Estimating emissions to water as a prerequisite for cost-effective measures

Dutch experiences and challenges

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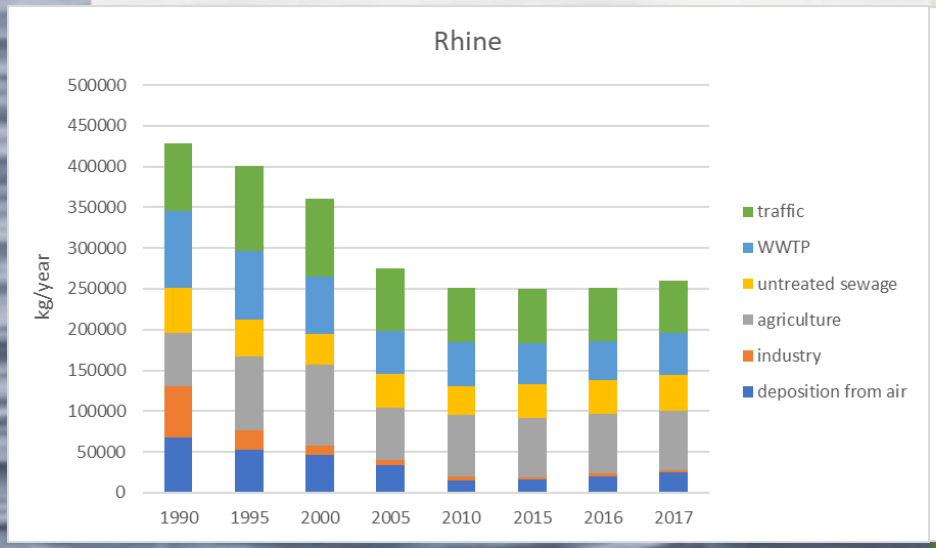
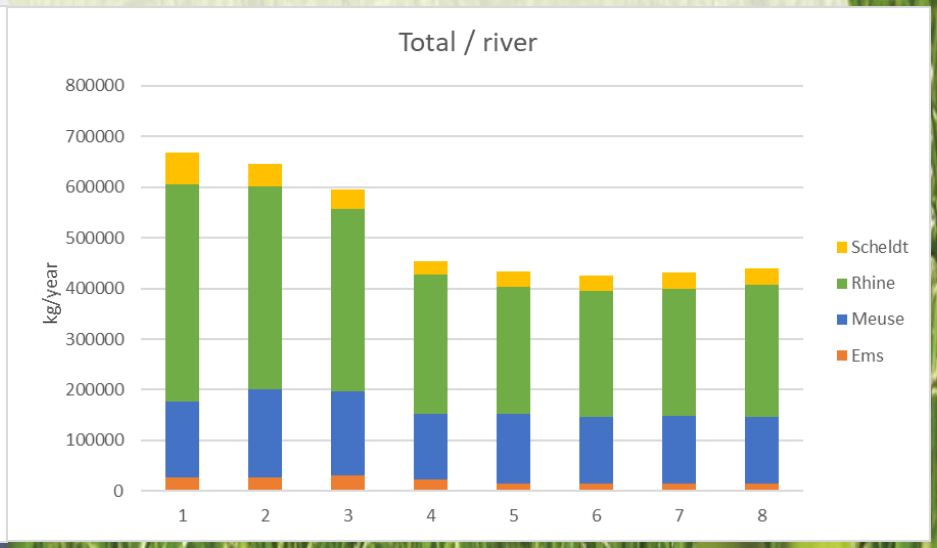
The Dutch emission – database

www.emissieregistratie.nl (also in English)
A nation-wide inventory of emissions to water, air and soil coordinated by the National Institute for Public Health and the Environment

Started in 1974 and expanded ever since
It covers over 350 substances and 700 emission sources
Close integration with GIS

