



Ground Water Management in Denmark

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Philip Grinder Pedersen
Anna Rils Kaagaard

Agency of Water and Nature
Management (SVANA)

The Danish Case



Population: 5.6 million

Total land area: 43.000 km²

62% agriculture.

Quaternary deposits – clay and sand.

Sand and calcareous aquifers.

No mountains. No rivers.



Water Supply in Denmark



- 100 % of the drinking water derives from ground water
- Generally only simple treatment (aeration and sand filtration)
- Highly decentralized
 - 87 public water companies, 2.400 private water companies, 50.000 private wells

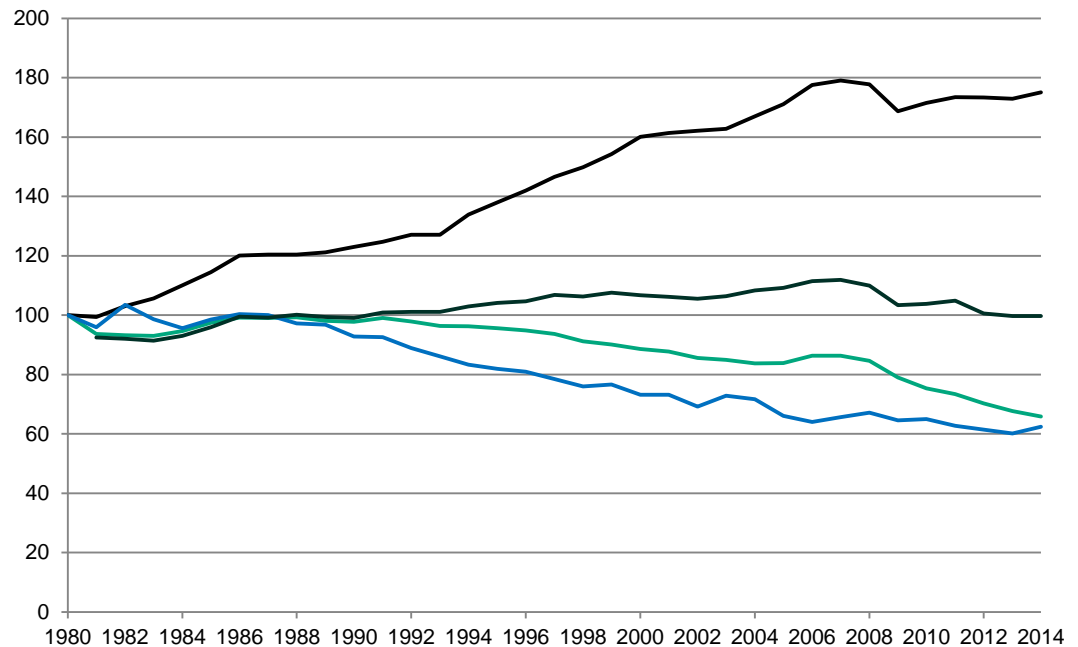


Decoupling of water consumption



The Danish example (1980 = index 100)

- Our economy has grown by more than 70 % since 1980
- Our energy consumption has remained the same
- While CO₂ emissions have been reduced
- And total water consumption has been reduced by 40 %



Source: Statistics Denmark, the Danish Energy Agency and DANVA

- GDP in real terms
- Gross energy consumption, climate adjusted
- CO₂ emissions, adjusted
- Total water consumption

Total water consumption



Non-Revenue Water

- Non-revenue water is only 7 pct. in Denmark. Copenhagen is at 5 pct.
- 11 % of water pipes in Copenhagen are over 100 years old and 76 percent are more than 60 years old.

Why?

Penalty for utilities with NRW >10%

- => better utility planning and operation.



How?



