Session 4.1: Manual on the Basic Set of Environment Statistics: Water Resources

Workshop on Environment Statistics and Information for Sustainable Development in the Arab Region

(Beirut, Lebanon, 12-16 November 2018)

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

Content

FDES Sub-Component 2.6 Water Resources

Topic 2.6.1: Water resources			
Inflow of water to inland water resources		▪ National ▪ Sub-national ▪ By territory of origin and destination	▪ UNSD: IRWS ▪ UNECE Standard Statistical Classification of Water Use (1989) ▪ UNSD: MDG Indicator 7.5 Metadata ▪ FAO AQUASTAT ▪ SEEA Central Framework (2012) asset accounts ▪ SEEA Water ▪ UNSD: Environment Statistics Section-Water Questionnaire
1. **Precipitation** (also in 1.1.1.b)	Volume		
2. **Inflow from neighbouring territories**	Volume		
3. *Inflow subject to treaties*	Volume		
Outflow of water from inland water resources			
1. **Evapotranspiration**	Volume		
2. Outflow to neighbouring territories	Volume		
3. Outflow subject to treaties	Volume		
4. Outflow to the sea	Volume		
Inland water stocks		▪ National ▪ Sub-national	
1. Surface water stocks in artificial reservoirs	Volume		
2. Surface water stocks in lakes	Volume		
3. *Surface water stocks in rivers and streams*	Volume		
4. *Surface water stocks in wetlands*	Volume		
5. *Surface water stocks in snow, ice and glaciers*	Volume		
6. Groundwater stocks	Volume		

Topic 2.6.2: Abstraction, use and returns of water				
a.	**Total water abstraction**	Volume	▪ By type of source ▪ National ▪ Sub-national	▪ UNSD: IRWS ▪ UNECE Standard Statistical Classification of Water Use (1989) ▪ FAO AQUASTAT ▪ SEEA Central Framework (2012) ▪ SEEA Water ▪ UNSD: Environment Statistics Section-Water Questionnaire
b.	**Water abstraction from surface water**	Volume		
c.	Water abstraction from groundwater			
	1. **From renewable groundwater resources**	Volume		
	2. **From non-renewable groundwater resources**	Volume		
d.	Water abstracted for own use	Volume	▪ By ISIC economic activity ▪ National ▪ Sub-national	
e.	Water abstracted for distribution	Volume		
f.	Desalinated water	Volume	▪ National ▪ Sub-national	
g.	Reused water	Volume		
h.	Water use	Volume	▪ By ISIC economic activity ▪ By tourists ▪ National ▪ Sub-national	
i.	*Rainwater collection*	Volume	▪ National ▪ Sub-national	
j.	*Water abstraction from the sea*	Volume		
k.	Losses during transport	Volume	▪ By ISIC economic activity ▪ National ▪ Sub-national	
l.	*Exports of water*	Volume	▪ National ▪ Sub-national	
m.	*Imports of water*	Volume		
n.	*Returns of water*	Volume	▪ By ISIC economic activity ▪ By destination (e.g., inland water, land, sea, ocean) ▪ National ▪ Sub-national	

2. Introduction/Relevance

- Management of water resources in terms of quantities, distribution and quality is one of the world's most important priorities today.
- Water users span all sectors and economic activities; of these, agricultural uses for irrigation, livestock and food production place one of the greatest pressures on freshwater resources.
- Continued increases in demand result in increasing pressures on water and can lead to issues such as over-abstraction of groundwater resources.
- Climate change has potential impacts on water resource availability through more severe and frequent droughts and floods, changes in rainfall distribution, etc.

3. Definitions and description of the statistics

- Definitions from:
  - International Recommendations for Water Statistics (IRWS)
  - OECD/Eurostat Joint Questionnaire
  - United Nations Statistics Division/United Nations Environment Programme Questionnaire

- The FDES covers all **inland water resources**, regardless of quality, (e.g., all freshwater, brackish water, saltwater and polluted water) but excludes marine water resources.

- **Water resources**:
  - Water that flows over or is stocked in inland water bodies, including surface water, groundwater and soil water.
  - Either renewable or non-renewable.
    - Renewable: replenished by precipitation and represented by the annual flow of surface water and groundwater.
    - Non-renewable: contained in groundwater bodies (usually deep aquifers) that have a negligible rate of recharge relative to the size of the aquifer (i.e., the storage or stock), and cannot be replenished.

