UNECE

Statistics on water resources

Data sources, stumbling blocks and simple data validation techniques

Michael Nagy (UNECE)

National Workshop on Environment Statistics and Sustainable Development Indicators
(Astana, Kazakhstan, 25-28 April 2017)

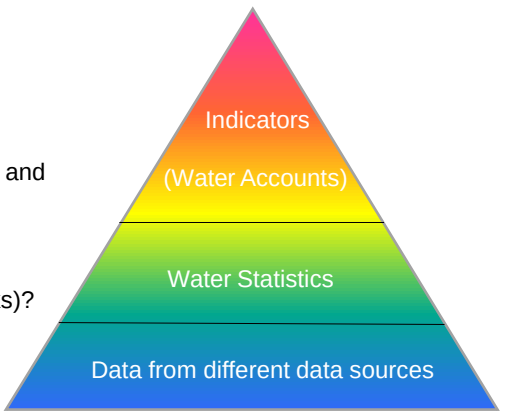
UNECE

Presentation Outline

How to validate statistics and indicators before dissemination?

How to make meaningful statistics (stumbling blocks)?

How to collect data?



1. Data sources

- Producing of statistics for template C-1 (Renewable Freshwater Resources) is a task of the National Hydrometeorological Institute.
- National Statistical Offices should be in a position to ask them the right questions, to understand and to (roughly) validate the data.

Clarifications with Hydrometeorological Institutes

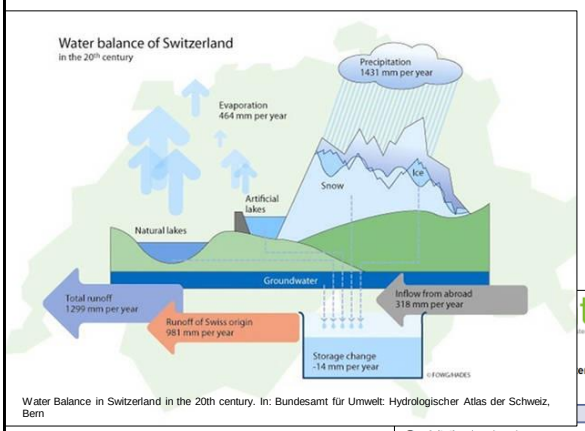
- Are annual water balances available, Long Term Annual Average (LTAA) or other?
- Does the national monitoring network qualify to calculate a national water balance?
- Which methods are used (e.g. following WMO Guide to Hydrological Practices), how are shared water bodies (e.g. border rivers) considered, etc.?
- Data is needed in terms of volume (not height)
- ACTUAL evapo-transpiration is needed

2. Stumbling Blocks

Data collection:
- Unit of measurement
- Transboundary waters
- ACTUAL evapotranspiration

Careful with the interpretation of results:
- Renewable freshwater resources:
  - Adding up (e.g. for a group of countries) will lead to double-counting
  - Ecological flow not considered
- National aggregates do not reflect seasonal or sub-national (river-basement) problems

Stumbling block: Unit of measurement



Water Balance in Switzerland in the 20th century. In: Bundesamt für Umwelt: Hydrologischer Atlas der Schweiz, Bern

Often you will get the data on water resources in terms of mm/year, km³/year or another unit.

