

Progress in SDG indicator 6.3.1 on wastewater

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Seventh Meeting of the Expert Group on Environment Statistics

17 November 2020



SDG Target 6.3, indicator 6.3.1

- 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 untreated wastewater and substantially increasing recycling and safe reuse globally”
- Indicator 6.3.1: “Proportion of **domestic and industrial** wastewater flow safely treated”

Indicator reports

- Preliminary data from 67 countries (household waste only) published in 2018
 - Incomplete methodology, data coverage
- Plan for updated indicator report mid-2021
 - Better alignment with ISIC, databases of UNSD/UNEP, OECD and Eurostat
 - Data available by March can contribute to global SDG database update, UNSG report
 - Total wastewater generated, treated, and % treated
 - Household wastewater generated, treated, and % treated



WASTEWATER SOURCES

COLLECTING SYSTEMS

TREATMENTS

DISCHARGES

NON-POINT SOURCES

- Runoff Rainwater
- Agriculture

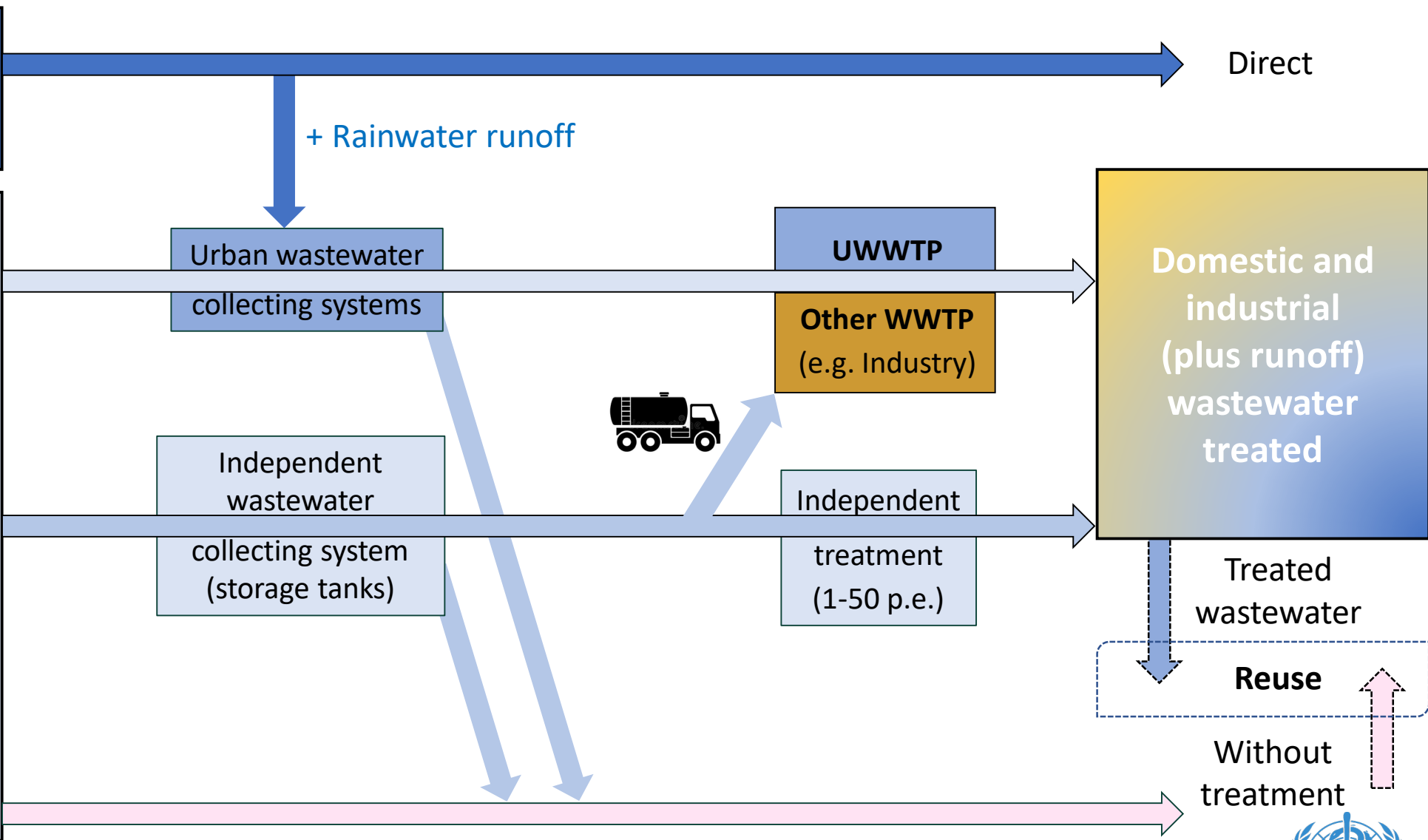
Wastewater generated by **POINT SOURCES**

Domestic Sector

- Private Households
- Services

Industrial Activities:

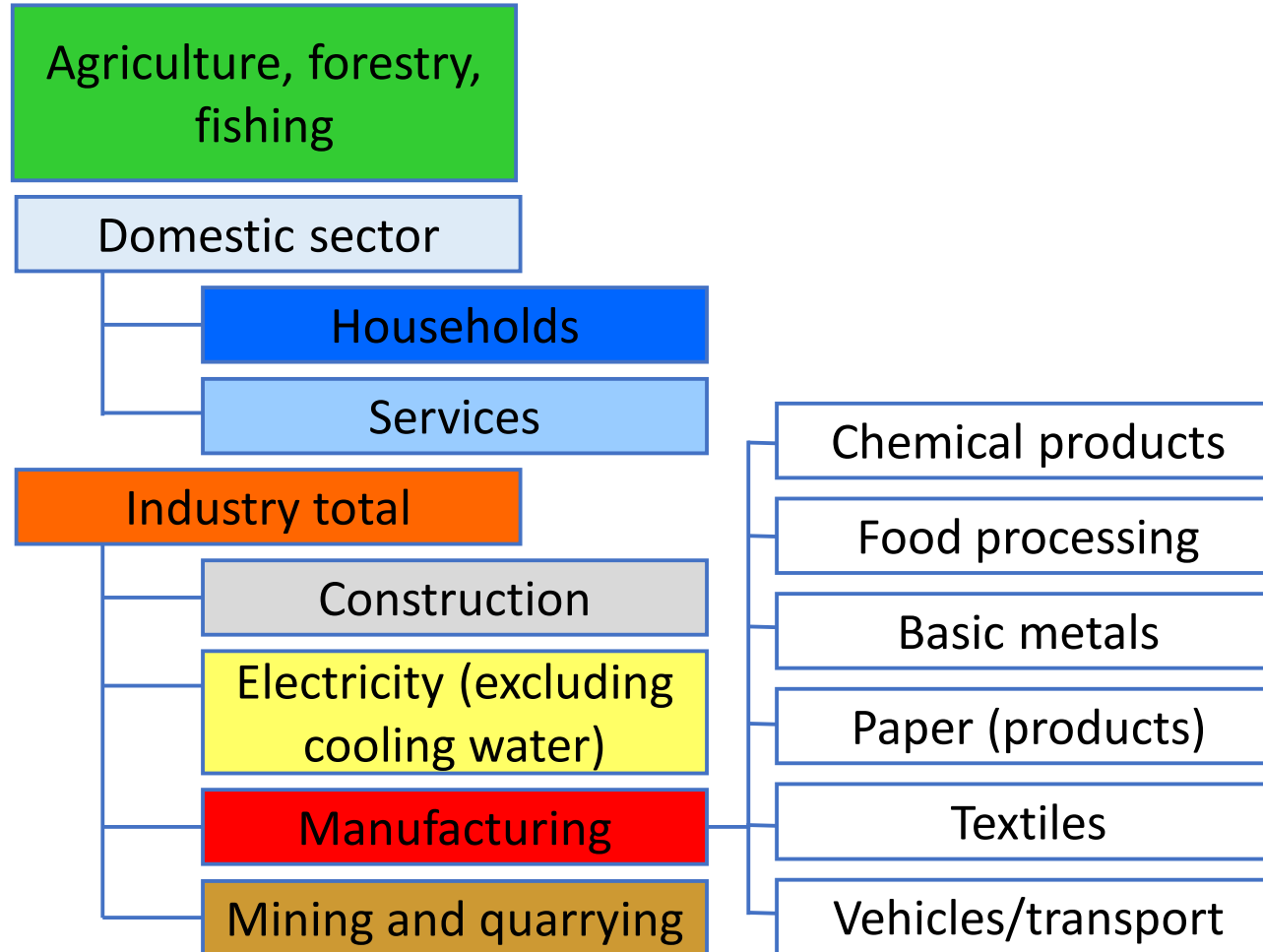
- Construction
- Pod./Distr. Electricity
- Manufacturing
- Mining and quarrying



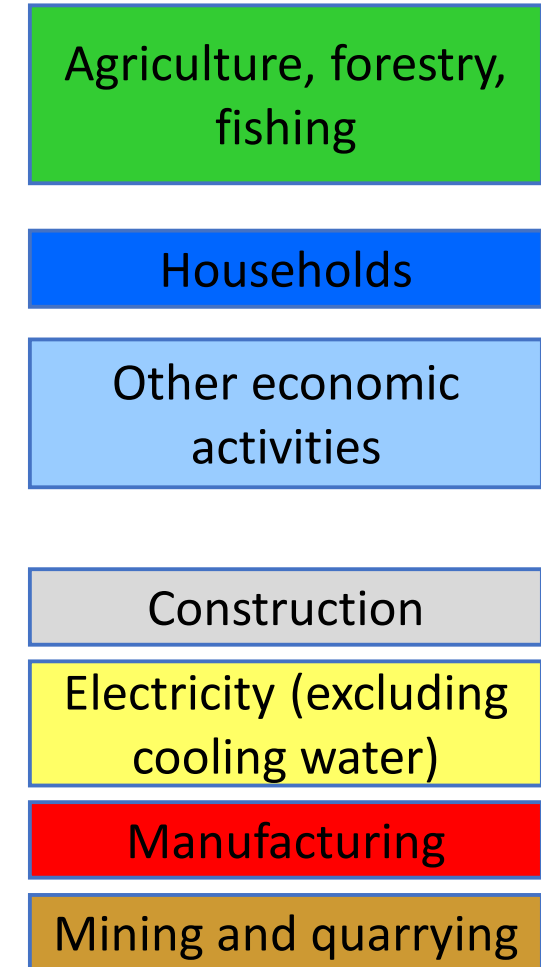
Modified from wastewater loading diagram (OECD/Eurostat, 2018)

Variables for the generation of wastewater

OECD/Eurostat (Mio m³/year)