3. Definitions and description of the statistics

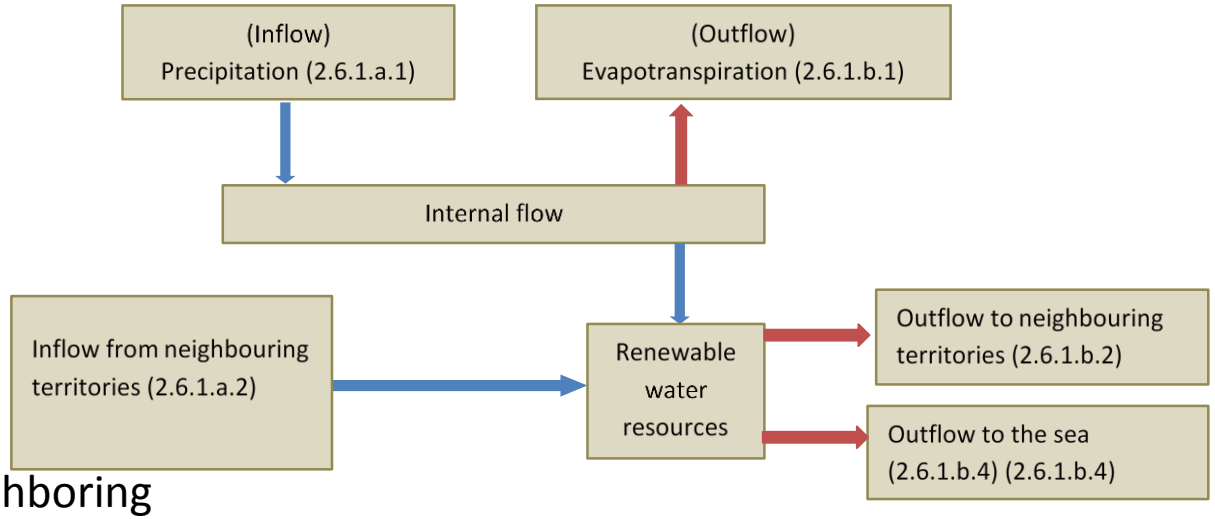
Classification of inland water bodies

1. Surface water bodies:
   - Artificial reservoirs
   - Lakes
   - Rivers and streams
   - Wetlands
   - Glaciers
   - Snow and ice
2. Aquifers
3. Soil water

3A. Water Resources (FDES Topic 2.6.1)

The volume of surface water and groundwater that moves into a territory from other territories.

Evapotranspiration: volume of water that enters the atmosphere by vaporization of water into a gas through evaporation from land and water surfaces and transpiration from plants.



Inflow from neighboring territories: Volume of surface water and groundwater that moves into a territory from other territories

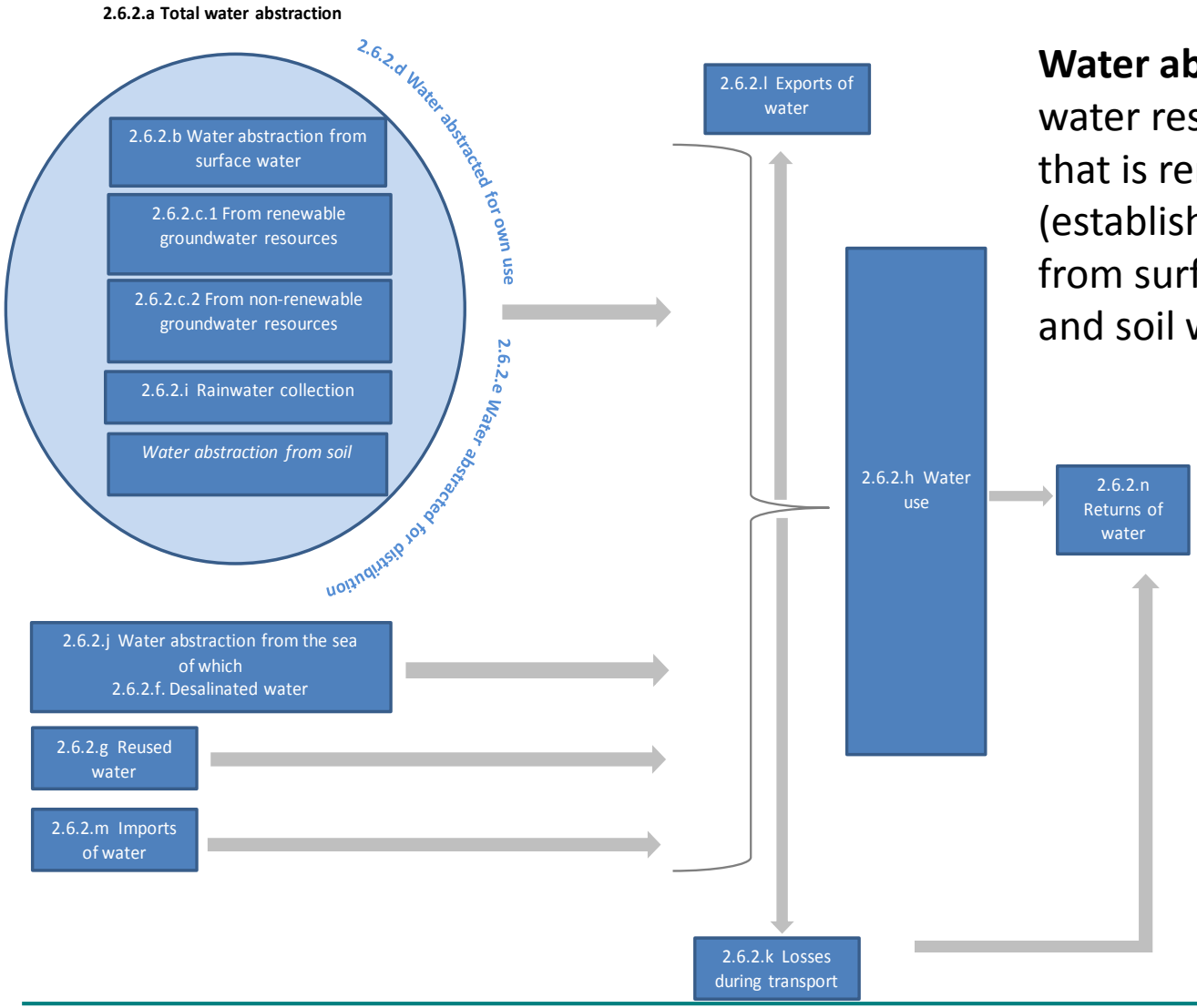
3A. Water Resources (Topic 2.6.1)