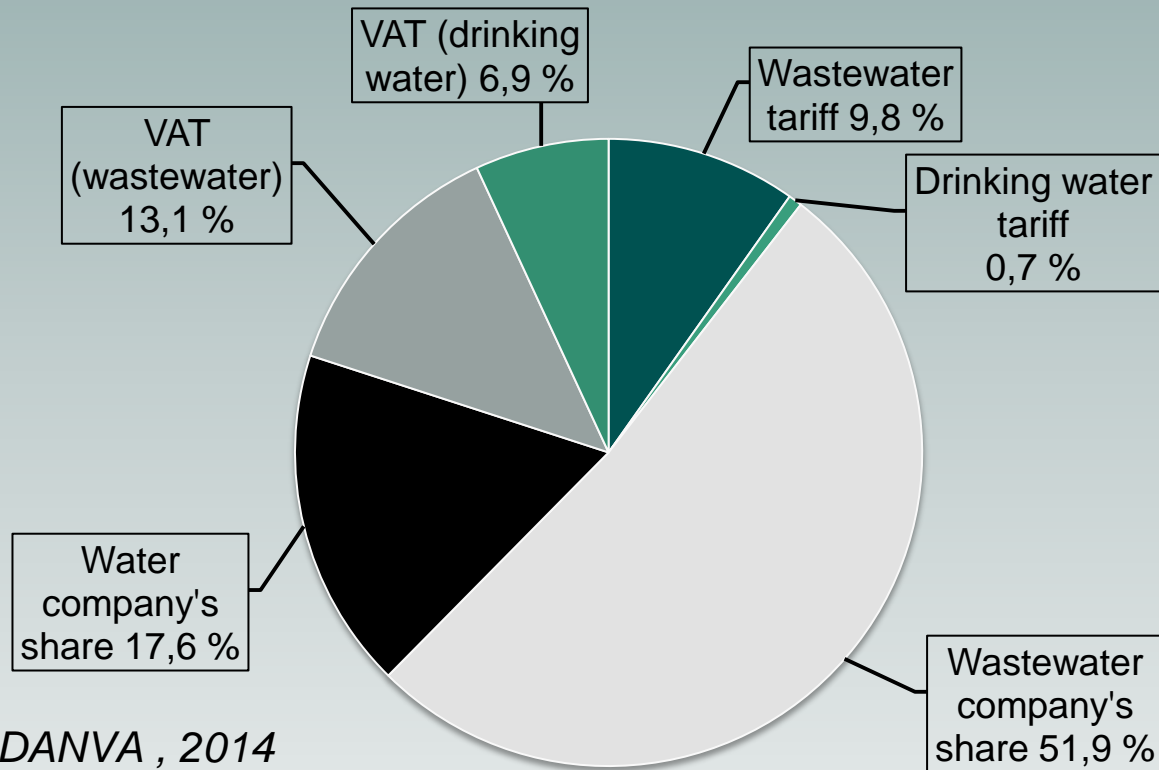
- Political consensus: Clear objective for all stakeholders
- Willingness to pay
- Awareness
- Knowledge based regulation



Price of Water



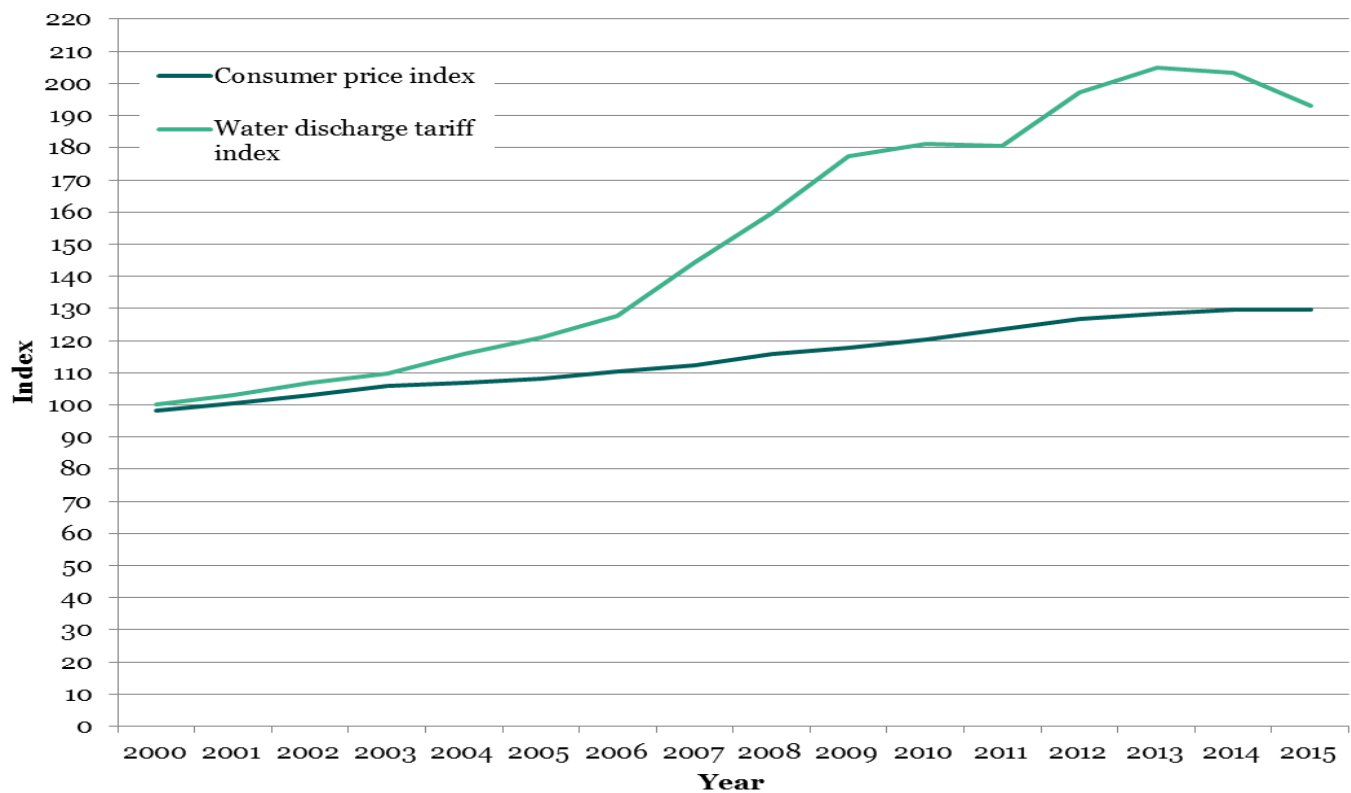
- Price of water supply and wastewater paid by the consumer: ~125 ZAR/m³
- Full cost recovery principle - financial balance between costs and income



