



**UNECE**

# Statistics on water abstraction and water use

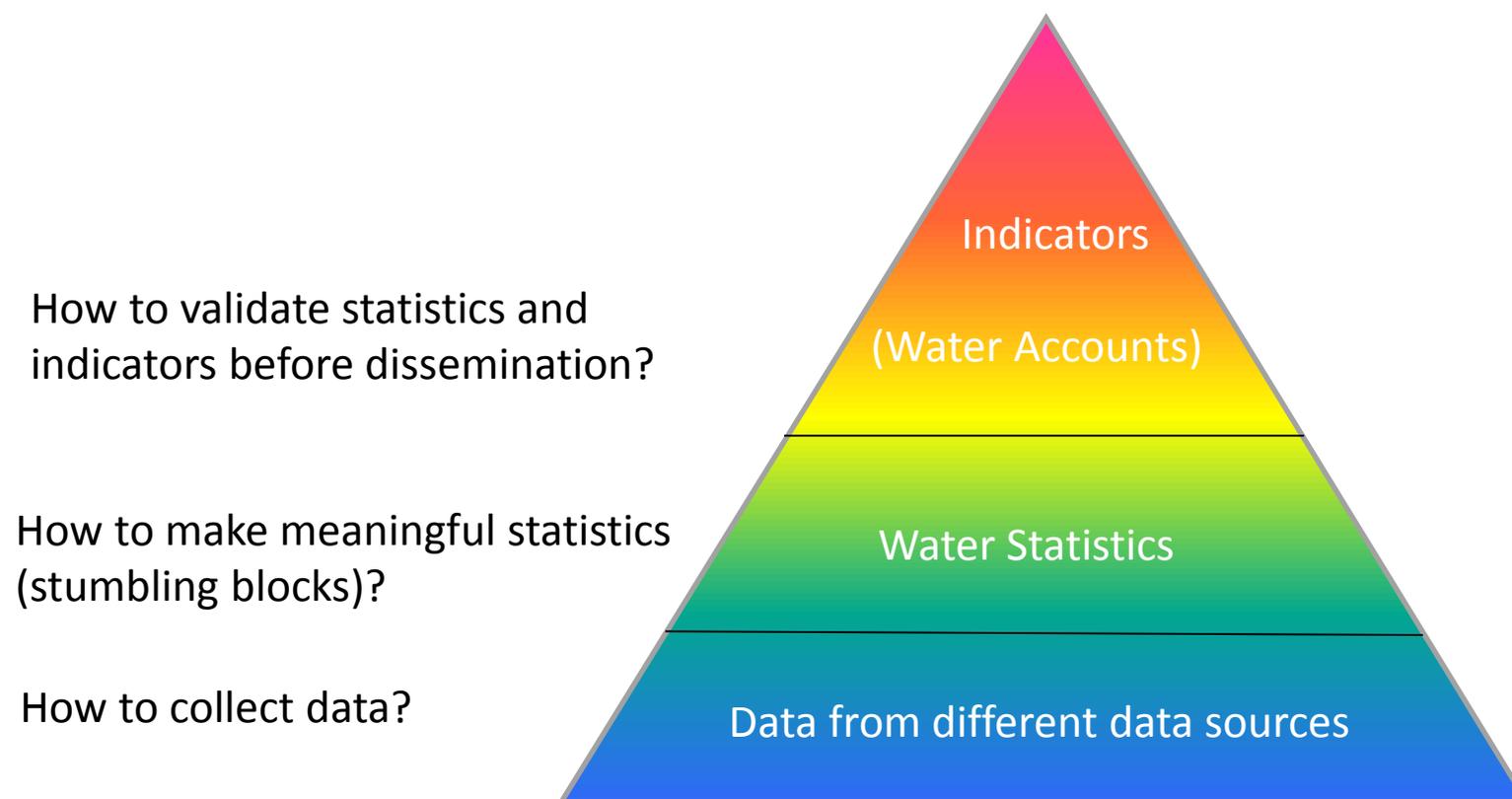
## Data sources, stumbling blocks and simple data validation techniques

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National Workshop on Shared Environmental Information Systems (SEIS) and Environmental Statistics for the Sustainable Development Goals (SDGs)

(Dushanbe, Republic of Tajikistan, 16-18 October 2017)

# Presentation Outline



# 1. Data Collection

# Example from SPAIN

See [http://www.ine.es/en/inebmenu/mnu\\_medioambiente\\_en.htm](http://www.ine.es/en/inebmenu/mnu_medioambiente_en.htm)