Stocks

Inland water stocks: Volume of water contained in surface water, groundwater and soil water within the territory of reference at a particular point in time. Includes freshwater, brackish water and saline water and water of all types of quality.

- Surface water stocks
  - Artificial reservoirs
  - Lakes
  - Rivers and streams
  - Wetlands
  - Snow, ice and glaciers
- Groundwater stocks (aquifers)

3B. Abstraction, use and returns of water (FDES Topic 2.6.2)



Water abstraction from inland water resources: Volume of water that is removed by economic units (establishments and households) from surface water, groundwater and soil water.

4. International sources and recommendations

4A. Classifications and groupings

- International Standard Industrial Classification of All Economic Activities (ISIC) for linking water statistics to the economy

4B. Reference to international recommendations, frameworks and standards

- Framework for the Development of Environment Statistics (FDES 2013)
- The United Nations Statistics Division/United Nations Environment Programme Questionnaire on Environment Statistics
- International Recommendations for Water Statistics (IRWS)
- System of Environmental-Economic Accounting for Water (SEEA Water)
- Guidelines for the Compilation of Water Accounts and Statistics

4. International sources and recommendations

4C. Sources of global and regional environment statistics and indicators series

- UNSD Environment Statistics and Indicators
  https://unstats.un.org/unsd/envstats/qindicators
- FAO: AQUASTAT
  http://www.fao.org/nr/water/aquastat/data/query/index.html?lang=en
- OECD database
  http://stats.oecd.org/
- Eurostat Water Statistics main tables and database
  http://ec.europa.eu/eurostat/web/environment/water/main-tables

5A. Data collection and sources of data: Water Resources (Topic 2.6.1)

- Main producers: National hydro and/or meteorological institutions (hydro meteorological institutions). Water and environmental authorities may provide some data.
- Main type of data: Hydrological/meteorological data and research. Often hydro meteorological institutions already produce water balances and/or data about water stocks.
- Scope: Water resources comprise all inland water resources of a country.
- Statistical unit: Inland water bodies => surface water bodies and aquifers.
- Reporting unit: Example: any information about the lake will have to be reported by a unit of the economy that owns, manages or monitors the lake or any part thereof (e.g., a water authority).

5A. Data collection and sources of data: Water Resources (Topic 2.6.1)

- Measurement unit: For water volumes cubic metres (m^3). When data are obtained from hydro meteorological institutions or other sources, often different units of measurement are used (for example height, e.g., mm of rainfall per year or flow, e.g., m^3 average inflow/second).
- Aggregation: by type of resources, e.g., water body, surface/non-surface, kind of water bodies, renewable/non-renewable resource.
- Temporal aspects: Calendar year vs hydrological year; long-term annual average (LTAA). Frequency of compilation of data (e.g. daily for precipitation vs LTAA for renewable water resources).
- Spatial aspects: Aggregation of data based on natural areas (watershed or river basin) or administrative areas.
- Validation: Usually conducted by hydro meteorological institutions and experts.