UNSD (1000 m³/day)

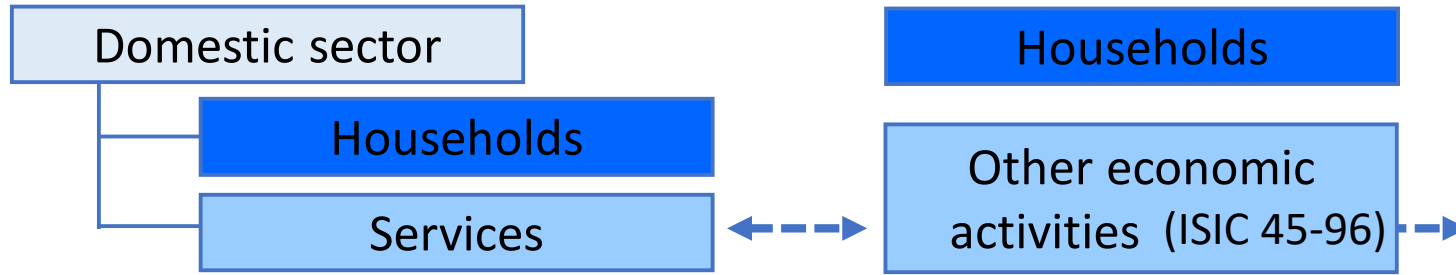


International Standard Industrial Classification
of All Economic Activities (ISIC) :

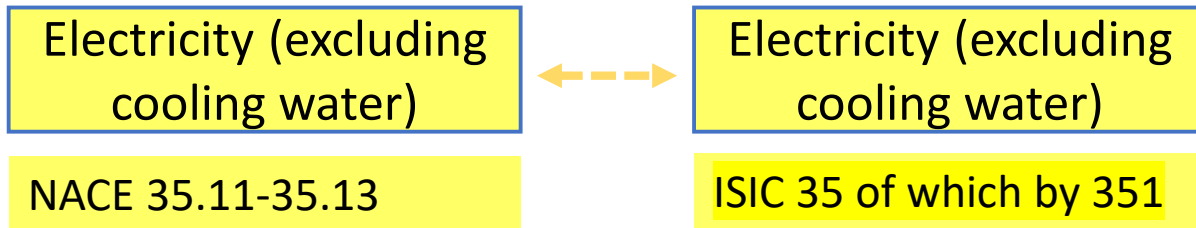
Division	Description
01-03	Agriculture, forestry and fishing
05-09	Mining and quarrying
10-33	Manufacturing
35	Electricity, gas, steam and air conditioning supply
36-39	Water supply; sewerage, waste management
41-43	Construction
45-47	Wholesale and retail trade; repair of motor vehicles
49-53	Transportation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

OECD/Eurostat

UNSD



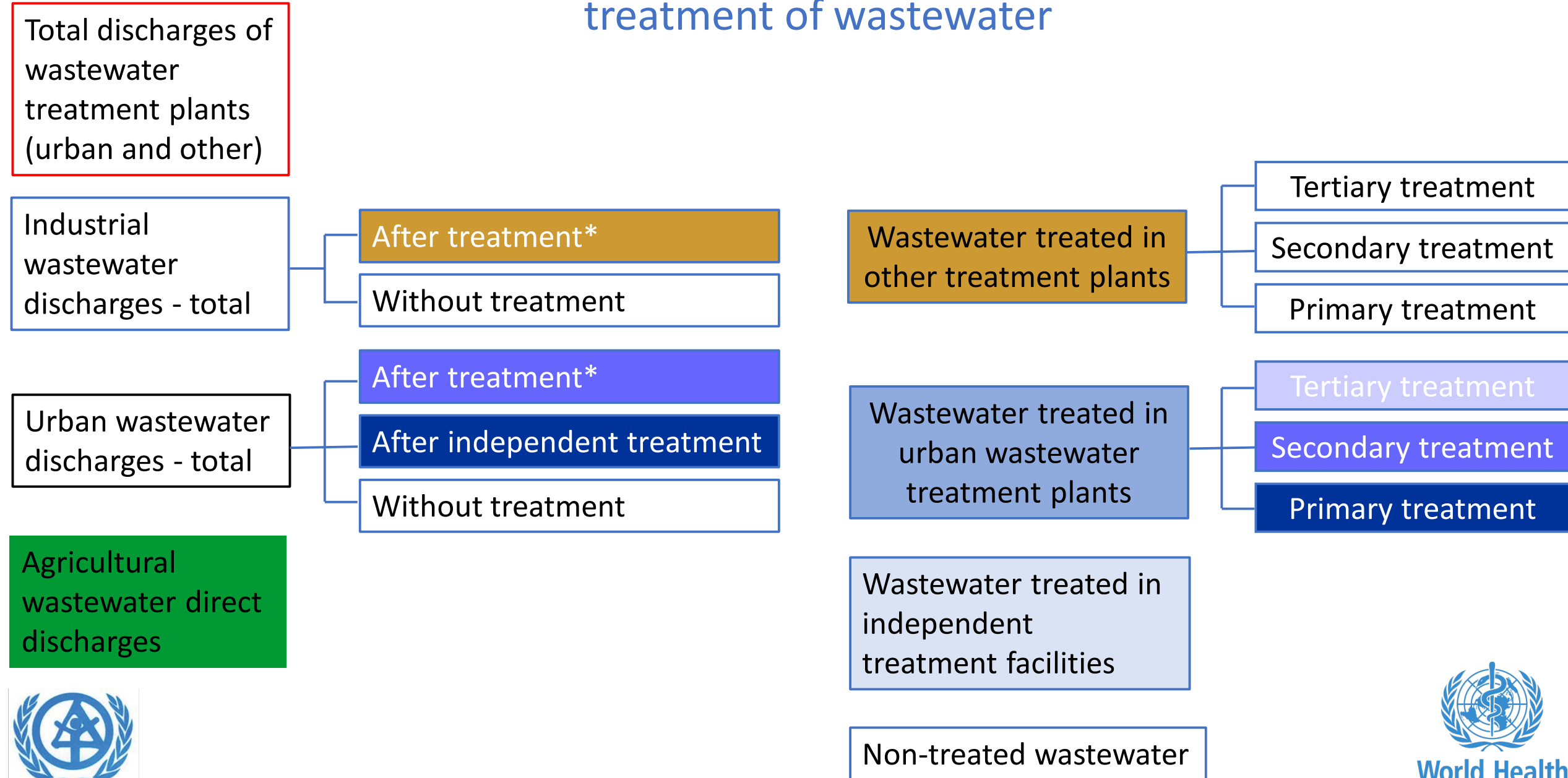
OECD/Eurostat: “**Services** are clearly identified by NACE Rev. 2 45-96 (e.g. offices, hotels, schools, universities and services) where water is mainly used for similar purposes as in households (sanitary, washing, cleaning, cooking, etc.). Private **households** refer to water use in the households sector, typically sanitary use of water, and from other activities.”



