

Ecologic Institute
Science and Policy
for a Sustainable World



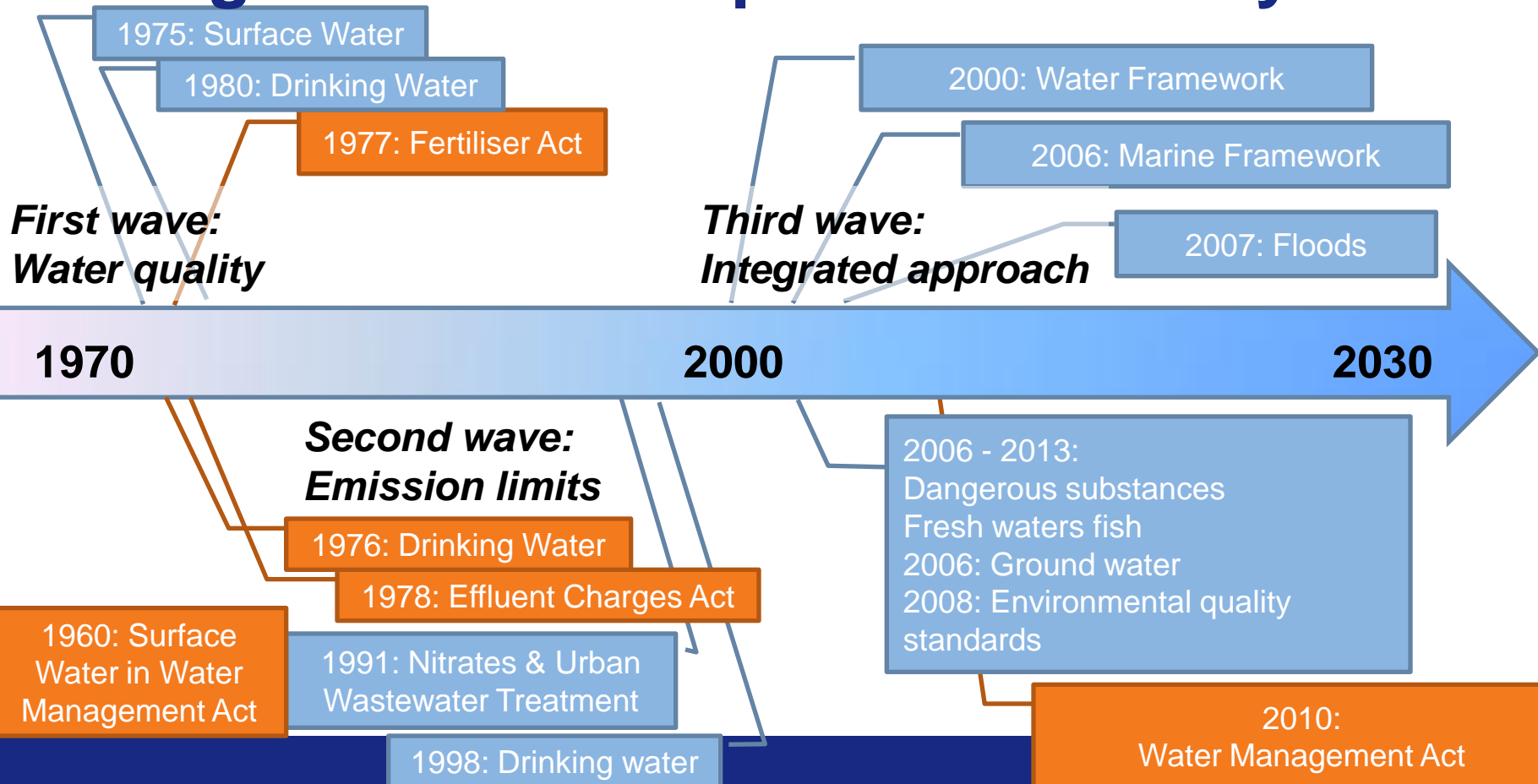
Water Management and Waste Water Treatment in Germany