## **A. Annual survey on water supply and sewerage**

- All units classified in NACE Divisions 36 or 37, excluding irrigation communities, for cities > 15 000 inhabitants
- Remaining units: sample
- Total coverage of about 85% of the total population

## **B. Annual survey on water usage in the agricultural sector**

- All irrigation communities > 2 000 ha
- Samples for smaller irrigation communities
- Represents approximately 60% of the total irrigation area
- Total of ca. 750 samples for Spain

## **C. Annual survey on water usage in the industrial sector**

- Manufacturing industries > 200 employees + samples
- From 2007-2010 included in Waste Generation in Industries Survey, now specific survey

# SPAIN: A ) Annual survey on water supply and sewerage - Variables

- **Water supply variables**

- Abstraction from fresh groundwater and surface water
- Water from desalination
- Water supplied to the public network
- water registered and distributed by type of user
- Volume of water non-registered:
  - Real losses
  - Apparent losses
- Total value of water invoiced

- **Sewerage variables**

- ...

## **SPAIN: B) Annual survey on water usage in the agricultural sector - Variables**

- Income and expenses
- Water rights
- Estimated losses in the water transport networks
- Water abstracted from groundwater and surface water
- Water supplied and purchased water to and from other communities
- Distribution of water to agricultural holdings

## **SPAIN: C) Annual survey on water usage in the industrial sector - Variables**

- Abstraction from groundwater and surface water
- Abstraction from other water resources
- Water supplied by means of public network
- Total amount of used water
- Treatment of wastewater

# Overview on typical data sources

## ☐ **Public water supply and desalination:**

- Municipal surveys
- Water Supply Association
- Census

## ☐ **Agriculture:**

- Agrarian statistics
- Data from water authorities
- Data from farmers associations

## ☐ **Manufacturing industry:**

- Industry surveys (specialised or combined)

## ☐ **Service industry:**

- Municipal surveys (data from public water suppliers)
- Statistics about employment and tourism x water use coefficients

## ☐ **Self supply of households:**

- Not connected households x water use coefficient
- In combination with data from water authorities and Water Supply Association

## **Gap filling via interpolation, extrapolation and use of water use coefficients**

### **□(Linear) interpolation:**

- E.g. Population connected to public water supply data only available from census data (2001 and 2011), then linear interpolation might help to calculate missing values (such as self-supply by households).

### **□Extrapolation from metered abstractors to non-metered abstractors:**

- Precondition: Similarities between the sampled group and the non-sampled group are required

### **□Water use coefficients:**

- E.g. range of typical household water use / capita (in Europe): ca. 90 l/day – 300 l/day
- Production specific water use coefficients
- Consult „Data Collection Manual for the OECD/Eurostat Joint Questionnaire on Inland Waters Tables 1 – 7“

# Example for water use coefficients (manufacturing industries)

*Table 8-3: Water use coefficients for different industry sectors (German example)*

industry sector line of production	production device	Unit	water use/unit	Reference
food industry	cereals	1 t cereals	1.5 - 8 m <sup>3</sup>	Hosang et al., 1998
	canned fruits or vegetables	1 t cans	4 - 14 m <sup>3</sup>	Hosang et al., 1998
	candies	1 t product	6 - 26 m <sup>3</sup>	Hosang et al., 1998
	sugar	1 t beets	10 - 30 m <sup>3</sup>	Hosang et al., 1998
	meat and fishproducts	1 cattle and horses or 2.5 pigs	0.3 - 0.4 m <sup>3</sup>	Hosang et al., 1998
	abbatoir			
	creamery (fresh milk)	1000 L milk	4 - 6 m <sup>3</sup>	Hosang et al., 1998
	creamery	L milk	1 - 1.5 L	Mutschmann et al., 2002
	cheese dairy or butter production	1000 L milk	10 m <sup>3</sup>	Hosang et al., 1998
	margarine	1 t margarine	20 m <sup>3</sup>	Hosang et al., 1998
leather and textile industry	brewery	1000 L beer	5 - 20 m <sup>3</sup>	Mutschmann et al., 2002; Hosang et al., 1998
	wine and liqueur distillery	1000 L corn	4 - 6 m <sup>3</sup>	Hosang et al., 1998
	shoes	1 pair of shoes	5 L	Hosang et al., 1998
	leather, tannery	1 t of skins	40 - 60 m <sup>3</sup>	Hosang et al., 1998
	woollaundry	1 t wool	20 - 70 m <sup>3</sup>	Hosang et al., 1998
	bleachery	1 t product	50 - 100 m <sup>3</sup>	Hosang et al., 1998
leather and textile industry	dyeing factory	1 t product	20 - 50 m <sup>3</sup>	Hosang et al., 1998
	synthetic fibre	1 kg product	200 L	Mutschmann et al., 2002