5B. Data collection and sources of data: Abstraction, Use and Returns of Water (Topic 2.6.2)

- Main producers: Water authorities and regulators, environmental authorities, municipalities, industries, and agricultural and irrigation authorities, and national statistical offices. Issues of overlap and non-comparability in the production of primary data about water abstraction.
- Main type of data: Water surveys and administrative data sources.
- Scope: All water abstracted and used at national, sub-national, regional and/or river basin level.
- Statistical unit: Establishments and households.
- Reporting unit: Public and private enterprises and establishments and municipalities that abstract, supply and/or use water. Also households for self-abstraction on their own land.

5B. Data collection and sources of data: Abstraction, Use and Returns of Water (Topic 2.6.2)

- Measurement unit: For water volumes cubic metres (m^3). However, for the collection of primary data, other units may be used.
- Aggregation: Type of water source; use; economic activity; recipient for water returns.
- Temporal aspects: Periodicity of primary data production on water abstraction usually annual, but occasionally quarterly or monthly. Compiled data normally disseminated annually.
- Spatial aspects: Important to disaggregate by basin or catchment areas or sub-national administrative units for policy user.
- Validation: Validation will need to be carried out by NSOs after receiving data from primary producers.
  - Check of expected order of magnitude
  - Consistency of time series
  - Cross-data checks, calculation of water balances and water use balances