OECD/Eurostat (Mio m³/year)

Variables for the treatment of wastewater

UNSD (1000 m³/day)



* Secondary treatment since 2020 data collection



World Health Organization

Proportion of total wastewater flows safely treated

$$= \frac{\sum \textit{treated}}{\sum \textit{generated}}$$

$$= \frac{OTP_{2,3} + UWWTP_{2,3} + ITF}{WW_{hh} + WW_{serv} + WW_{ind}}$$

$$= \frac{WWT_{ind} + WWT_{urb}}{WW_{hh} + WW_{serv} + WW_{ind}}$$

Wastewater generated from :

- Households
- Services
- Industries

UNSD/UNEP questionnaire:

- Other Treatment Plants (secondary and tertiary)
- Urban WasteWater Treatment Plants (2^{ary} and 3^{ary})
- Independent Treatment Facilities

OECD/Eurostat questionnaire:

- Industrial wastewater discharges after treatment
- Urban wastewater discharges after treatment (including independent treatment)

Data collection status: total wastewater

- Main source of data: UNSD/UNEP, OECD, Eurostat questionnaires
- Previous rounds: 2004, 2006, 2008, 2010, 2013, 2016, 2018
- Current round: 2020
 - OECD, Eurostat, UNSD/UNEP distributing in November 2020
 - Some but not all will be available by March 2021 for update to SDG database
- SDG 6.3.1 indicator report to be published in mid-2021
 - As many countries as possible with data on generation and/or treatment
- Challenges
 - **Relatively few countries fully completing questionnaire**
 - Need to complete sections on both generation & treatment for proportion
 - Treatment: any treatment / at least secondary treatment

Proportion of household wastewater flows safely treated

$$\begin{aligned} &= \frac{WW_{hh \text{ treated offsite}} + WW_{hh \text{ treated onsite}}}{WW_{generated, household}} \\ &= \frac{\left(WW_{generated, hh \text{ with sewer connections}} \times \textit{Treatment}_{WWTP} \right) + \left(WW_{generated, hh \text{ with septic tanks}} \times \textit{Treatment}_{septic tanks} \right)}{WW_{generated, household}} \end{aligned}$$

Data collection status: household wastewater

- Previous report: 67 countries in 2018 report
 - Linked to 6.2 data collection and analysis
- Current round: >120 countries expected for 2020 report
 - Linked to 6.2 data collection and analysis
 - Also UNSD/UNEP, OECD, Eurostat data
 - Also other national data on wastewater treatment, efficiency
- WHO country consultation
 - November 2020 – January 2021
- Challenges: same as for total wastewater, but also
 - **Lack of data on household generation of wastewater**
 - **Lack of data on on-site treatment (septic tanks)**
 - Treatment: any treatment / at least secondary / compliant with national standards

Discussion

- What are some of the **main impediments** for countries being able to fully complete the questionnaire and provide data for indicator 6.3.1?
- What **additional information** would be required for the monitoring of the target?
- Is there a channel for communication between the NSO and **municipal level wastewater treatment plants**? If not, could one be established? Is there a need for other institutions (e.g. regulatory authority, state/provincial authority) to be involved?
- For countries with communication channels between municipal level wastewater treatment plants and the NSO, are these **formalized** e.g. with “memorandum of understanding” or similar documentation?