# Recommendations and Guidance

- Data Collection Manual for the OECD/Eurostat Joint Questionnaire on Inland Waters  
([http://ec.europa.eu/eurostat/ramon/coded\\_files/OECD\\_ESTAT\\_JQ\\_Manual\\_version\\_2\\_21.pdf](http://ec.europa.eu/eurostat/ramon/coded_files/OECD_ESTAT_JQ_Manual_version_2_21.pdf))
  
- International Recommendations for Water Statistics  
(<http://unstats.un.org/unsd/envaccounting/irws/>)

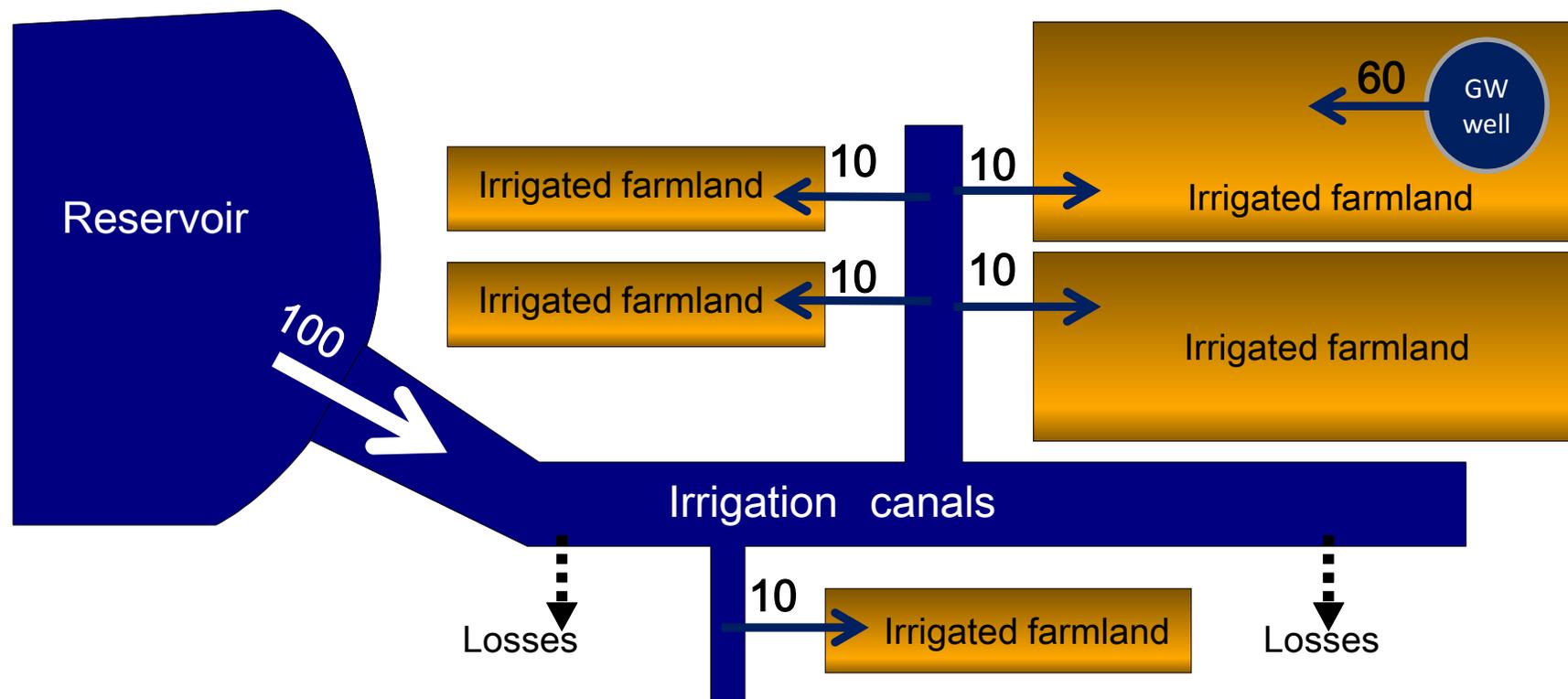


## 2. Stumbling Blocks

**Be careful with system boundaries**

- Irrigation canals
- Industry parks
- Water abstracted and used for cooling purposes
- Reuse and recycling of water