Zinc as an example

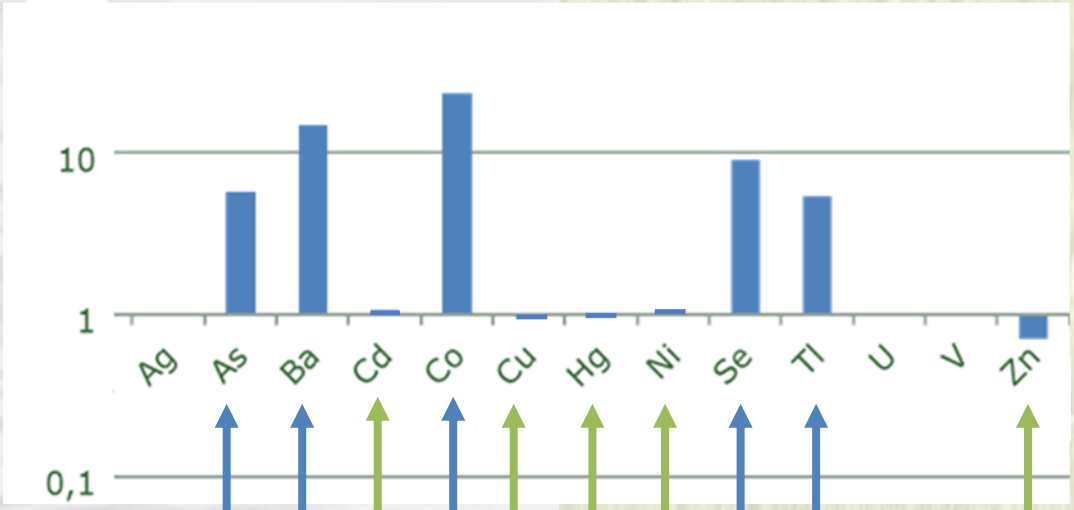




Relevant pathways

Substance-specific experts consider relevant pathways, perform calculations and/or formulate recommendations for aspects to improve (quality assurance; missing data; further research etc)

Example: ratio between measured and modelled concentrations in surface water



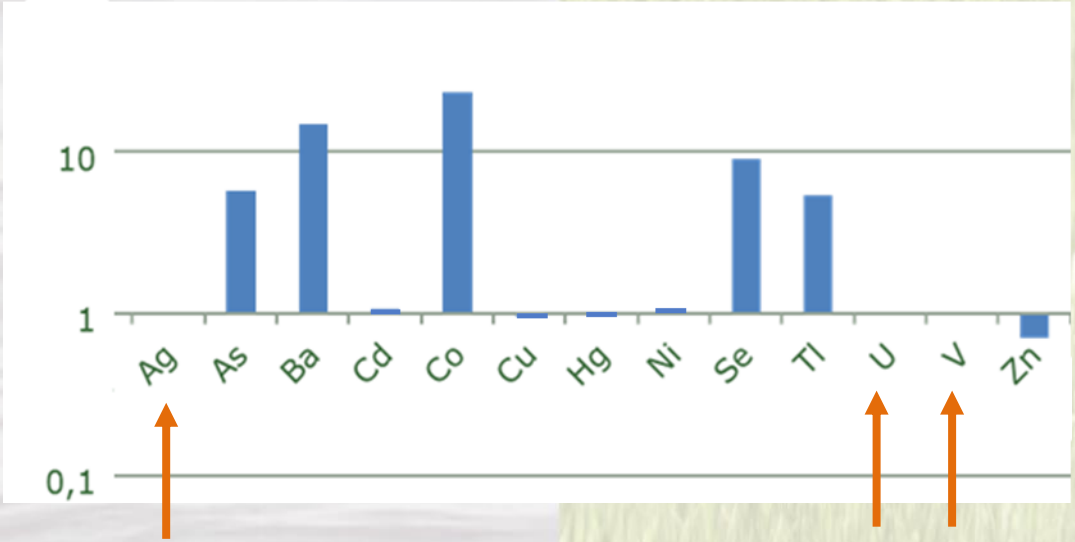
Emission underestimate conc, sources are missing

measured and modelled conc in close proximity

Relevant pathways

Substance-specific experts consider relevant pathways, perform calculations and/or formulate recommendations for aspects to improve (quality assurance; missing data; further research etc)

Example: ratio between measured and modelled concentrations in surface water



no known sources

Example for present use

Next river basin management plan (2022-2027):
need to decide whether additional measures are needed