Extra slides

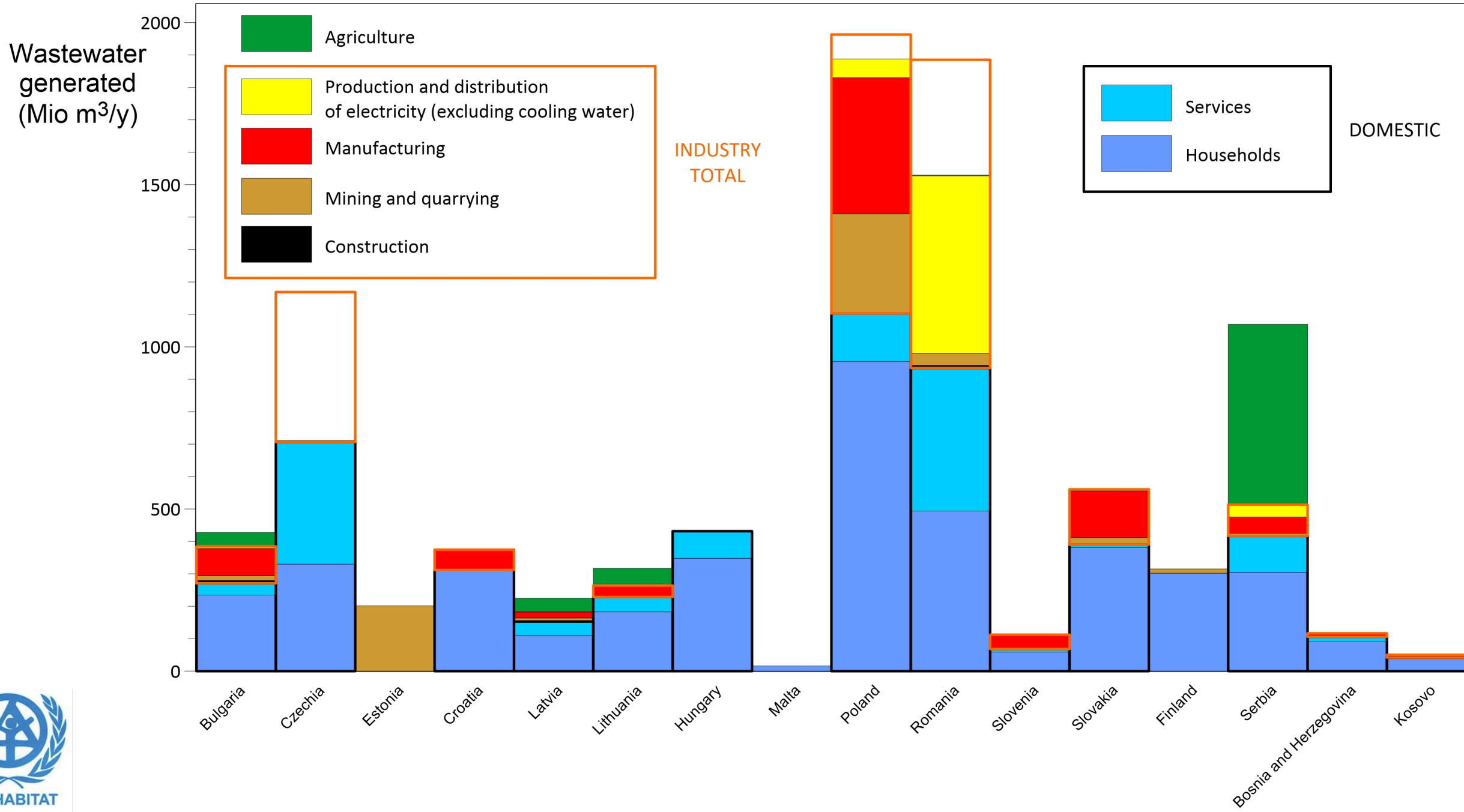
Previous Metadata

- Previous Metadata also based on ISIC, SEEA, IRWS
- Aim was to collect data on
 - Wastewater generated from households: from SDG indicator 6.2.1
 - Wastewater generated from industries: from inventories of industries
- Aim was to report separately on
 - Amount of WW generated from households that is safely treated
 - Amount of WW generated from industries that is safely treated