# Irrigation canals

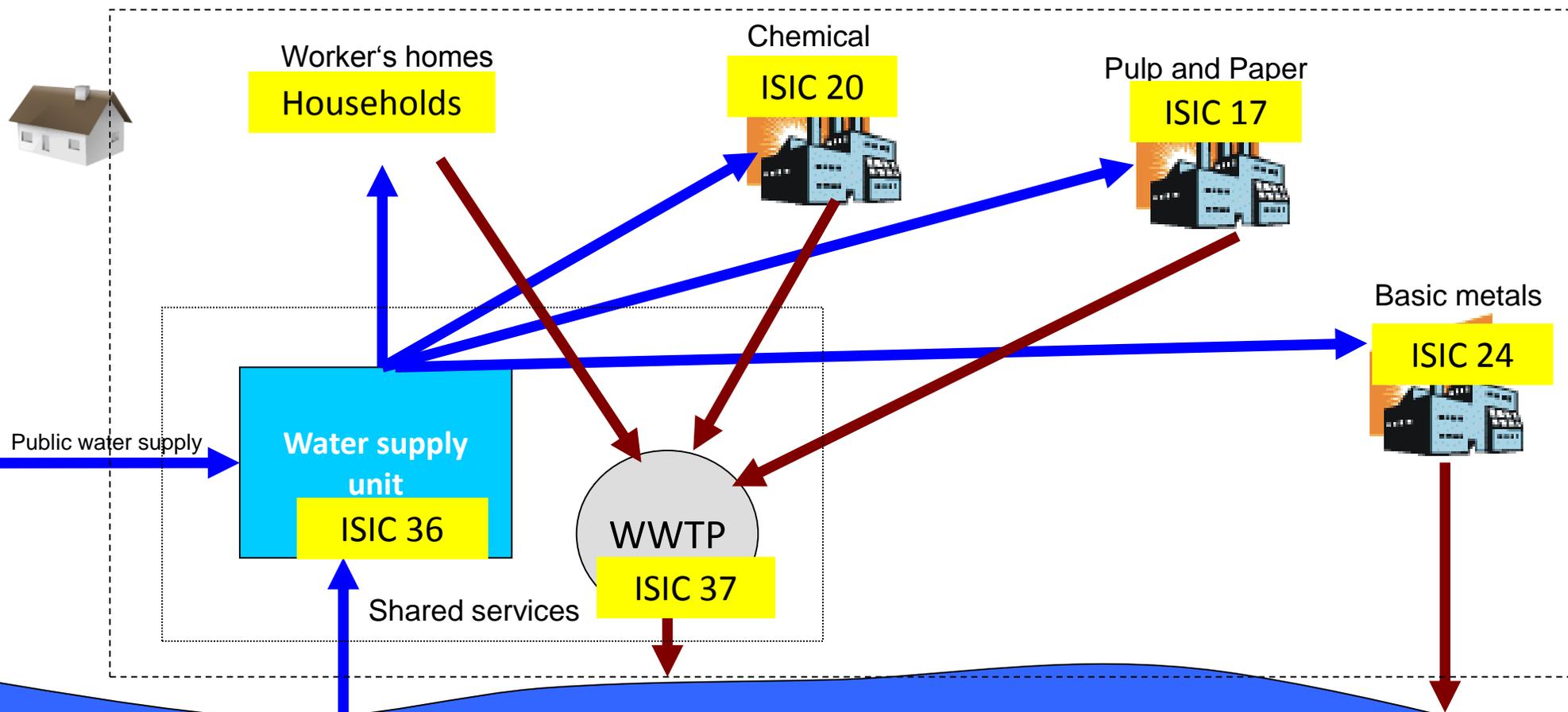


## Questions:

- How many units of water are abstracted by Agriculture (ISIC 01)? 60
- How many units of water are used by Agriculture (ISIC 01)? 110