Overview document for each substance that doesn't fulfil its water quality criteria covering
- current status
- emissions
- trends in concentration and emission

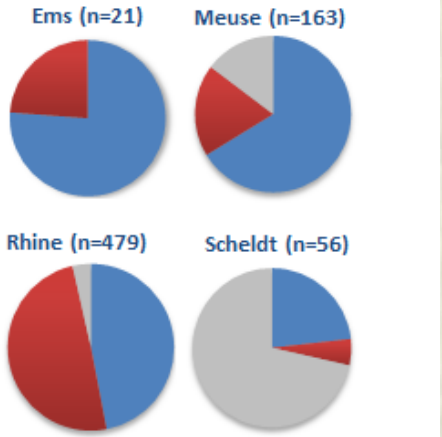
to decide whether measures are needed and which might be effective

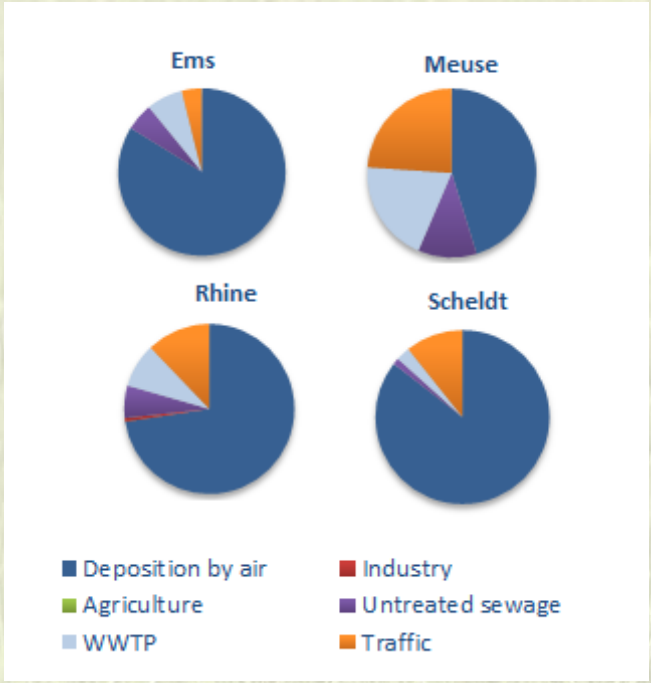
Two examples: fluoranthene and barium

Fluoranthene

1) Current status and emissions

	Number of waterbodies
< WQC	362
> WQC	276
no data	81

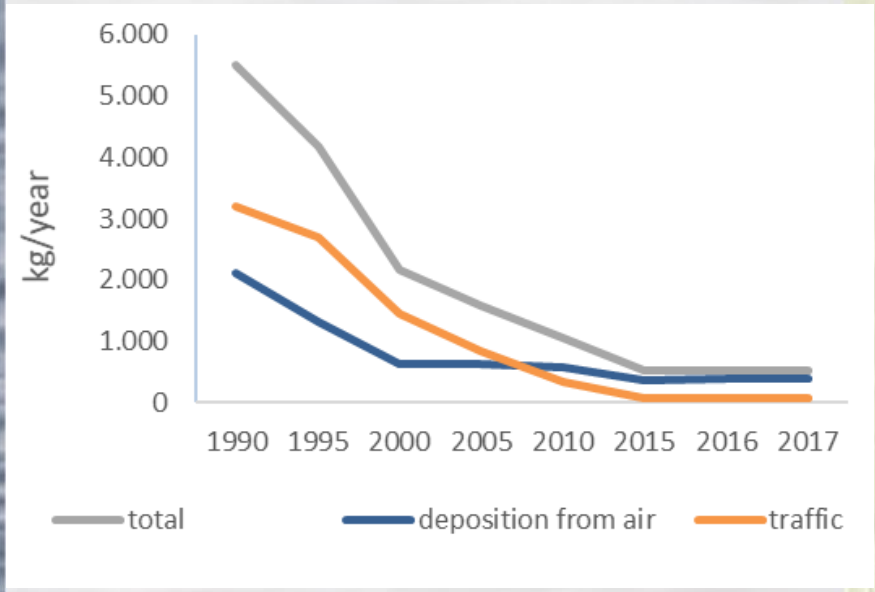




Fluoranthene often exceeds water quality criteria
Atmospheric deposition is main source