Visitors Programme: Green Tech (made) in Germany

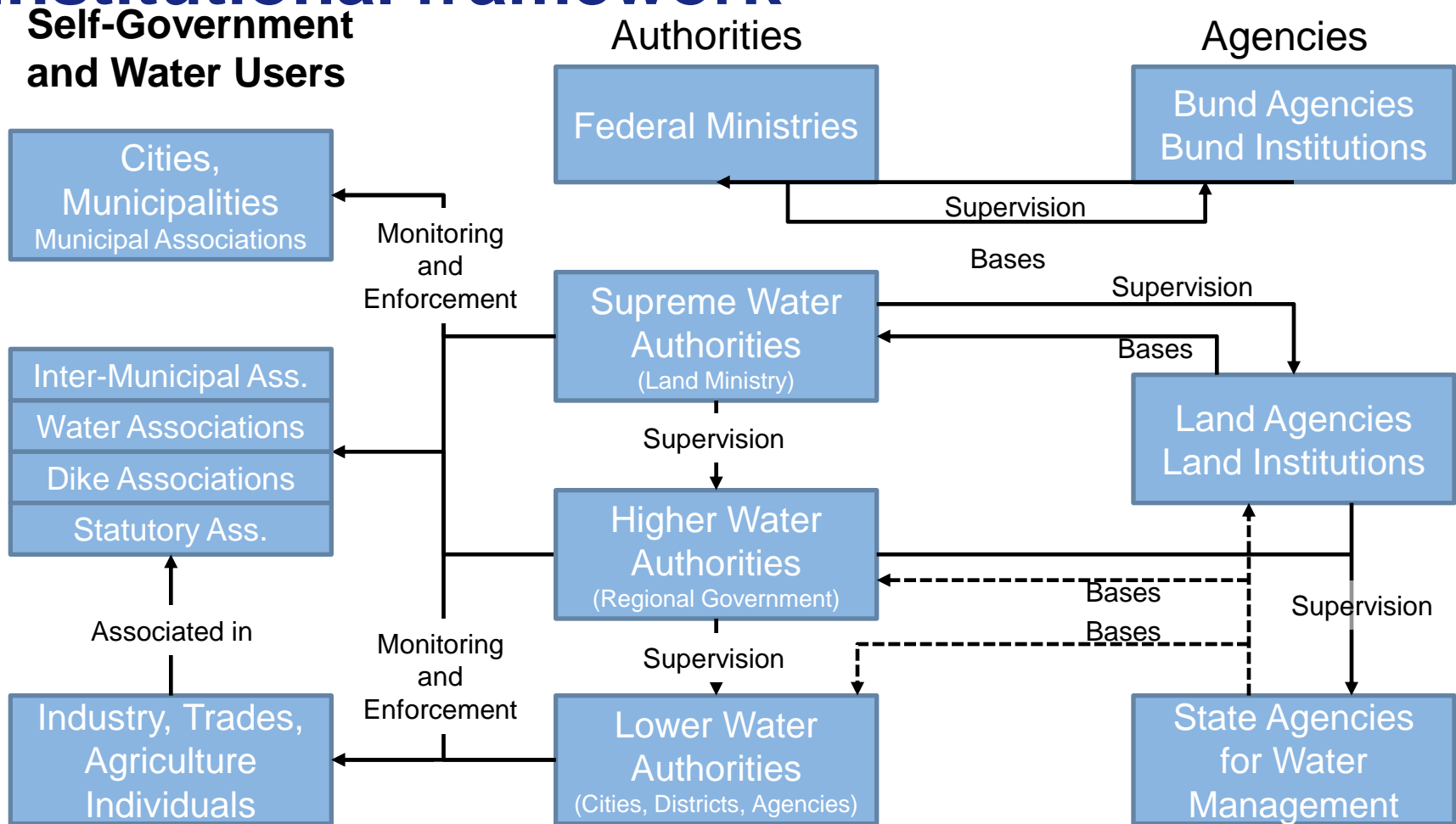
Berlin, September 6th, 2016

Evelyn Lukat

The statutory framework of water management in Europe and Germany



Institutional framework

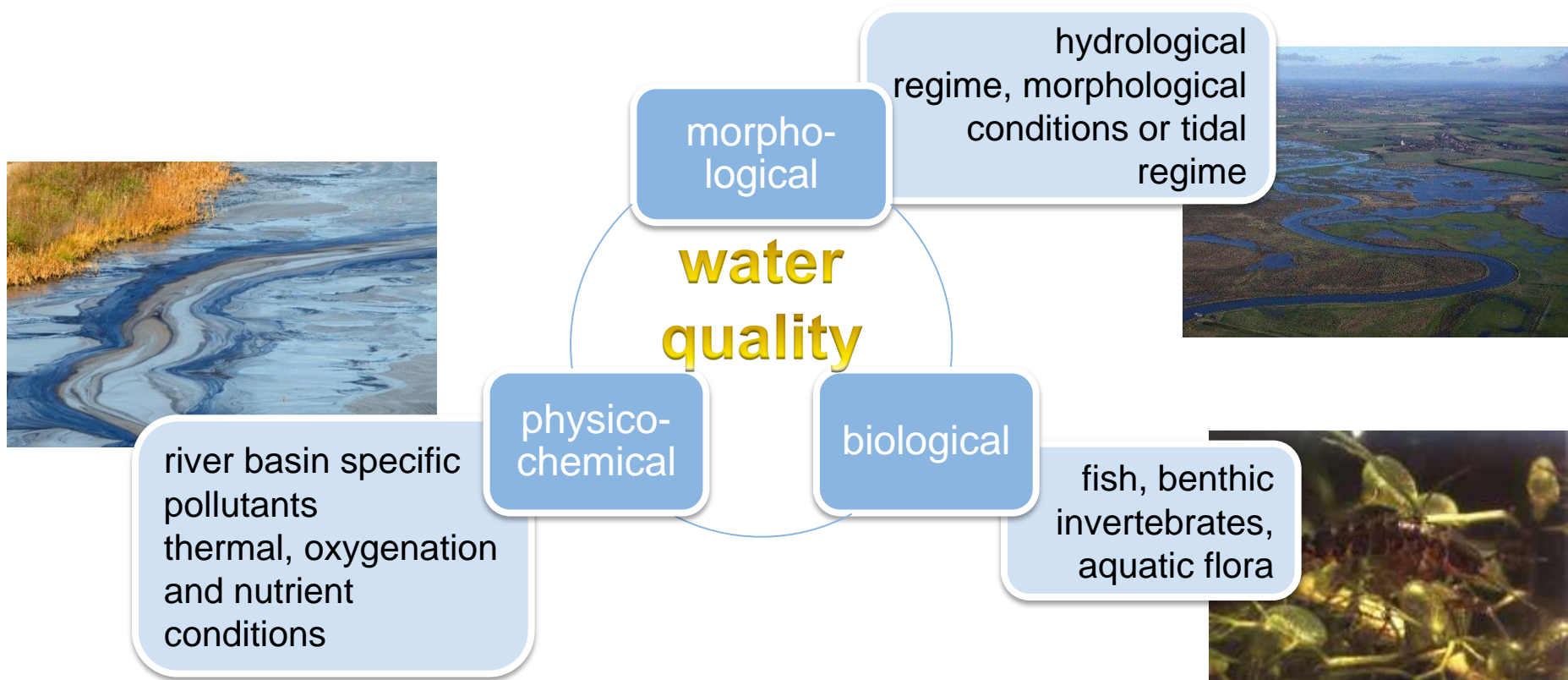


Statutory framework in Germany

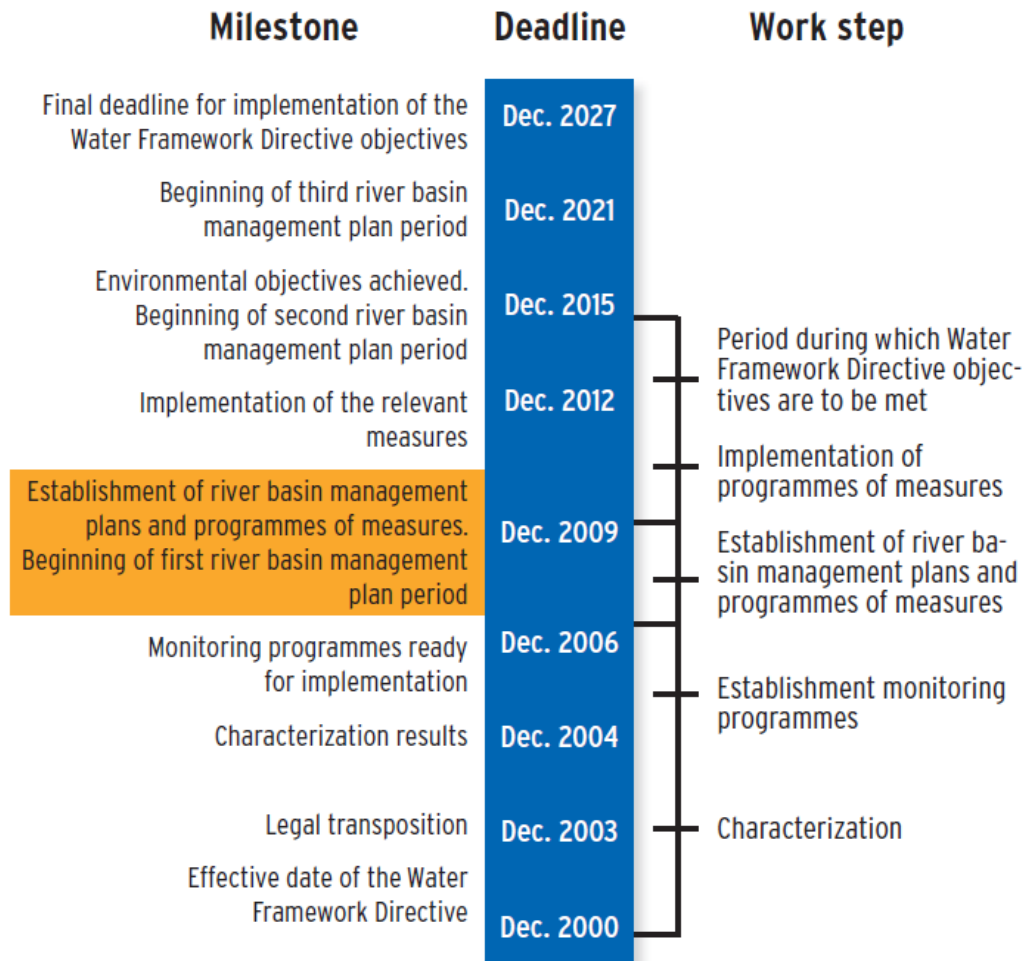
	Exclusive competence	Concurrent competence	Competence for framework laws
Bund	<ul style="list-style-type: none"> •WaterFramework Directive •Groundwater •Floods •Marine Strategy •Surface Water •Drinking Water 	<ul style="list-style-type: none"> • Water Management Act • Water Association Act • Federal Waterways Act • Drinking Water Ordinance 	<ul style="list-style-type: none"> • Effluent Charges Act
Länder			<ul style="list-style-type: none"> •Land Water Acts and implementation of law

The EU Water Framework Directive (WFD)

Objective: Attaining “good environmental status” for Europe’s rivers, lakes, groundwater bodies and coastal waters by 2015



The Implementation of the WFD



River Basin Management Plans

- **Water management according to the natural unit: the river basin**
- **Responsibility on Laender level**

