

Sediments feed and conserve soil

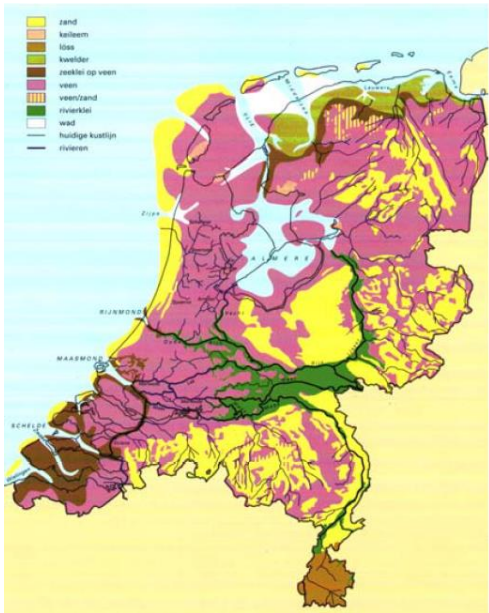
SedNet Conference, Dubrovnik

Jan Willem Berendsen
4 April 2019
Open

500 AD



800 AD



1250 AD



2019 AD







Sustainable Development Goal 15



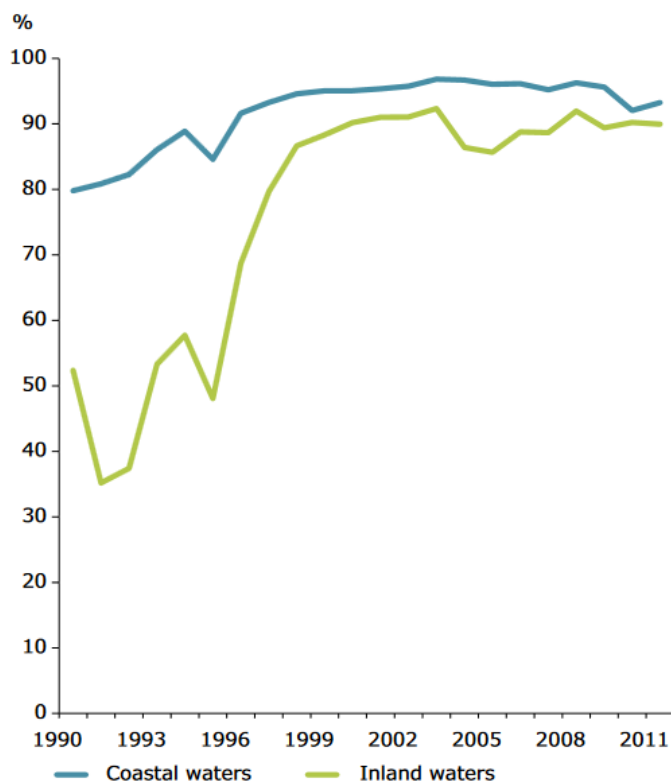
- Includes halting and reversing land degradation
- SDG target 15.1: By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world

BUT

Water quality trends

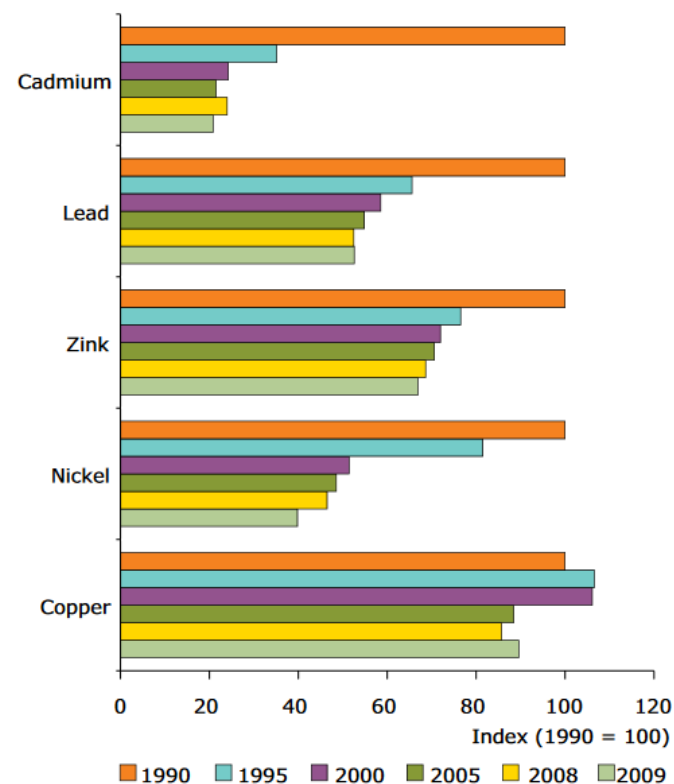
Figure 3.2 Changes in water quality variables during the last two decades (cont.)

(c) Percentage bathing waters complying with mandatory quality requirements, EU results based on more than 21 000 beaches



Source: EEA, 2012j.