Price of Water

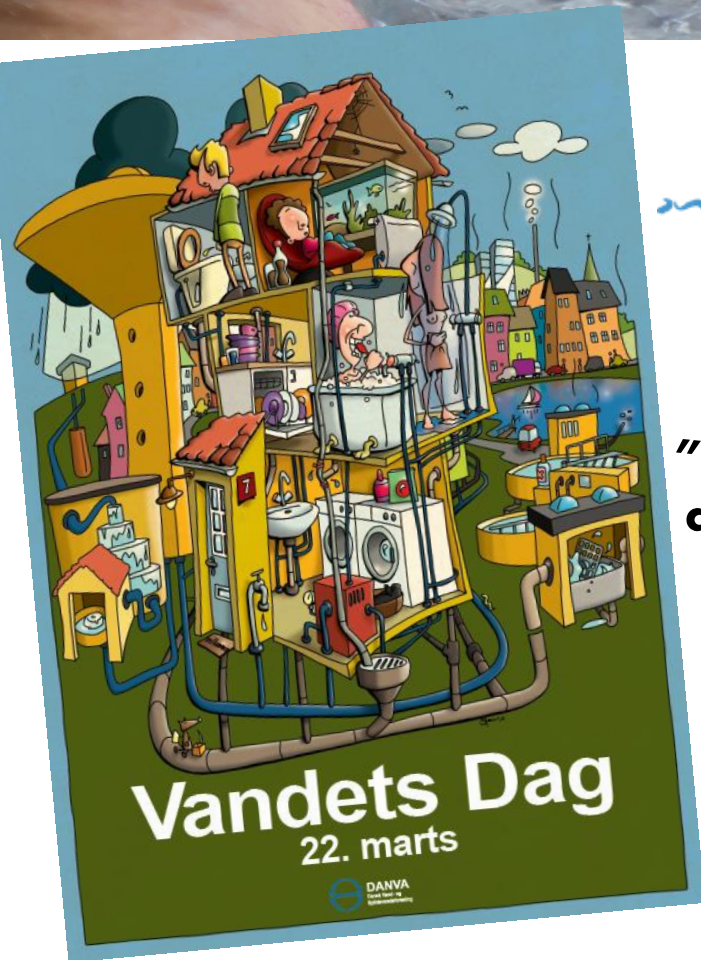


Index, 2000 = 100



Danmark Statistik, 2015

Awareness campaigns



"You live on your drinking water"



Water policies



- **Highly regulated legal area**
- **Data based regulation**
- **Shared authority with municipalities**
- **Minimal treatment of drinking water**
- **Decentralized abstraction**

Water Legislation in Denmark



Highly regulated legal area

- **Water Supply Act:** Water abstraction permits, drinking water quality requirements, groundwater protection areas etc.
- **Environmental Protection Act:** Waste water, industry regulation, agriculture regulation.
- **Planning Act:** Restricted planning for polluting activities and cities in groundwater protection areas
- **Water Sector Act:** Price cap, benchmarking
- **Soil Contamination Act:** prevent, eliminate or reduce contamination
 - + multiple statutory orders, guidance documents etc.

