisions 35-37 ▪ SEEA Water ▪ UNSD: Environment Statistics Section-Water Questionnaire
	b.	Pollutant content of wastewater	Mass	▪ By pollutant or pollution parameter (e.g., biochemical oxygen demand (BOD), chemical oxygen demand (COD), nitrogen, phosphorous, total suspended solids (TSS)) ▪ By ISIC economic activity ▪ National ▪ Sub-national	
Topic 3.2.2: Collection and treatment of wastewater	a.	**Volume of wastewater collected**	Volume	▪ National ▪ Sub-national	▪ UNSD: IRWS ▪ ISIC Rev. 4, Section E, Division 35 and 36 ▪ UNSD: Environment Statistics Section-Water Questionnaire
	b.	**Volume of wastewater treated**	Volume	▪ By treatment type (e.g., primary, secondary, tertiary) ▪ National ▪ Sub-national	
	c.	Total urban wastewater treatment capacity			
		1. Number of plants	Number		
		2. Capacity of plants	Volume		
	d.	Total industrial wastewater treatment capacity			
		1. Number of plants	Number		
		2. Capacity of plants	Volume		
Topic 3.2.3: Discharge of wastewater to the environment	a.	Wastewater discharge		▪ By treatment type (e.g., primary, secondary, tertiary) ▪ By recipient (e.g., surface water, groundwater, wetland, sea, land) ▪ By ISIC economic activity ▪ National ▪ Sub-national ▪ By source (point/non-point source)	
		1. **Total volume of wastewater discharged to the environment after treatment**	Volume		
		2. **Total volume of wastewater discharged to the environment without treatment**	Volume		
	b.	Pollutant content of discharged wastewater	Mass	▪ By pollutant or pollution parameter (e.g., BOD, COD, nitrogen, phosphorous) ▪ National ▪ Sub-national ▪ Net emission by ISIC economic activity ▪ By source (point/non-point source)	

Status: 2. Introduction/Relevance

- **Highlighting importance of this field of work**
- *…majority of wastewater is released to the environment with less than ideal levels of treatment… degraded aquatic ecosystems, increased waterborne illnesses, contaminated freshwater supply…*
- *potential benefits… in the immediate vicinity, are the financial returns which potentially cover all operational costs concerning wastewater management. Such financial benefits can stem from resource recovery… in the form of energy, nutrients, reusable water, and biosolids…*
- *there is need for a paradigm shift… for such a realisation to occur, the cost associated with neglecting any attention toward wastewater treatment must be factored into consideration by policy makers together with benefits from resource recovery.*

Status: 2. Introduction/Relevance

- *a notable absence of data in this field which contributes to the difficulty in managing wastewater…*
- *wastewater management is clearly gaining interest via policy demands… SDG indicator 6.3.1: "Proportion of domestic and industrial wastewater flow safely treated"*
- *should also be viewed as an integrated, holistic part of a big-picture environment system. Wastewater is not only crucial to every aquatic ecosystem and watershed, it is also closely knitted with other environmental components, include air, soil, energy and agricultural production, among others*

- Cross-reference to Water Resources and Marine Water Quality manual chapters is provided

Source: https://unstats.un.org/unsd/envstats/fdes/manual_bses.cshtml

Status: 3. Definitions and description of statistics

- Definitions proposed align well with those used for some decades in international data collections conducted by Eurostat, OECD and UNSD/UNEP.
- Those organizations' collections are very strong on measurements in volume (e.g. volumes generated, collected, treated, discharged).
- Pollutant content (e.g. Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), nitrogen, phosphorous) are also measured in mass, but not included in all data collections.
- Percentage reduction of BOD_5 and total suspended solids applied to definitions of primary, secondary and tertiary wastewater treatment.

- Analysis has deepened via some 20+ teleconferences on water statistics which started between Eurostat, OECD, FAO and UNSD. Recently, two other organisations (UN-HABITAT and WHO) have become involved, especially on wastewater..