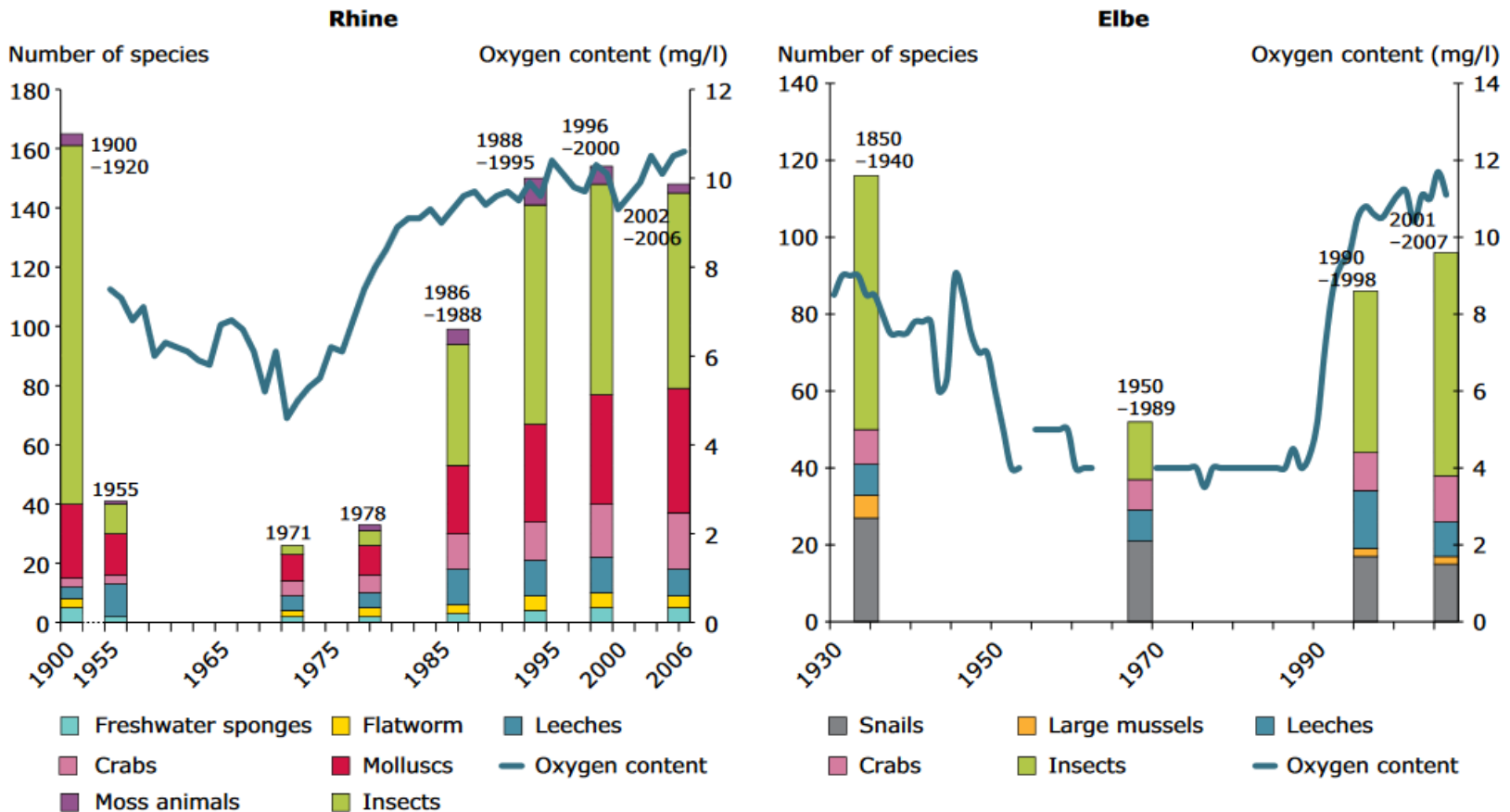
(d) Emission of heavy metals from Dutch wastewater treatment plants



Source: CBS, PBL, Wageningen UR, 2011.

Water quality trends

Figure 3.3 Historical development of the biotic community and average oxygen levels of the River Rhine near Emmerich and the Elbe near Magdeburg



Source: BMU/UBA, 2010; adapted from Schöll, 2009a; 2009b.

Challenges

- Mitigate oxidation of peat, slow down soil subsidence
- Improve moisture and nutrient retention in sandy soils, prevent leaching of nitrate to groundwater
- Compensate soil losses in arboriculture
- Greening cities, urban farming

Actions

- Exploration of social costs and benefits
- Joint identification of challenges – governments, farmers, research institutes
- Develop guidelines for joint agronomical and environmental assessment
- Field trials on peat grounds and on sandy soils
- Real implementation on sandy meadows and arable farmland
- Integrate demand for and delivery of fertile sediments and soil into tenders



Social costs-benefits – common practice



Social costs-benefits – sandy soil improvement



Social costs-benefits – compensation of losses

Costs-benefits – euros per 500,000 m³, >25 years

Amounts in million euro, present value	Urban greening	Arboriculture	Agriculture
<u>DIRECT EFFECTS</u>			
Investment	(2,3)	(4,0)	(1,5)
Leisure value	<i>P.M.</i>	<i>N.A.</i>	<i>N.A.</i>
Water storage	4,0	<i>N.A.</i>	<i>N.A.</i>
Effect on business operation	<i>N.A.</i>	2,7	9,9
Land value	<i>N.A.</i>	4,8	<i>N.A.</i>
<u>INDIRECT EFFECTS</u>			
Employment	1,6	<i>N.A.</i>	<i>N.A.</i>
<u>EXTERNAL EFFECTS</u>			
Health effects	<i>P.M.</i>	<i>N.A.</i>	<i>N.A.</i>
Carbon capture	0,1	0,9	-
Net Present Value	3	4	8

Draft guidelines tested

- Structure, texture, plant availability of nutrients and trace elements, organic matter important. Adhere to existing agricultural assessment and advice practice
- Agricultural recommendations and environmental standards conflictive
- Environmental standards for sediments and soils conflictive with other regulations