6A. Uses and dissemination: Potential presentation/dissemination formats

Precipitation, monthly and long-term average, Guyana October 2016

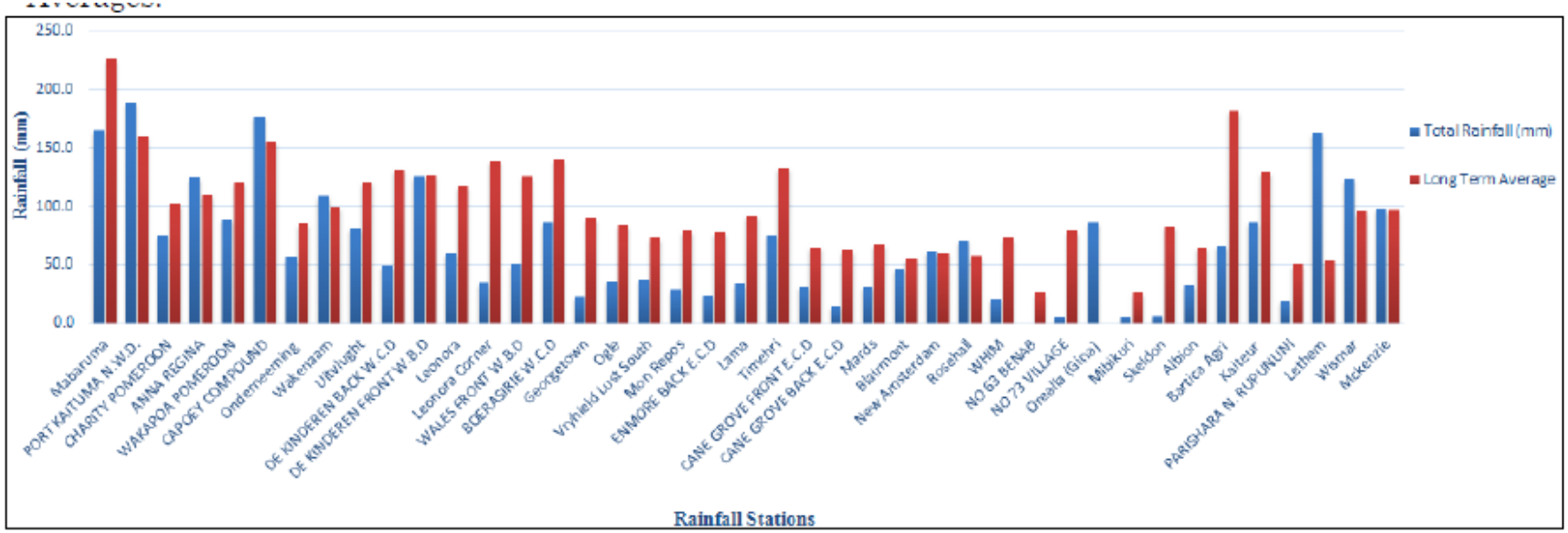
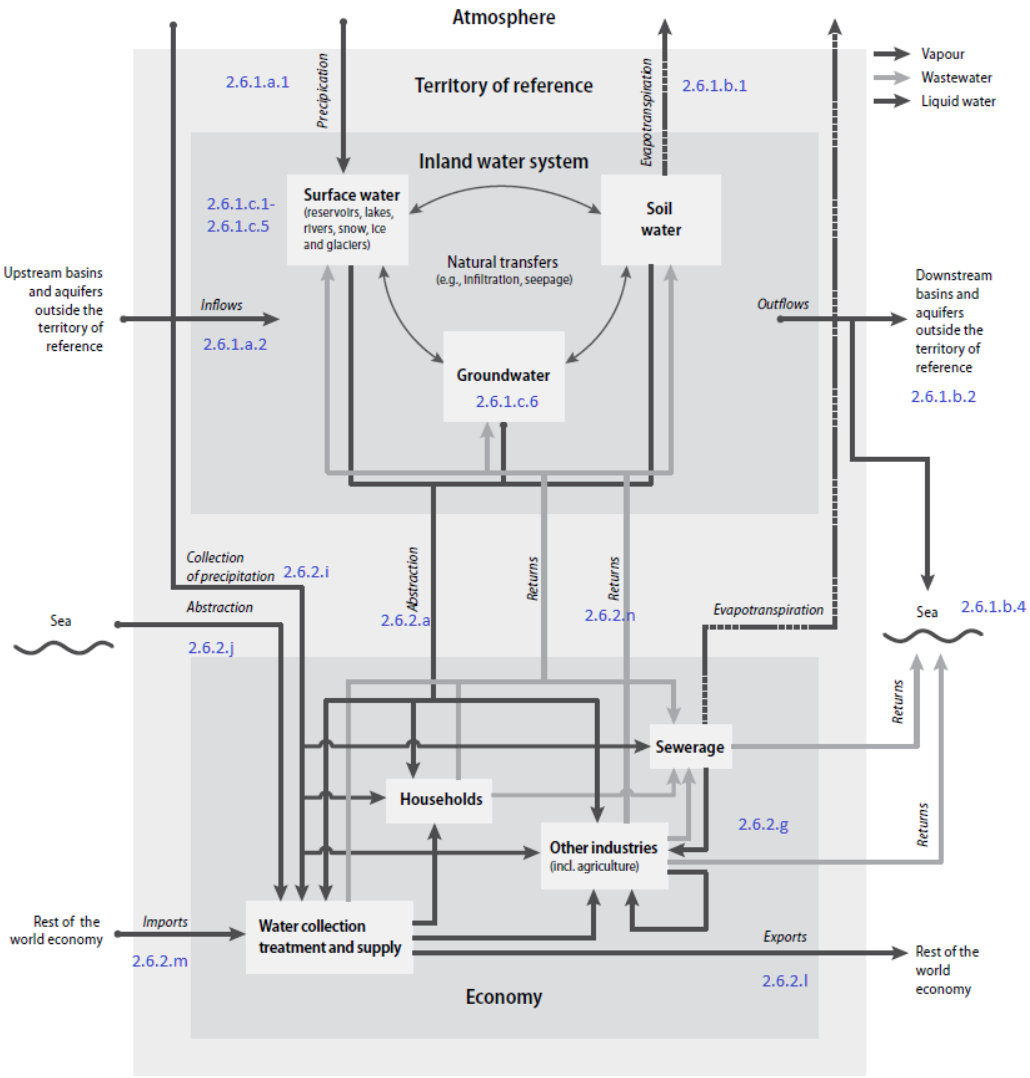


Figure1: Comparison of the accumulated rainfall and the long-term averages for selected stations for October, 2016.

6B. Uses and dissemination: SEEA accounts/tables that use these statistics



6C and 6D. Uses and dissemination: Indicators

- Water productivity = $\frac{Gross\ Domestic\ Product\ (GDP)}{Total\ annual\ freshwater\ abstraction\ \ (FDES\ 2.6.2.a)}$

- SDG Indicator 6.4.1: Change in water-use efficiency over time => under development, will measure the output over time of a given major sector per volume of water withdrawn.

- SDG Indicator 6.4.2: Level of water stress: freshwater withdrawal as a proportion of available freshwater resources (also known as water withdrawal intensity) = $\frac{total\ freshwater\ withdrawn\ by\ all\ major\ sectors\ (TWW)}{total\ renewable\ freshwater\ resources,actual\ (TRWR) - environmental\ water\ requirements(Env.)} * 100$

Thank you for your attention!

For more information please contact
the Environment Statistics Section
at the UN Statistics Division:
E-mail: envstats@un.org

website: https://unstats.un.org/unsd/envstats/