Fluoranthene

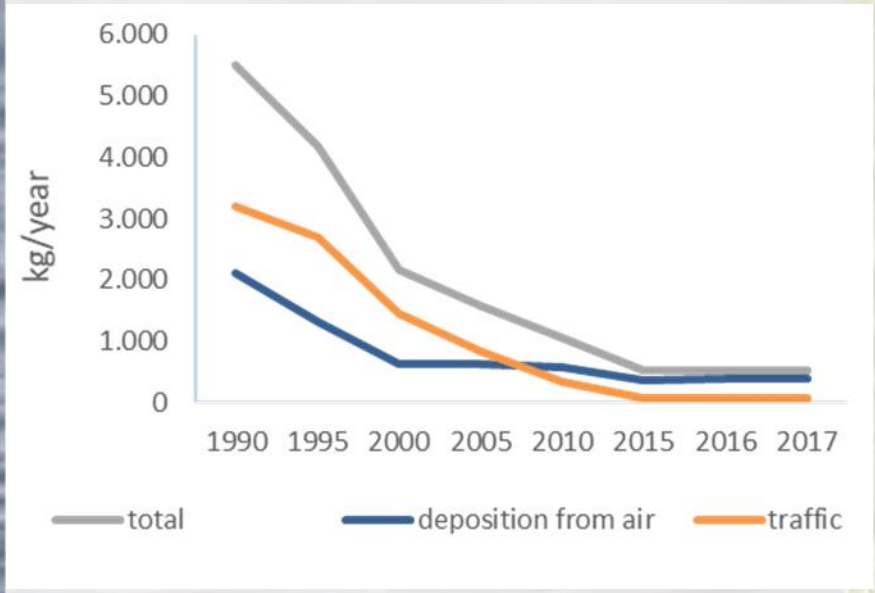
2) Trends in emissions

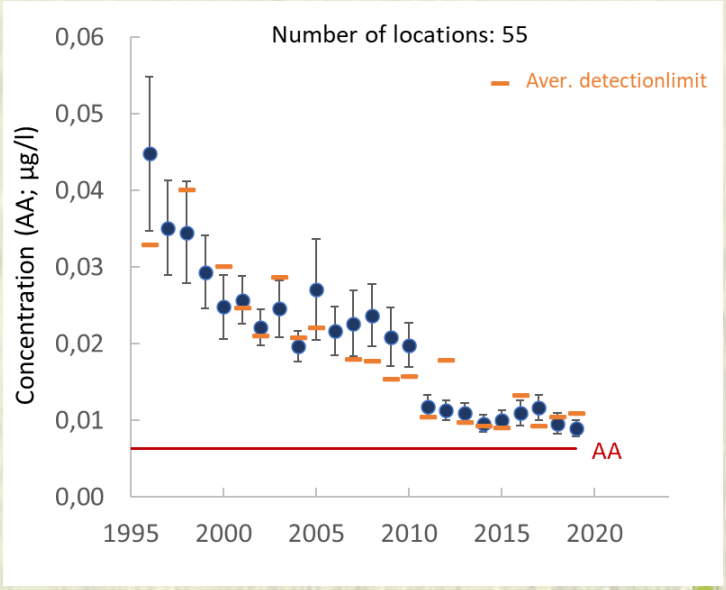


Decrease is due to lower atmospheric deposition (particulate filter in cars) and reduced use of tar coatings on ships

Fluoranthene

2) Trends in emissions and concentrations





Concentrations are also decreasing (up to 2011) but at least partly due to improved analytics (lower detection limit)

Fluoranthene

3) Inland emission compared to amount transported by rivers (kg / year)

	Inland emission	Influx from rivers at border crossing
Ems	20	unknown
Meuse	49	184
Rhine	391	744
Scheldt	70	89

Conclusion:

-knowledge on present emissions is sufficient to take measures

-options to consider:

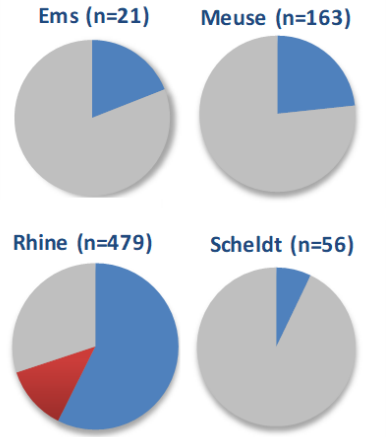
i) general (waste water, point sources, industrial emissions directive, ..)

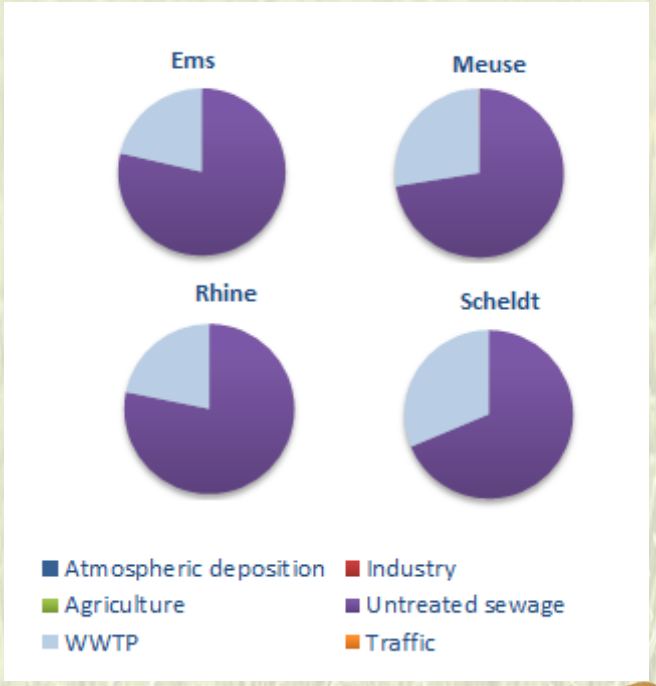
ii) wood stoves (to improve human health; (ultra)fine particles)

Barium

1) Current status and emissions

	Number of waterbodies
< WQC	321
> WQC	60
no data	338



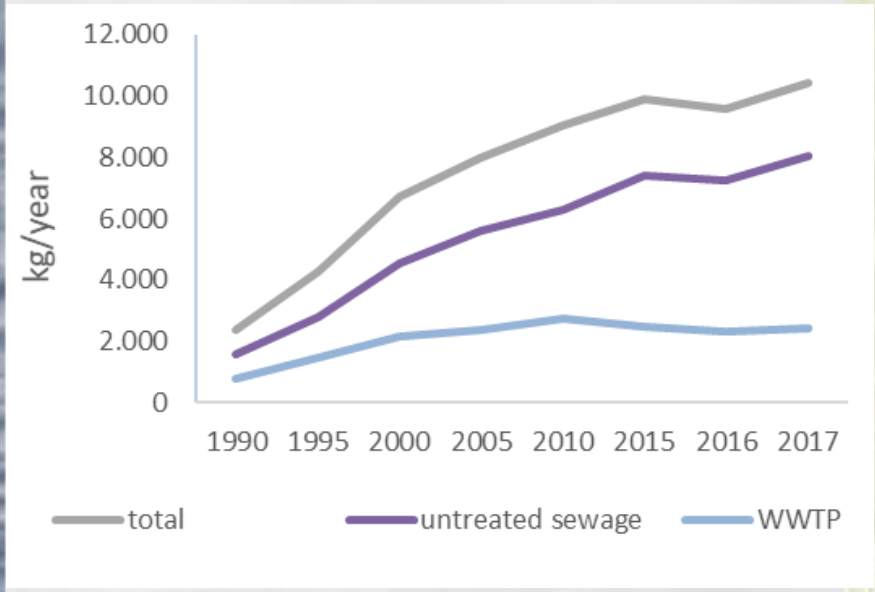


Some waterbodies do not fulfil water quality criteria (AA=93 µg/l) but Ba is not yet monitored in all waterbodies