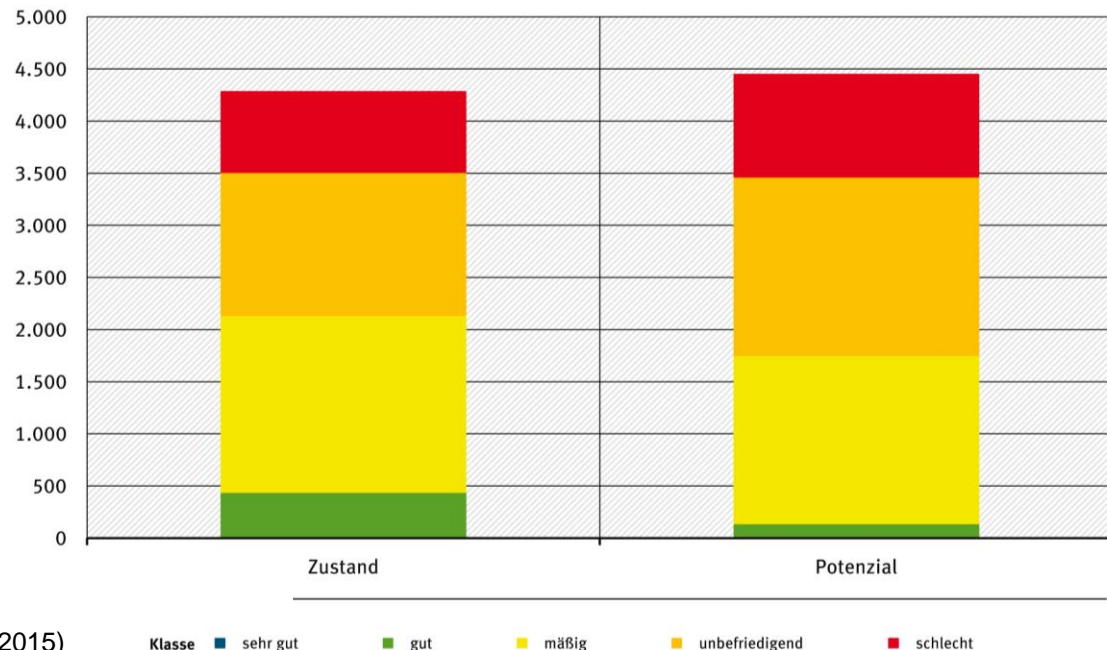
Good Ecological Status in Germany

In 2015, 10 % of the surface water bodies are in good or very good state.

More than half of the water bodies are heavily modified in their flow regime. 3 % of these have a good ecological potential.

The main reasons for not reaching the good status are:

- Alterations in the flow regime (regulations on the rivers, interrupted passability)
- Nutrient emissions to water bodies mainly from agriculture

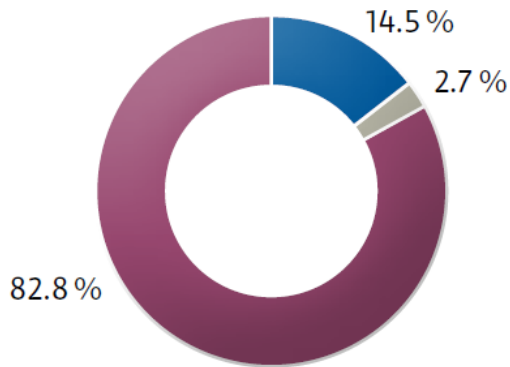


Source: UBA (2015)