Status: 4. International sources and recommendations

Reference provided to:

- International Standard Industrial Classification of All Economic Activities (ISIC, rev. 4).
- Framework for the Development of Environment Statistics (FDES 2013)
- UNSD/UNEP Questionnaire on Environment Statistics
- Manual on the Basic Set of Environment Statistics of the FDES 2013 - Water Resources Statistics
- International Recommendations for Water Statistics
- System of Environmental-Economic Accounting for Water (SEEA Water)
- Guidelines for the Compilation of Water Accounts and Statistics (draft)

Status: 4. Sources of global and regional environment statistics and indicators series

Reference provided to:

- Eurostat's database online: https://ec.europa.eu/eurostat/data/database Includes data on: treatment capacity of wastewater treatment plants; wastewater treatment plants by treatment level; generation and discharge of wastewater in volume; generation and discharge of wastewater by pollutant
- OECD's database online: https://stats.oecd.org/ Include tables on: wastewater treatment; and treatment capacity of wastewater treatment plants
- UNSD webpage: https://unstats.un.org/unsd/envstats/qindicators Includes tables on wastewater generation and treatment; proportion of wastewater treated; non-treated wastewater.

Status: 4. Sources of global and regional environment statistics and indicators series

- "…data availability is not at all comprehensive and in many cases, rather sporadic. Many known issues remain such as difficulty in aggregating wastewater plants' data to the national level, disconnect between national statistical offices and municipal level wastewater treatment plants, etc."

Status: 5. Data collection and sources of data

- At international level, Eurostat's, OECD's and UNSD's data collections are comprehensive for the whole world. Details on each collection including geographical scope, aggregation levels, variables collected, etc. are included.
- A unit of measurement issue remains outstanding (wastewater volumes measured in either millions of metres cubed/year, or in thousands of metres cubed per day).

- At national level, collaboration across multiple levels of government (municipal, state/provincial and national) is emphasized. Administrative records and statistical surveys are most common known sources.

Example of UNSD indicator table: Total wastewater generated (1000 cubic metres per day)