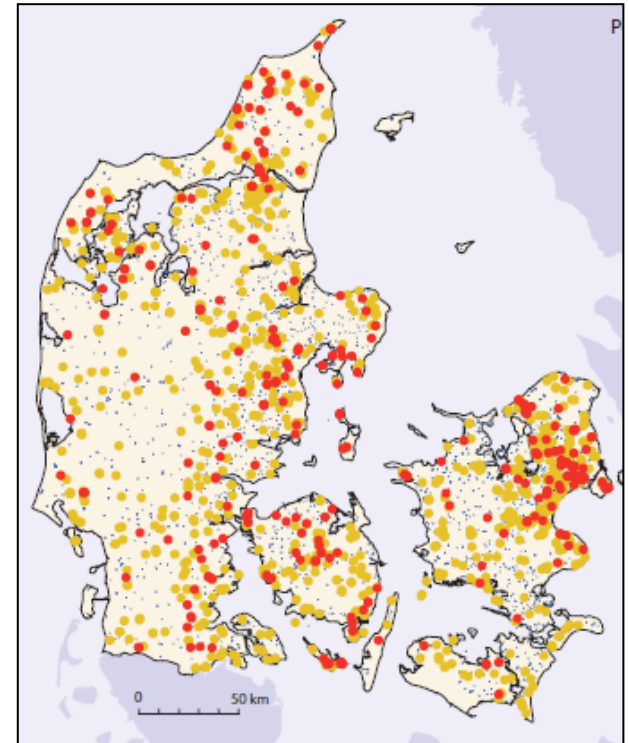
Water Legislation in Denmark



Data based regulation

Requirements to supply certain information into a national free public database

- **Wells**
 - Geographic location
 - Chemical samples
 - Technical structure
 - Etc.
- **Waterworks**
 - Administrative information
 - Chemical samples
 - Water abstraction permit
 - Amount of abstracted water
 - Etc.



Water Legislation in Denmark

Data based regulation

- Groundwater mapping

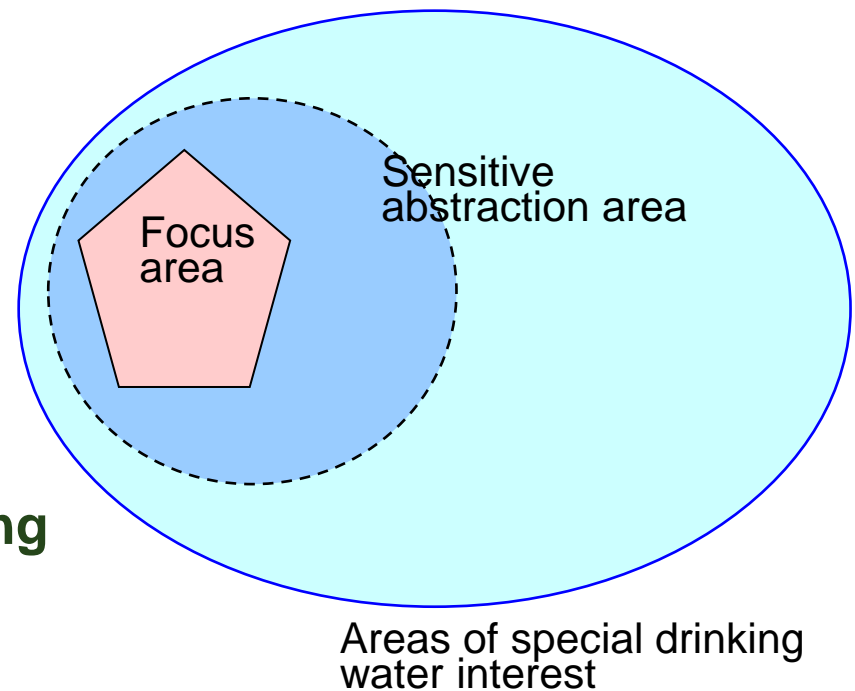


Water Legislation in Denmark



Shared authority with municipalities

- **MEF:**
 - **Legislation**
 - **National planning**
 - **Groundwater mapping**
 - **Monitoring**
- **Municipality:**
 - **Targeted action plans**
 - **Local water supply planning**
 - **Monitoring**



Groundwater protection



Minimal treatment of drinking water

- **Only simple treatment (aeration and sand filtration)**
- **Further purification requires authorisation**
- **Politically “protected”**
- **EU**

Prevention of pollution before purification

- **Both general and targeted protection schemes**
 - **General: Pesticide approval scheme, industry permits, agricultural fertilizer limits and mandatory catch crops etc.**
 - **Targeted: Targeted action plans, etc.**

Why does it work?



- Universal understanding of the importance of clean drinking water.
- Groundwater is viewed as belonging to all
- Valuable data
- Dialogue with municipalities and other stakeholders
- Integrated sector



A close-up photograph of a woman's face in profile, looking down as she drinks water from her cupped hands. The water is splashing and dripping from her hands into a body of clear, turquoise water below. The background is a soft, out-of-focus light blue sky.

Thank you for your attention!