Availability and Sources of Water

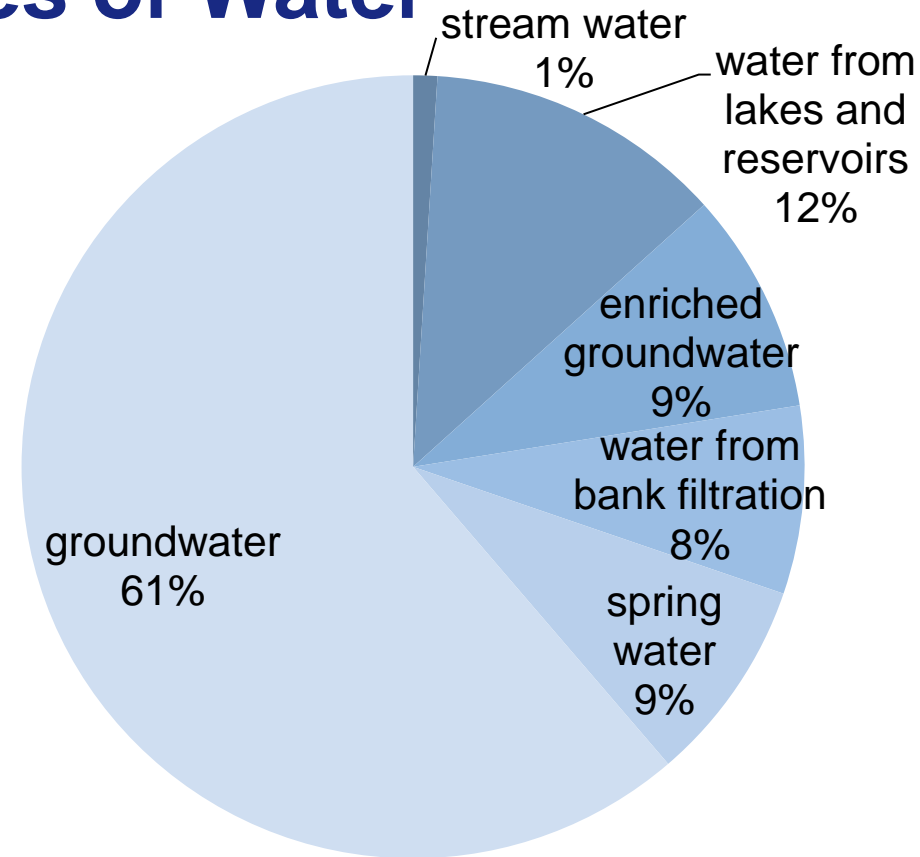
Water utilisation in Germany in 2007

Total available water resources:
188 billion cubic metres



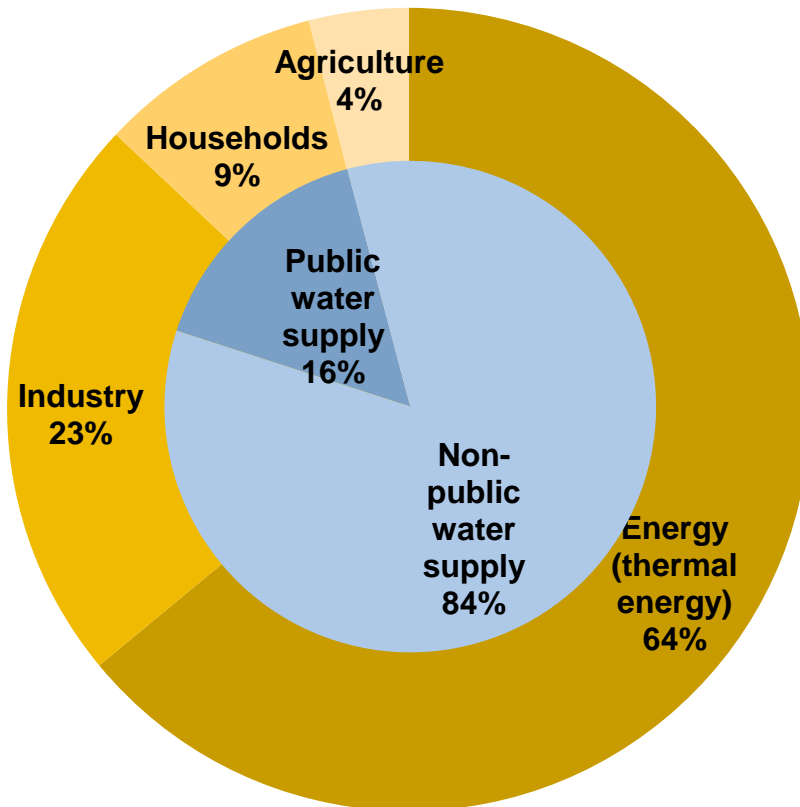
Total water consumption 17.2% (32.3 billion m³)

