



Renewable Freshwater Resources (C-1)

Data sources, stumbling blocks and simple data validation techniques

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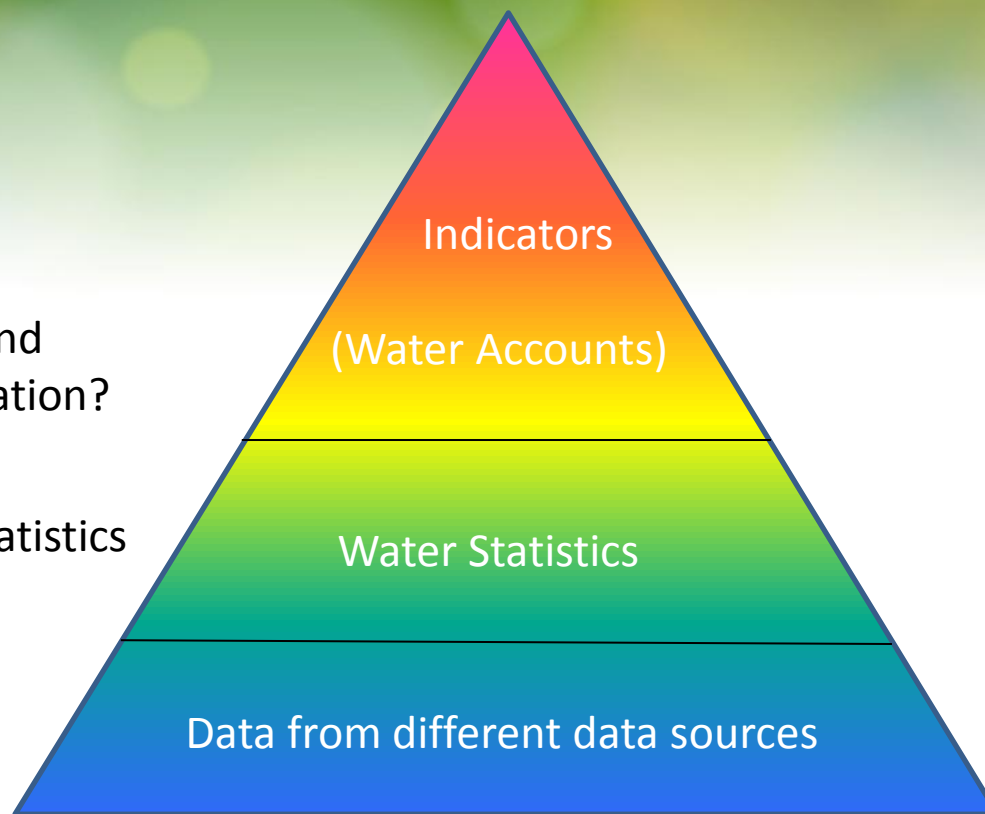