Revised Metadata

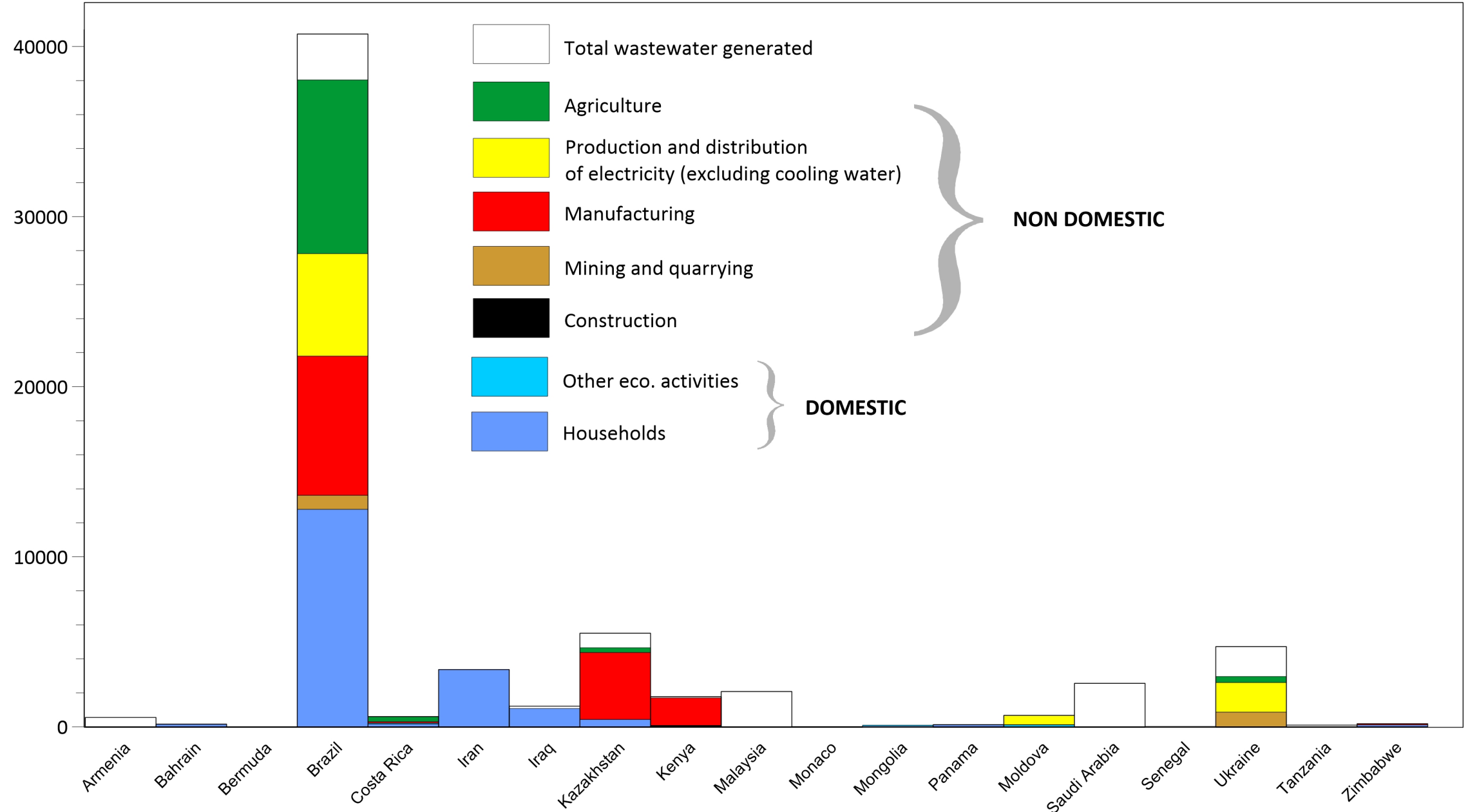
- Not always possible to disaggregate volumes treated by type of wastewater
 - Centralized treatment treats mixtures of wastewaters coming from different sources
- New emphasis on total wastewater, aligning with UNSD/OECD/Eurostat data
 - Total wastewater generated
 - Disaggregated into industries/services (ISIC codes), and households (non-ISIC)
 - Total wastewater collected and treated
 - Disaggregated into primary, secondary, tertiary
 - Disaggregated into centralized/on-site treatment
- Where possible, disaggregated treatment by type of wastewater
 - Domestic and industrial

Wastewater generated by point sources in 2017 (Mio m³/y) in European countries (Eurostat 2020)



Wastewater generated by point sources in 2017 (Mio m³/y) (UNSD 2020)

Wastewater generated (Mio m³/y) in 2017



Monitoring definitions (UNSD/OECD/Eurostat)

Wastewater treated in **other treatment plants**

Treatment of wastewater in any non-public treatment plant, i.e., Industrial Wastewater Treatment Plants (IWWTPs), hotels, army camps, hospitals, etc. which have their own treatment plants (septic tanks excluded).

Wastewater treated in **urban wastewater treatment plants**

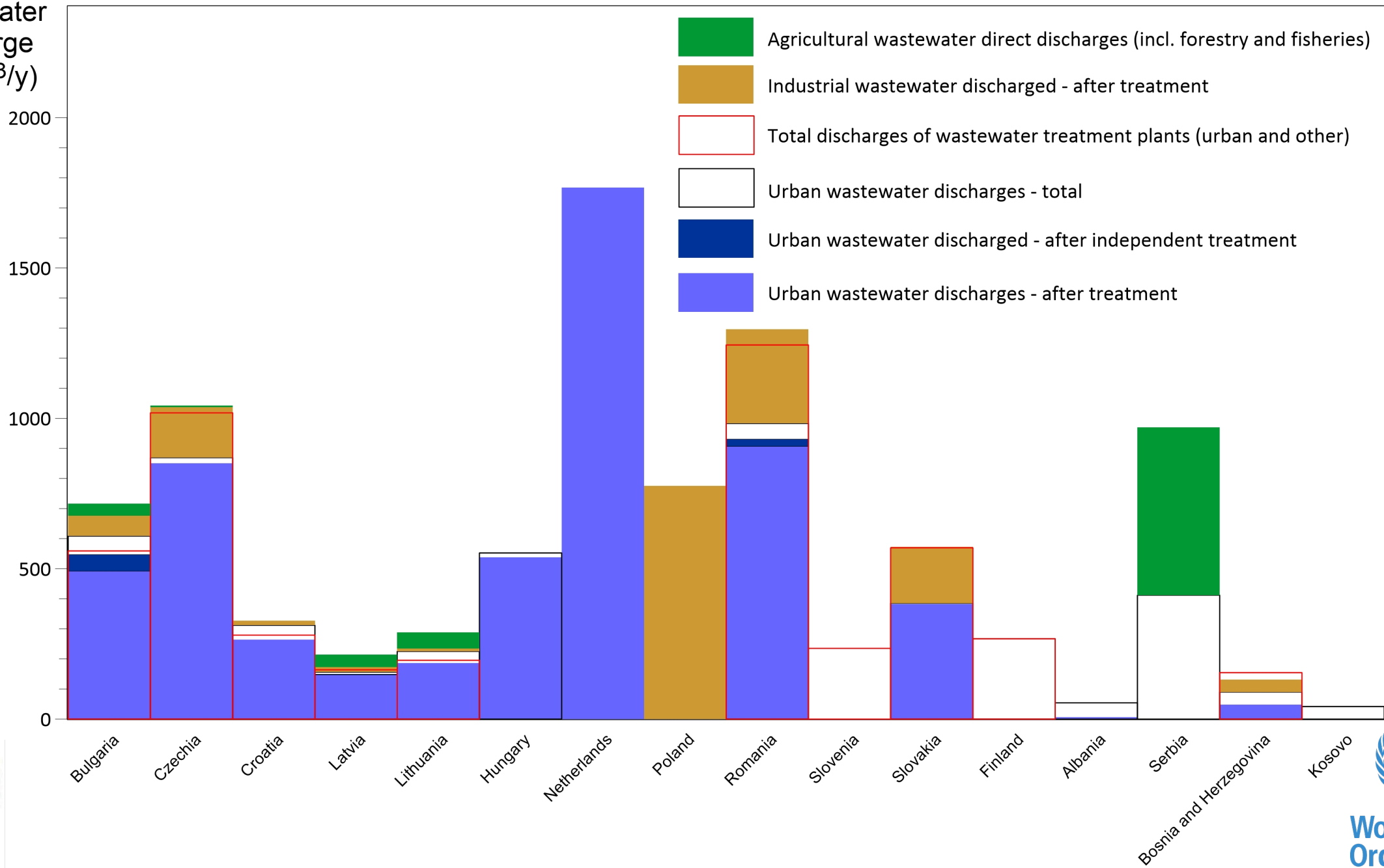
Usually operated by public authorities or by private companies working by order of public authorities (includes wastewater delivered by trucks).