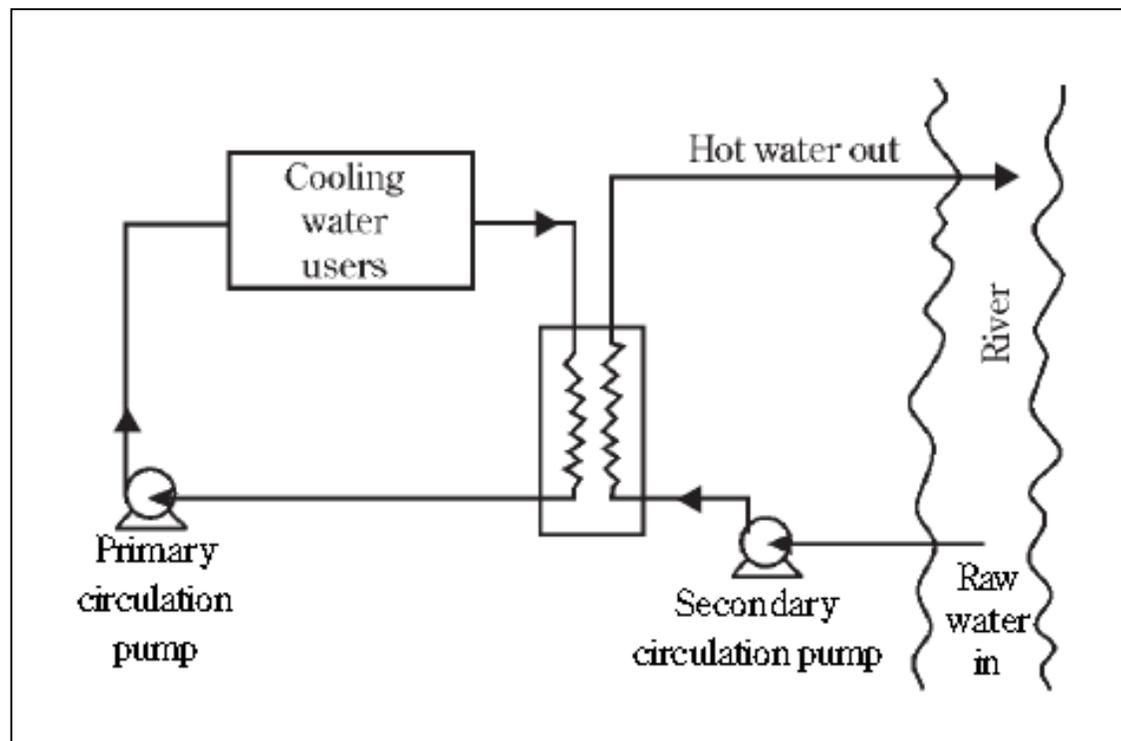
**Note:** Operation of irrigation canals is classified as ISIC 36 (water supply) (ISIC rev. 4.0)!

# Industrial Parks



**Note:** Even if industries are organised in industrial parks with shared services, they have to be considered individually (according to their main activity).