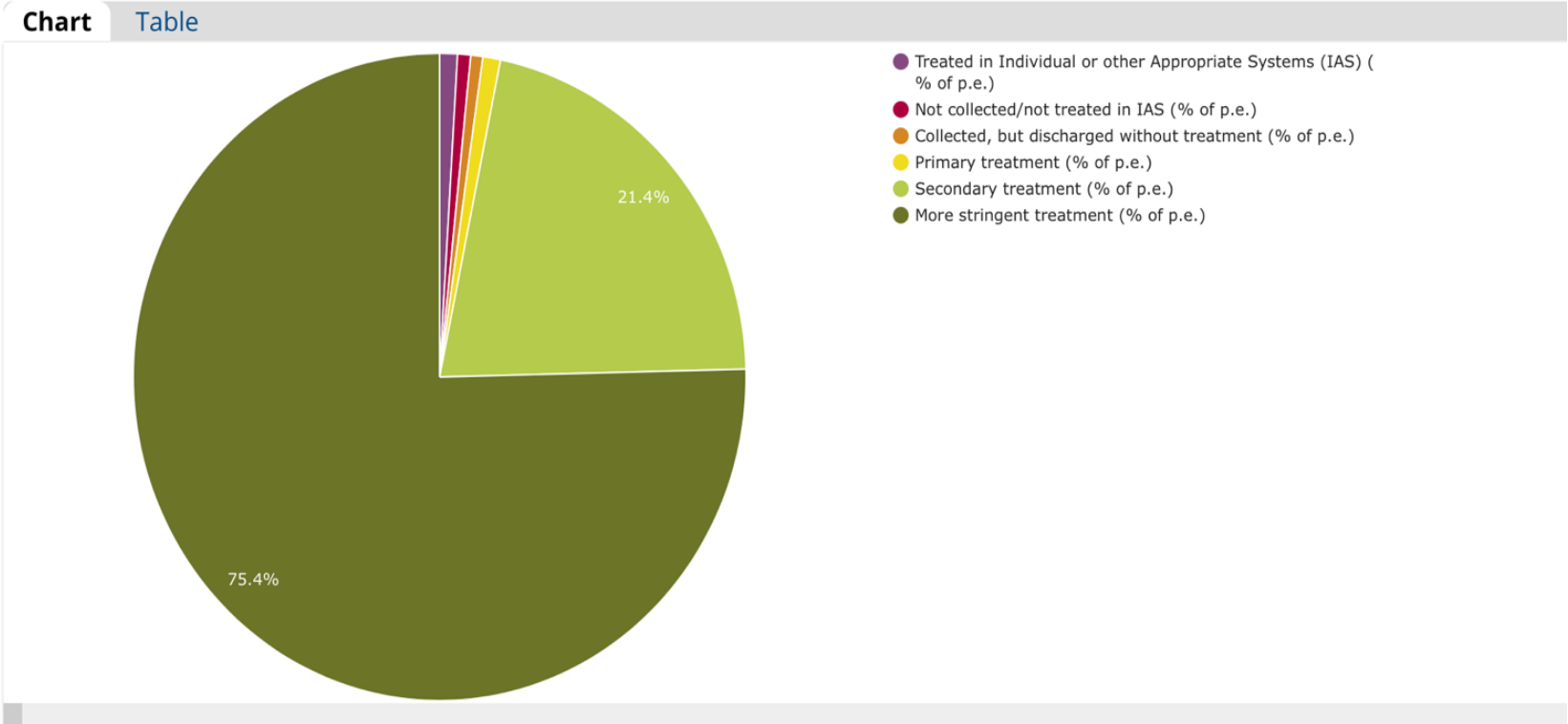
CountryID	Country	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
8	Albania	...	...	...	...	...	...	...	...	...	...	147.94	147.94	147.94	150.68
20	Andorra	43.37	44.44	45.95	47.04	47.67	47.71	48.10	46.40	51.37	56.97	54.94	54.82	...	...
51	Armenia	949.00	930.00	830.00	808.00	1,023.00	984.00	1,179.00	2,056.00	2,228.00	2,569.00	2,319.00	2,221.00	2,108.80	1,509.04
40	Austria	6,454.73	...	6,561.58	...	6,443.77	...	6,580.76	...	6,462.95	...	6,564.32	...	6,575.28	...
48	Bahrain	175.64	181.60	182.10	238.20	268.30	297.40	316.10	320.90	320.20	341.40	432.00	425.50	433.50	428.10
112	Belarus	...	...	...	...	...	...	...	...	...	...	...	...	...	...
60	Bermuda	...	8.66	9.17	8.77	8.29	8.73	8.03	7.65	8.14	8.60	8.84	8.11	9.22	6.70
70	Bosnia and H	311.72	318.07	277.83	294.01	302.22	483.14	481.69	445.98	487.82	472.82	428.43	442.87	...	...
76	Brazil	74,117.44	75,708.80	69,350.69	78,376.79	82,822.65	79,344.24	86,008.13	87,392.05	94,315.10	102,151.67	106,983.67	111,465.24	109,494.16	111,604.28
170	Colombia	...	...	...	...	...	...	...	...	...	...	2,848.56	2,896.47	2,764.03	...
188	Costa Rica	...	...	...	...	316.48	318.07	533.00	540.29	544.30	536.02	547.03	1,164.27	1,609.69	1,646.41
191	Croatia	...	...	...	...	1,150.67	1,175.33	1,109.58	1,172.59	1,093.14	1,109.58	1,109.58	1,073.96	1,090.40	1,027.39
818	Egypt	...	...	...	...	...	...	...	...	...	...	...	32,600.00	...	...
268	Georgia	...	...	...	...	...	...	...	...	...	...	...	...	...	...
364	Iran (Islamic I	6,070.00	6,350.00	6,643.00	6,887.00	7,203.00	7,537.00	7,807.00	7,495.00	7,723.00	8,123.00	8,304.00	8,519.00	8,748.00	9,221.00
368	Iraq	...	1,525.50	1,205.10	2,164.70	991.10	1,665.50	1,661.30	1,937.70	28,761.80	1,895.80	1,724.30	1,930.40	2,320.00	3,323.10
398	Kazakhstan	10,123.00	10,330.00	11,706.00	15,638.00	14,155.00	14,708.00	16,395.00	15,183.00	15,403.00	16,455.00	16,907.00	16,216.00	14,221.00	15,074.00
404	Kenya	...	...	...	...	...	...	...	...	...	...	...	...	...	4,865.47
442	Luxembourg	...	...	...	...	...	...	...	...	...	...	...	...	...	...
458	Malaysia	...	...	...	3,670.52	3,940.94	4,266.36	4,266.36	4,480.11	4,654.98	4,848.65	5,066.35	5,291.37	5,581.90	5,683.08
470	Malta	161.64	175.34	186.30	205.48	175.34	219.18	189.04	210.96	147.94	139.72	145.20	158.90	120.55	142.46
492	Monaco	17.55	17.22	17.09	16.39	17.62	18.05	17.80	17.06	16.14	18.99	21.17	16.83	16.59	16.08
499	Montenegro	...	33,131.00	...	...	35,849.00	...	...	30,501.00	...	...	...	...	...	...
504	Morocco	...	...	...	...	...	...	...	...	...	...	...	2,054.80	...	...
528	Netherlands	...	...	...	...	...	...	9,591.69	...	8,128.69	...	...	...	...	...
591	Panama	212.77	220.22	236.29	251.25	260.78	269.34	280.79	281.17	290.41	301.27	313.21	323.39	334.08	344.80
604	Peru	...	...	2,083.53	2,047.35	2,115.25	2,148.46	2,151.09	2,198.04	2,063.30	2,187.83	2,579.15	2,283.02	2,852.70	...
616	Poland	5,849.26	5,794.47	5,830.08	5,893.09	6,128.71	6,021.86	6,325.97	6,224.60	6,024.60	5,939.67	5,819.12	5,813.64	5,934.19	6,021.86
498	Republic of M	1,906.00	1,909.00	1,903.90	1,882.60	1,878.20	1,872.40	1,887.30	1,879.00	1,867.10	1,860.50	1,836.40	1,841.70	1,840.20	1,843.90
642	Romania	...	...	10,914.96	13,493.02	15,747.80	14,027.26	13,353.30	15,405.33	13,651.93	5,498.58	5,410.91	5,323.24	5,353.37	5,164.33
682	Saudi Arabia	...	...	...	...	...	...	5,857.23	6,030.00	6,225.00	6,373.78	6,538.70	6,698.00	6,852.73	7,002.00
688	Serbia	1,127.00	1,158.00	1,126.00	1,395.00	1,352.00	1,339.00	1,292.00	1,197.00	1,268.00	1,231.00	1,172.00	1,230.00	...	...