Unit of measurement of template C1: **million m³/year!**

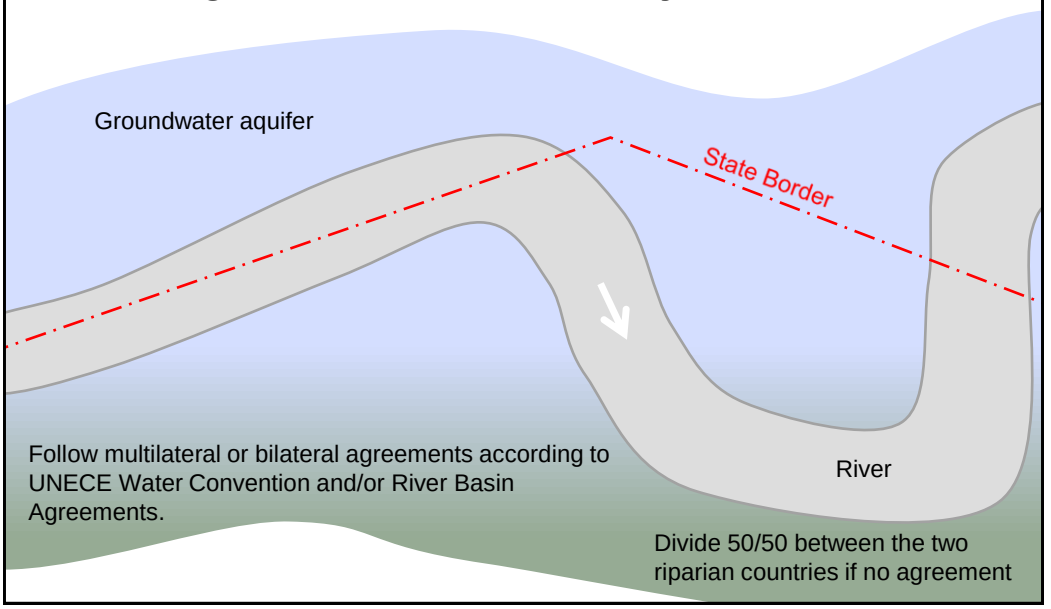
Food and Agriculture Organization of the United Nations

erm annual renewable water resources (RWR) by country (in km³/year, average)

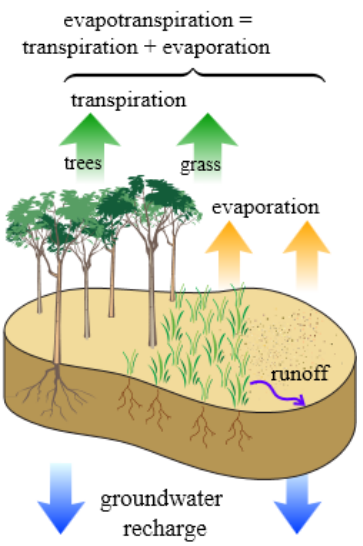
Georgia

Precipitation (mm/year)	[1]	1 026	
Area of the country (1000 ha)	[2]	6 970	
Precipitation (km³/year)	[3]	71.51	=([1]/1000000)x([2]x10)
Surface water: produced internally	[4]	56.9	(a)
Groundwater: produced internally	[5]	17.23	
Overlap between surface water and groundwater	[6]	16	(b)
Total internal renewable water resources	[7]	58.13	=[4]+[5]-[6]

Stumbling block: Transboundary waters



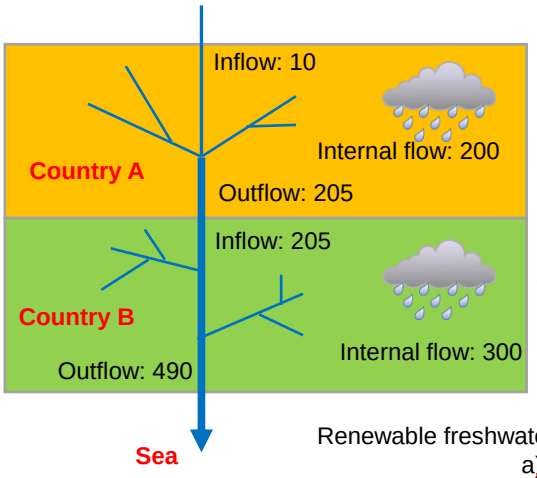
Stumbling block: ACTUAL evapotranspiration is needed!



You also might get data on the POTENTIAL evapotranspiration (ET), which is not needed for C1.

Potential ET represents the evapotranspiration rate of a short green crop (grass), completely shading the ground, of uniform height and with adequate water status in the soil profile. It is a reflection of the energy available to evaporate water, and of the wind available to transport the water vapour

Stumbling block: Interpretation of renewable freshwater resources (I)



Country A:
Renewable freshwater resources = 210= 200 + 10

Country B:
Renewable freshwater resources = 505 = 300 + 205

Renewable freshwater resources of countries A and B together?
a) ~~715?~~ b) ~~705?~~ c) 510?