- Non-public water supply and wastewater disposal 27.2 billion m³
- Public water supply 5.1 billion m³
- Unused 155.7 billion m³



Reclaimed water is not (yet) used in Germany due to abundance of water resources

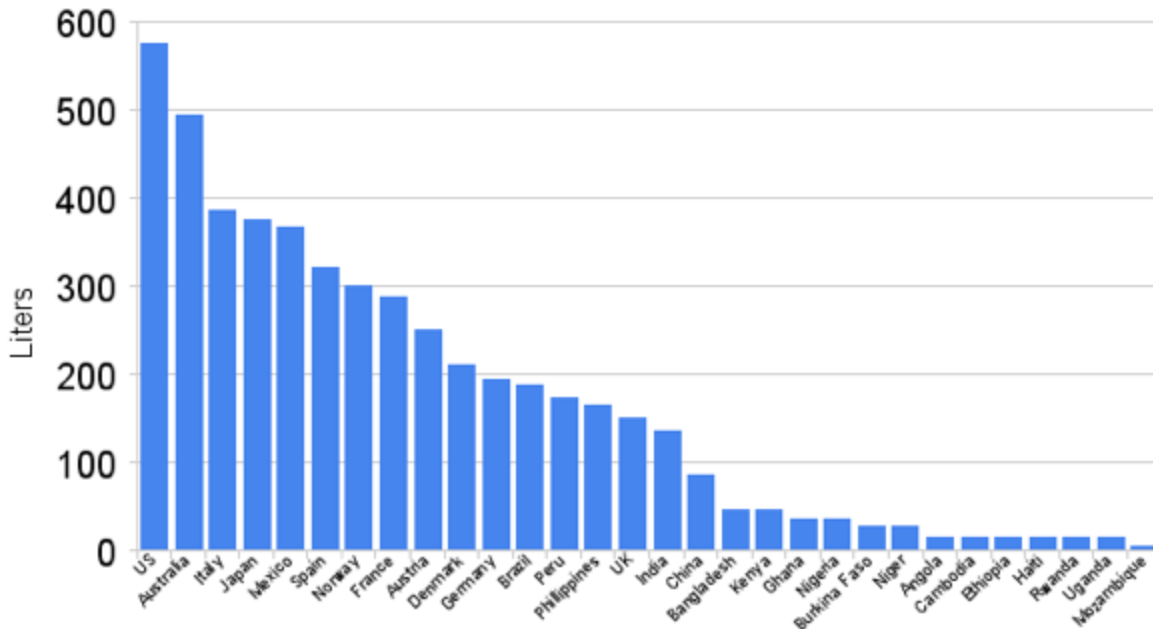
Uses of Water



- Non-public water supply comprises water uses of industry, agriculture and energy
- 94 % of the industrial water demand is covered by own supply

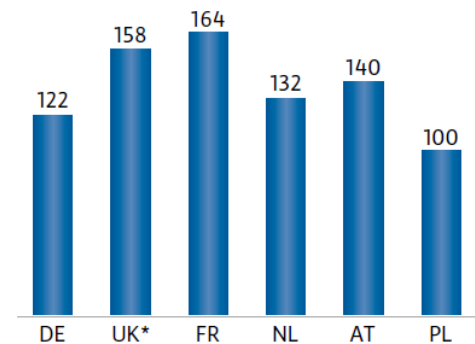
Per-capita water consumption in Germany

Average Daily Water Usage Per Person



Comparison of per-capita water consumption on a European level

Data in litres per person and day (status: 2007)