Status: 6. Uses and dissemination

Presentation and dissemination formats: (in addition to continual requests UNSD received for tabulated data, data straight from our database)

What levels of urban waste water treatment are applied in 'big cities' in the EU?

Fig. 8: Type of waste water treatment in 'big cities' in the EU



Source: European Environment Agency https://www.eea.europa.eu/data-and-maps/indicators/urban-waste-water-treatment/urban-waste-water-treatment-assessment-4

Status: 6. Uses and dissemination

Source: The World Bank https://blogs.worldbank.org/water/wastewater-treatment-critical-component-circular-economy

Status: 6. Uses and dissemination

Key users and demands:

- System of Environmental-Economic Accounting (SEEA) Central Framework and SEEA-Water
- SDG indicators

  6.3.1: Proportion of domestic and industrial wastewater flows safely treated (UNSD/UN-HABITAT/WHO)

  6.3.2: Proportion of bodies of water with good ambient water quality (UNEP)

Observations, next steps

- This methodology sheet on wastewater seems quite advanced. Please review and offer written comments by mid-December.
- UNSD's work on wastewater will see it continue liaisons with UN-HABITAT (esp. for SDG 6.3.1 as pertains to UN-HABITAT's, WHO's and UNSD's co-custodianship) and WHO (esp. for SDG 6.2 as pertains to WHO's custodianship)
- Could your country work with UNSD on a wastewater pollutant content pilot questionnaire in 2021?
- Could you or your office offer expert comments on **pollutant content** and related statistics, and their definitions?