Wastewater treated in **independent treatment facilities**

Collection, preliminary treatment, treatment, infiltration or discharge of domestic wastewater from dwellings generally between 1 and 50 population equivalents, not connected to a wastewater collection system (septic tanks).

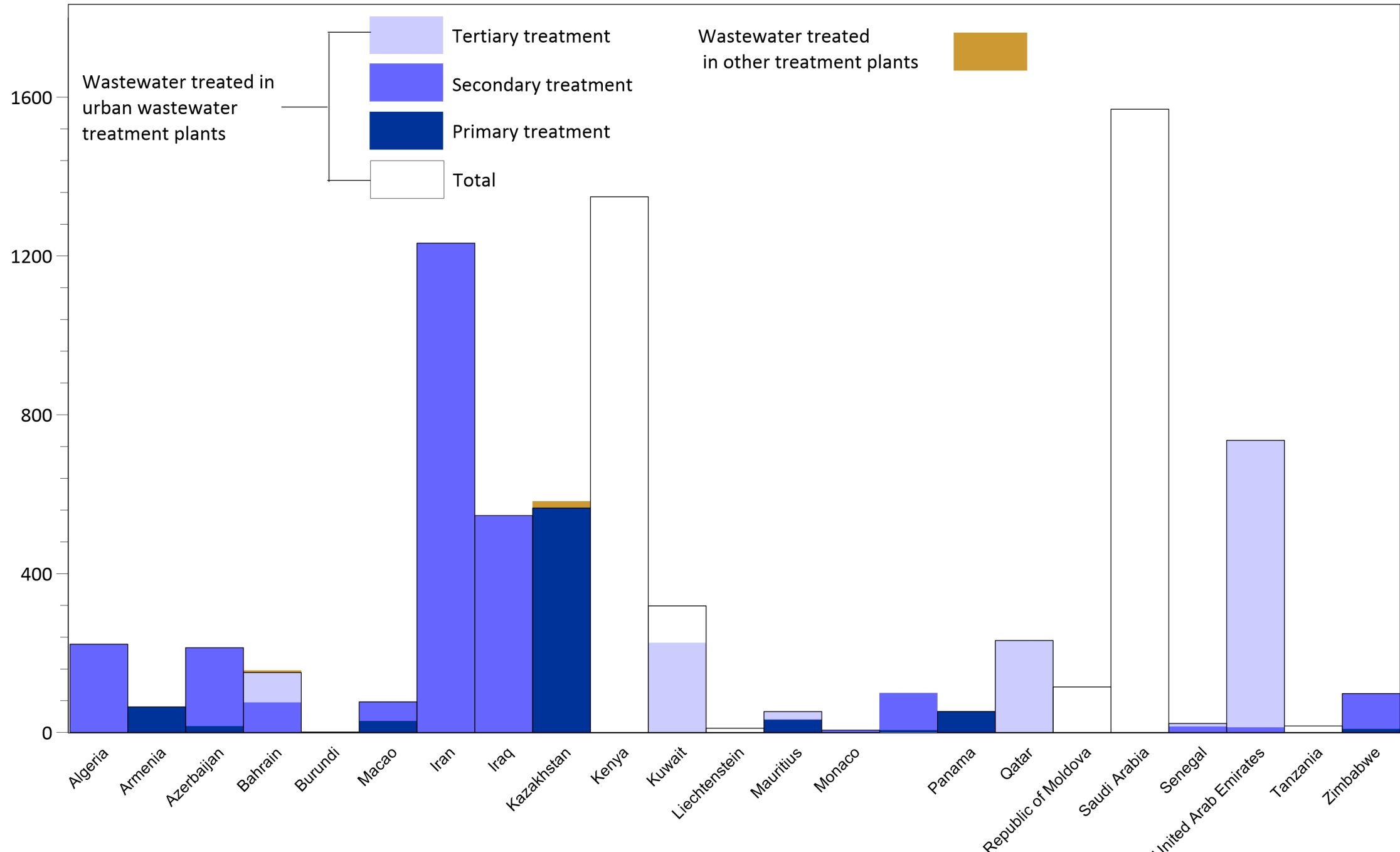
Treated wastewater discharge in 2017 (Mio m³/y) in European countries (Eurostat 2020)