Stumbling block: Interpretation of renewable freshwater resources (II)

Calculation of annual or LTAA renewable freshwater resources on country level provides important information for a range of indicators (e.g. water exploitation index, dependency ratio etc.), **but does not consider:**

- ❑Ecological requirements (ecological flow)
- ❑Multi- or bilateral agreements
- ❑Seasonal and/or sub-national water stress situations

3. Simple Data Validation

Can the values be true?

What is questionable here? Why?
(Size of country: 85 000 km²)

		Unit	1990	1995	2000	2001
1	Precipitation	million m^3	93000		85000	90000
2	Actual evapotranspiration	million m^3	38000			30000
3	Internal flow (Row 1 - row 2)	million m^3	55000	n/a	85000	60000
4	Inflow of surface and groundwaters from neighbouring countries	million m^3	23000		20000	25000
5	**Renewable freshwater resources** (Row 3 + Row 4)	million m^3	**78000**	**n/a**	**105000**	**85000**
6	Outflow of surface and groundwaters to neighbouring countries	million m^3	78000		70000	72000
7	Outflow of surface and groundwaters to the sea	million m^3	0		0	0

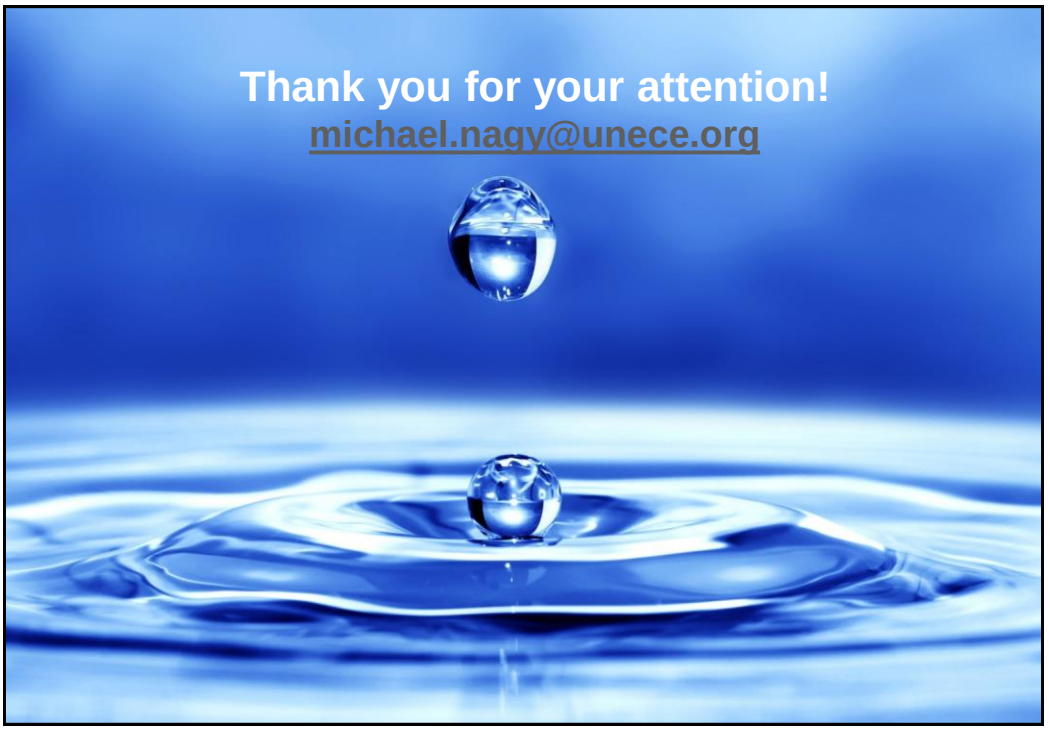
Avoid empty cells. Is it "0" or “n/a”?

Careful: Templates contain formulas for internal flow and renewable freshwater resources.

Double-check with other data sources, e.g:

- FAO Aquastat
- World Bank (average precipitation: divide volume / land area)
- CIA World Factbook
- Etc.

Suggestion: Long Term Annual Average (LTAA) figures could be useful


Thank you for your attention!
michael.nagy@unece.org