Presentation Outline

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

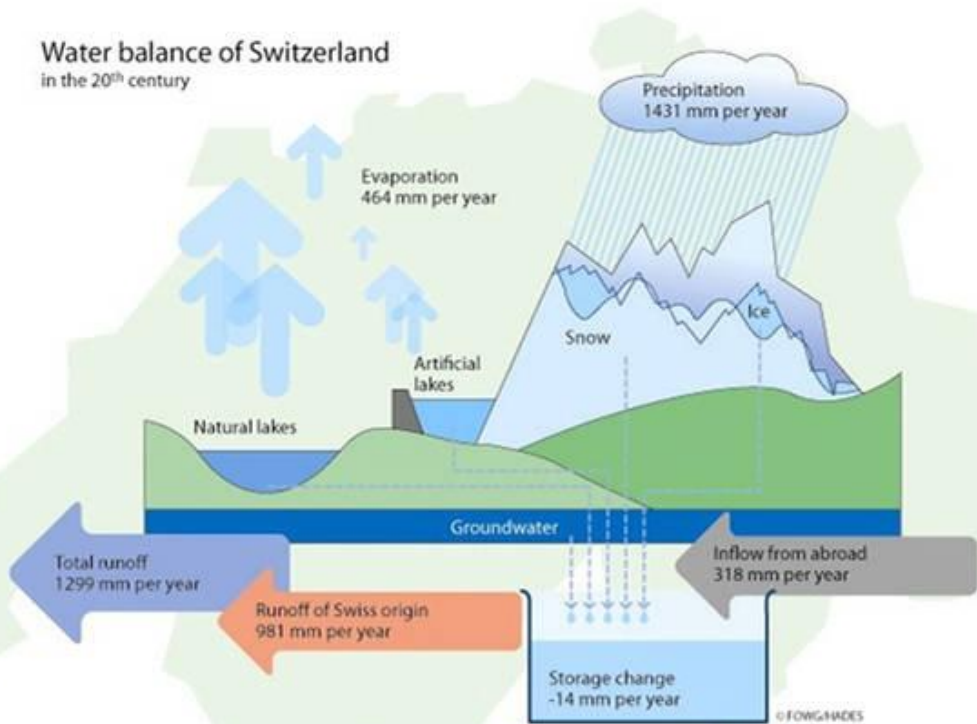


Stumbling block: Unit of measurement

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!**

Water balance of Switzerland
in the 20th century



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

t
stem

Food and Agriculture Organization
of the United Nations



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

Georgia

Precipitation (mm/year)
Area of the country (1000 ha)
Precipitation (km³/year)

[1]
[2]
[3] =([1]/1000000)x([2]x10)

Surface water: produced internally

[4] (a)

Groundwater: produced internally

[5]

Overlap between surface water and groundwater

[6] (b)

Total internal renewable water resources

[7] =[4]+[5]-[6]





Stumbling block: Transboundary waters

Groundwater aquifer

State Border



River

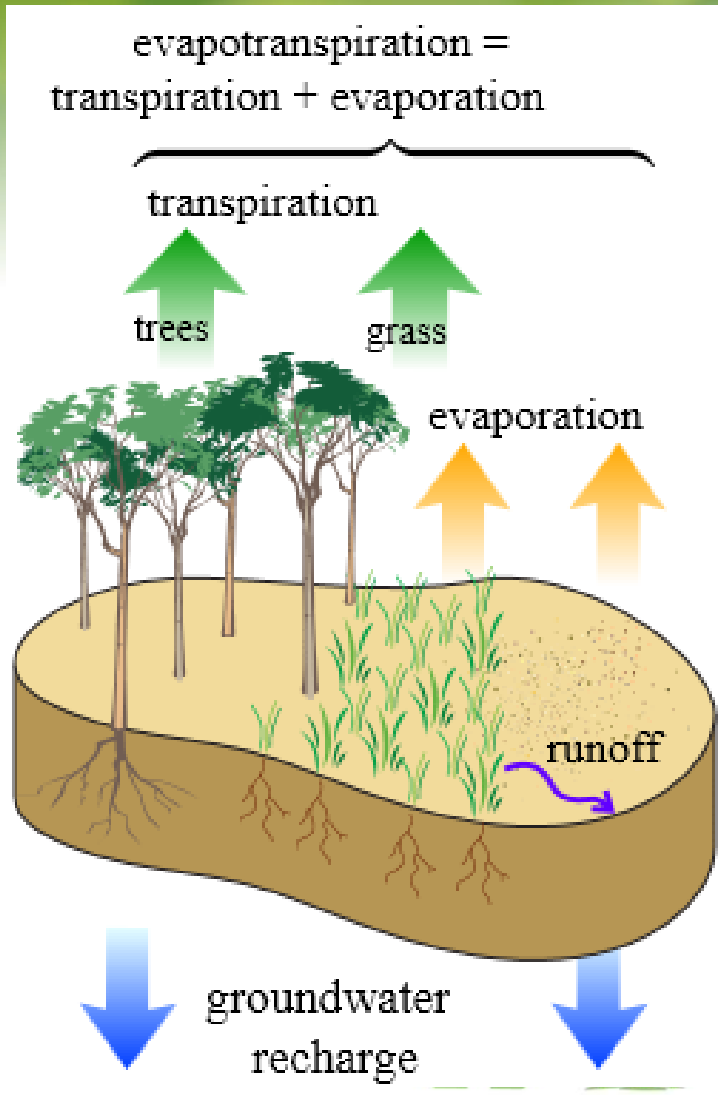
Follow multilateral or bilateral agreements according to UNECE Water Convention and/or River Basin Agreements.