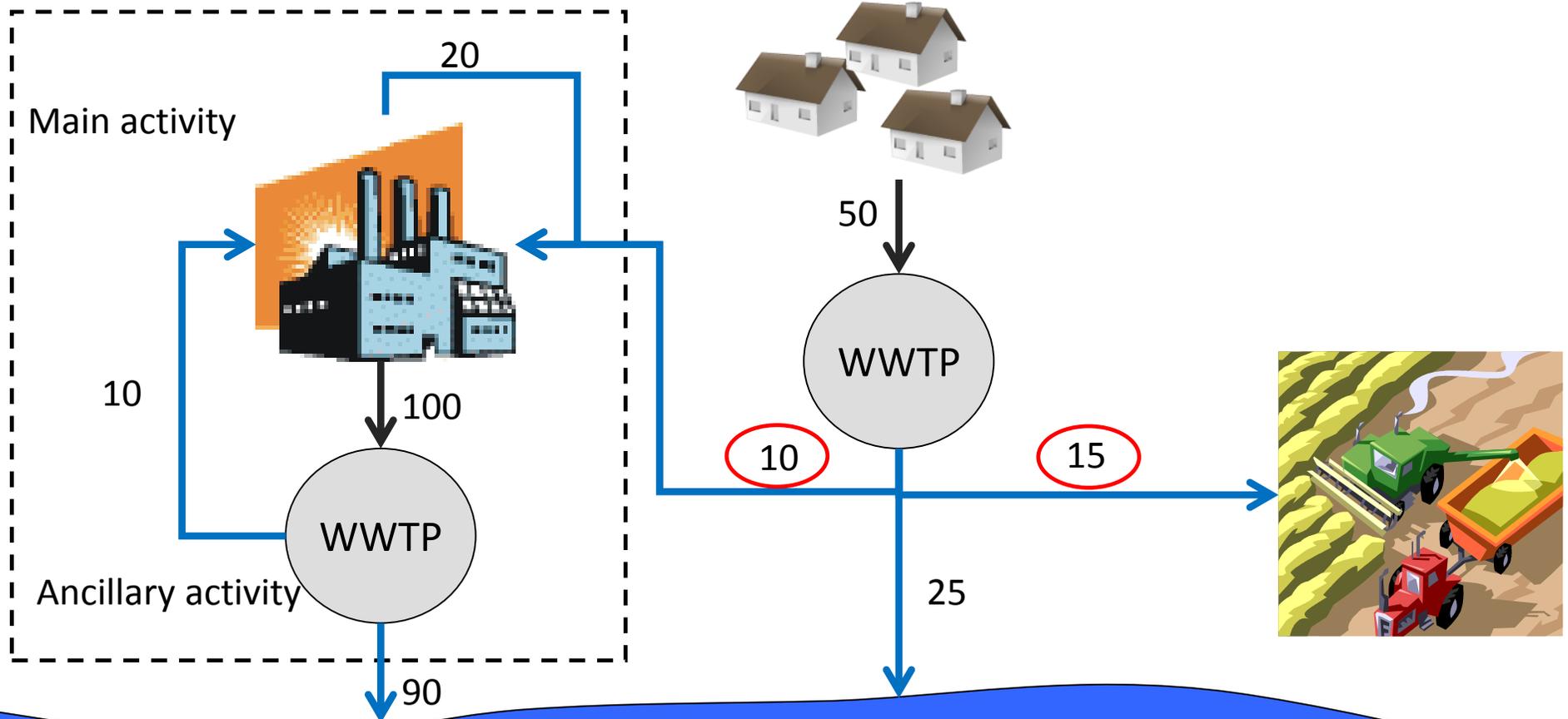
# Cooling water



**Cooling water could be the dominating water abstraction and use:**  
Electricity production, metal industry, oil industry, chemical industry, pulp and paper

**Note:** Cooling water is not separated from other water uses in C2 and C3. Keep it separately in your national records; suggestion to add it in C2 and C3 or make footnotes

# Reuse and Recycling of Water



**Question:** How many units of water are re-used?

**Note:** Reused water is delivered directly to a user as reclaimed wastewater. Recycling within industrial sites is excluded.

# 3. Simple Data Validation

Can the values be true?

# What is questionable here, why?

Time series data on the indicators for 1990-2013, Table C-2 Freshwater abstraction:

	Unit	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	
<b>Surface and groundwater abstracted</b>												
1	Fresh surface water abstracted	million m <sup>3</sup>		0	0	0		1000	0	1000	1100	N.A.
2	Fresh groundwater abstracted	million m <sup>3</sup>	4790	5000	4714	4502	6390	3064	4072	3993	7112	N.A.
<b>Freshwater abstracted</b>												
4	<b>Freshwater abstracted</b> (Row 1 + row 2)	million m <sup>3</sup>	4790	5000	4714	4502	6390	4090	4072	4993	8212	4913
<i>of which abstracted by</i>												
6	Water supply industry (ISIC 36)	million m <sup>3</sup>		205	210	212	2215	220	222	225	228	230
7	Households	million m <sup>3</sup>	110	105	104	100	95	120	90	98	95	93

**NOTE:**

- Avoid empty cells. Is it "0" or "N.A."?
- Look at time series. Consistent development or outliers?
- Abstraction by water supply industry usually develops continuously (e.g. increases continuously due to increased connection rate; reduction possible e.g. due to technical measures to reduce losses)
- Households' water abstraction usually develops continuously (e.g. reduces because increase of connection rate)
- Abstraction by manufacturing is strongly dependent from the economic situation and technical developments.
- Agricultural abstraction is strongly influenced by weather conditions in the growing season

## **C-3:Water use, validation techniques**

1. Check if values for freshwater abstracted are identical with C-2
2. Check water balance of the table, e.g. total freshwater available minus losses = sum of water use by households and economic activities.
3. Check time series: Empty cells, outliers?

## C-3: Water use, validation techniques (cont.)

4. Losses: Calculate losses in % of water abstracted by water supply industrie. Check with water supply industry.
  
5. Water use by households and economic activities: Right order of magnitude?  
Methods:
  - Re-calculate household water use per capita per day with population data. Check with indicators from water supply industry (typical range in Europe e.g. 90 – 300 l/capita/day)
  - Re-calculate irrigation water per irrigated area. Check with farmers association
  - Water use by manufacturing industry difficult to validate the aggregated data as cooling water and single producers may have a big influence. Check consistency of data of the biggest users.

**Thank you for your attention!**

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