Wastewater discharge (Mio m³/y)



Treated wastewater volume in 2017 (Mio m³/y) (UNSD 2020)

Wastewater treated (Mio m³/y) in 2017



Forward perspective for a PROGRESSIVE MONITORING APPROACH?

The target 6.3 wording calls to “minimizing **release of hazardous chemicals and materials**” and “substantially increasing recycling and safe **reuse** globally.”

Possible to use the same sources of data (OECD/Eurostat, → UNSD) and without developing supplementary indicators → linkages with 6.3.2 (ambient water quality), 6.4 (water use/stress), 6.5 (water resources management), 6.6 (aquatic ecosystems)

Level 1

Wastewater **generated** (by sources) and wastewater **treated** (by type and level of treatment)
in volume

Level 2

Wastewater **pollutant** loads (for select pollutants)
in mass

Level 3

Wastewater recycling and safe **reuse**
in volume

SDG Targets and indicators

- Target 6.2: “By 2030, achieve **access to adequate and equitable sanitation** and hygiene for all and **end open defecation**, paying special attention to the needs of women and girls and those in vulnerable situations”
- Indicator 6.2.1: “Proportion of population using (a) **safely managed sanitation services** and (b) a hand-washing facility with soap and water
- 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 untreated wastewater** and substantially increasing recycling and safe reuse globally”
- Indicator 6.3.1: “Proportion of domestic and industrial wastewater flow **safely treated**”



Comparison

- 6.2.1 Population using safely managed sanitation services
- Ratio of **populations**
- All people use sanitation services
 - Some services are eligible for 'safely managed' and some are not
- Only considers household services
 - Not e.g. schools, health care facilities, workplace
- 6.3.1 Proportion of domestic wastewater flow safely treated
- Ratio of **volumes**
- All people generate wastewater
 - Some wastewater is eligible for 'safely treated' and some is not
- Only considers household wastewater
 - Not Services (at this stage)



Comparison

- 6.2.1 Population using safely managed sanitation services
- Excludes
 - Shared sanitation facilities
- Includes
 - Dry sanitation systems
 - On-site and off-site treatment
 - Secondary or better treatment (nominal)

- 6.3.1 Proportion of domestic wastewater flow safely treated
- Excludes
 - Dry sanitation systems
- Includes
 - Shared sanitation facilities
 - On-site and off-site treatment
 - Secondary or better treatment, or (if available) compliance with applicable standards (e.g. effluent discharge permits)



Proportion of population using safely managed sanitation services

$$= \frac{Pop_{onsite,treated,not\ shared} + Pop_{sewered,treated,not\ shared}}{Pop_{total}}$$

$$= \frac{Pop_{onsite,treated,not\ shared}}{Pop_{total}} + \frac{Pop_{sewered,treated,not\ shared}}{Pop_{total}}$$

$$= \left(\frac{Pop_{onsite}}{Pop_{total}} \times \frac{Pop_{onsite,not\ shared}}{Pop_{onsite}} \times \frac{WW_{treated\ onsite}}{WW_{generated\ onsite}} \right) + \left(\frac{Pop_{sewered}}{Pop_{total}} \times \frac{Pop_{sewered,not\ shared}}{Pop_{sewered}} \times \frac{WW_{treated\ sewered}}{WW_{generated\ sewered}} \right)$$



Proportion of total wastewater flows safely treated: outstanding issues

- Requires two numbers (treated AND generated) → excludes many reporting countries
- Units: Annual volumes in 1000 m³/day (UNSD) and Million m³/year (Eurostat/OECD))
- Ratio should decrease in the future... since more WW generated should be reported (industries)
- Wastewater receiving at least **secondary treatment**, or compliant to the effluent **national and local standards** (relies on specific water uses and potential reuse options) → not comparable
- Some ratios > 100% since more WW treated than “generated” (reported)
 - Combined sewers, runoff -> collection can exceed generation by over 50%
 - Data on

Proportion of domestic and industrial wastewater safely treated: outstanding issues

- Definition of 'domestic'
 - OECD/Eurostat: households and services
 - WHO data: households
- The physical flows of WW generated and treated are not physically related.
 - **Treated WW disaggregated by type** (e.g. urban and industrial) and/or level of treatment (e.g. secondary) **rather than by sources** (for WW generated)
 - Disaggregation is difficult using existing data, but may be possible with additional data:
 - Volumes generated
 - Volumes treated on-site
 - Volumes delivered to centralized treatment

Conclusion: next steps and timeline

- Publish indicator report (along with other SDG6 indicators) in mid-2021
 - Possibly including some data from 2020 round of questionnaires
 - Total wastewater, household wastewater
- Future work
 - Continue work to harmonize wastewater terms and definitions
 - Continue work to refine methods, e.g. produce time series
 - Compile data on wastewater from industries and services