Divide 50/50 between the two riparian countries if no agreement





Stumbling block: ACTUAL evapotranspiration is needed!



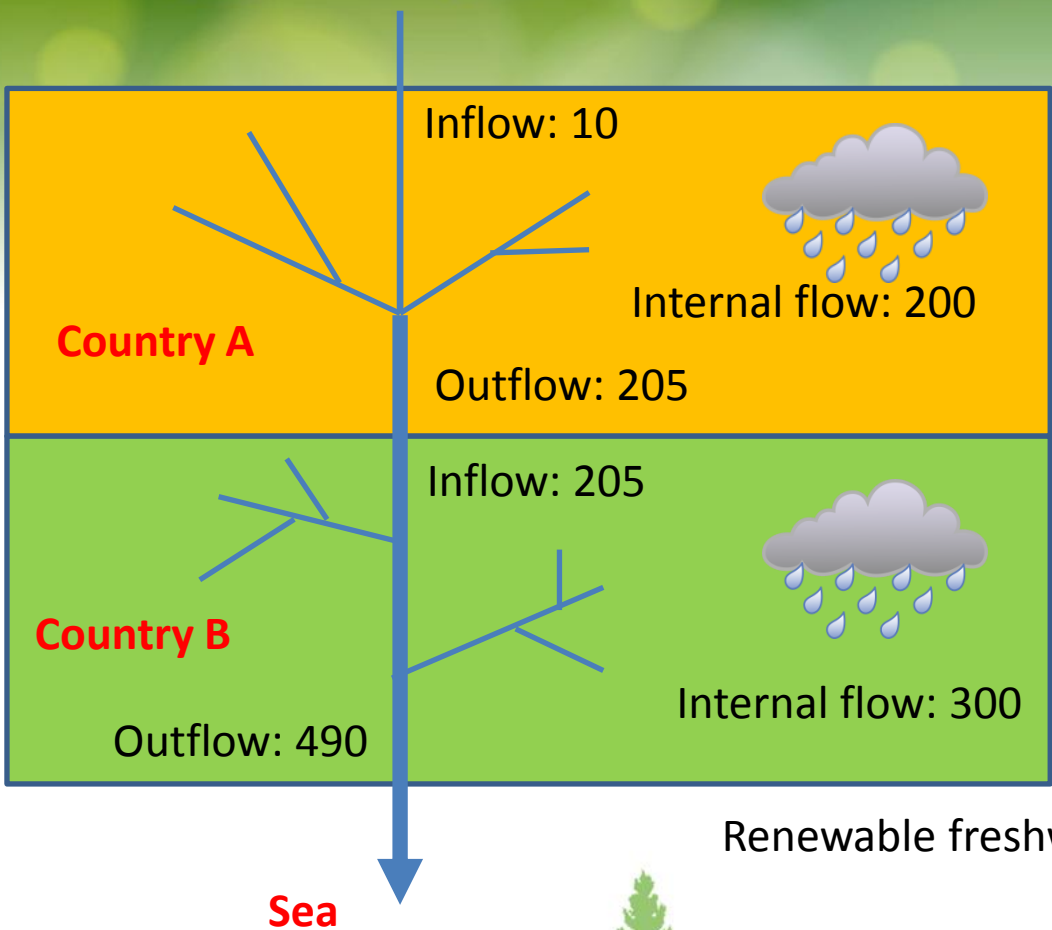
You also might get data on the POTENTIAL evapotranspiration (ET), which is not needed for C1.

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





Other experiences (collection, stumbling blocks, validation)?
Please share them with us!

Thank you very much for your attention!

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