WWTP and untreated sewage are the only known sources

Barium

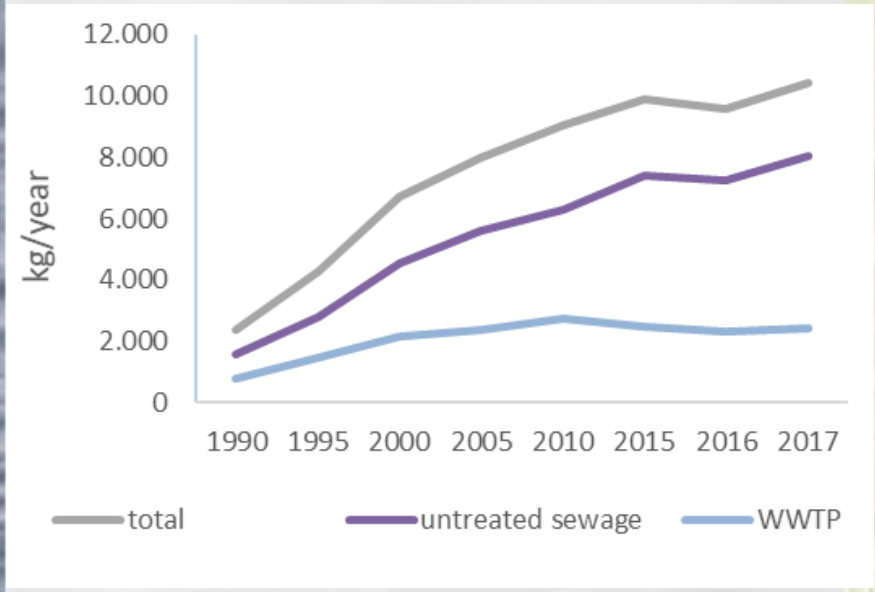
2) Trends in emissions

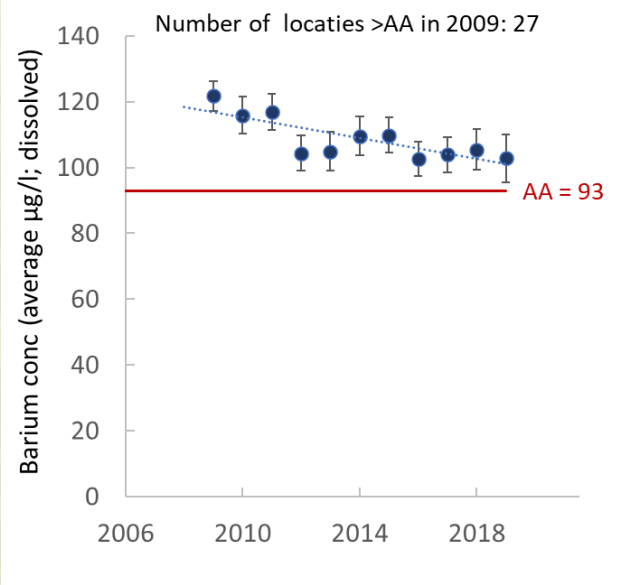


Increase is due to an increase in the use of firework (atmospheric deposition in cities, washed away by rainfall)

Barium

2) Trends in emissions and concentrations





Concentrations are slowly decreasing but reason is unknown

Barium

3) Inland emission compared to amount transported by rivers (kg / year)

	Inland emission	Transported by rivers	
Ems	346	unknown	
Meuse	1845	125,000	1.4%
Rhine	7952	4,467,000	0.1%
Scheldt	308	105,000	0.3%

Conclusion:

-knowledge on present emissions is insufficient to take effective measures

-research needed for atmospheric deposition (fuel combustion) and barium leaching from (agricultural) soils

Conclusion

Accurate insight in present emissions is essential

- to underpin the necessity for additional measures
- to choose the most (cost) effective ones
- to demonstrate that goals cannot be reached due to natural conditions

Questions ?