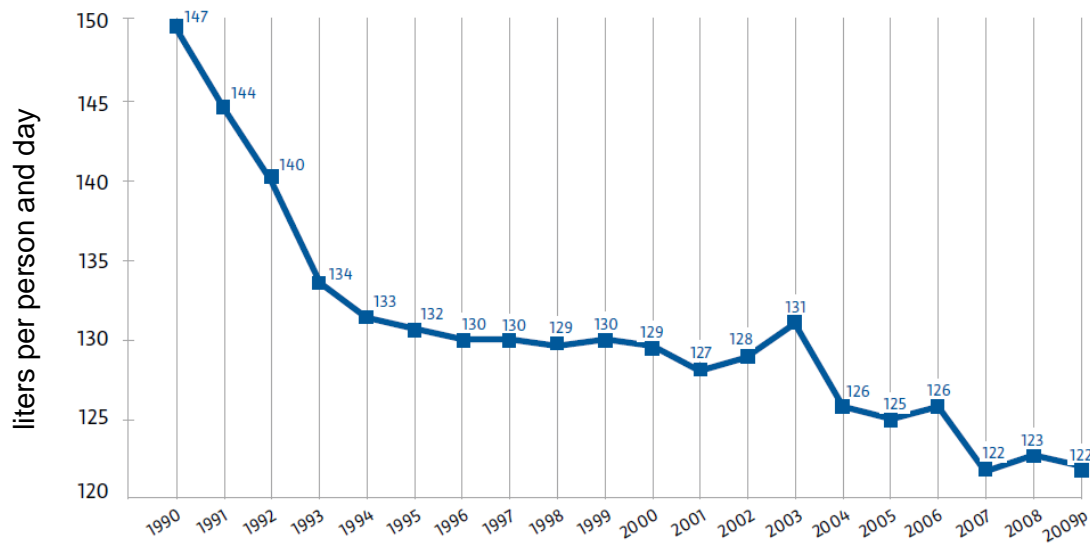


* England & Wales only

- India: 135 L
- Phillipines: 165 L
- Canada: 335 L

Per-capita water consumption in Germany

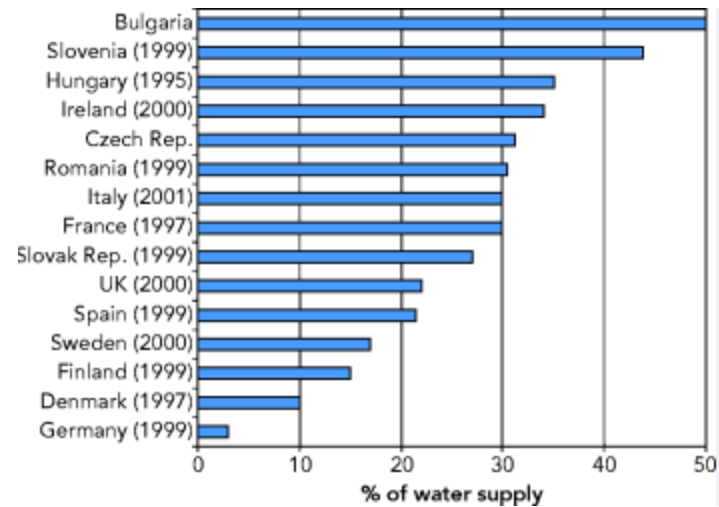
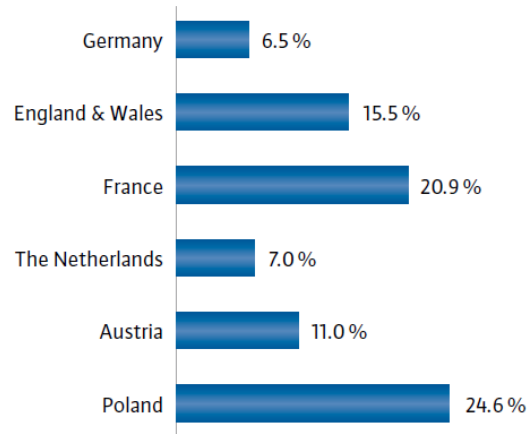
➤ Since 1990, average water consumption has decreased by 16% due to changed consumption patterns, the development and use of water-saving fittings and household appliances.



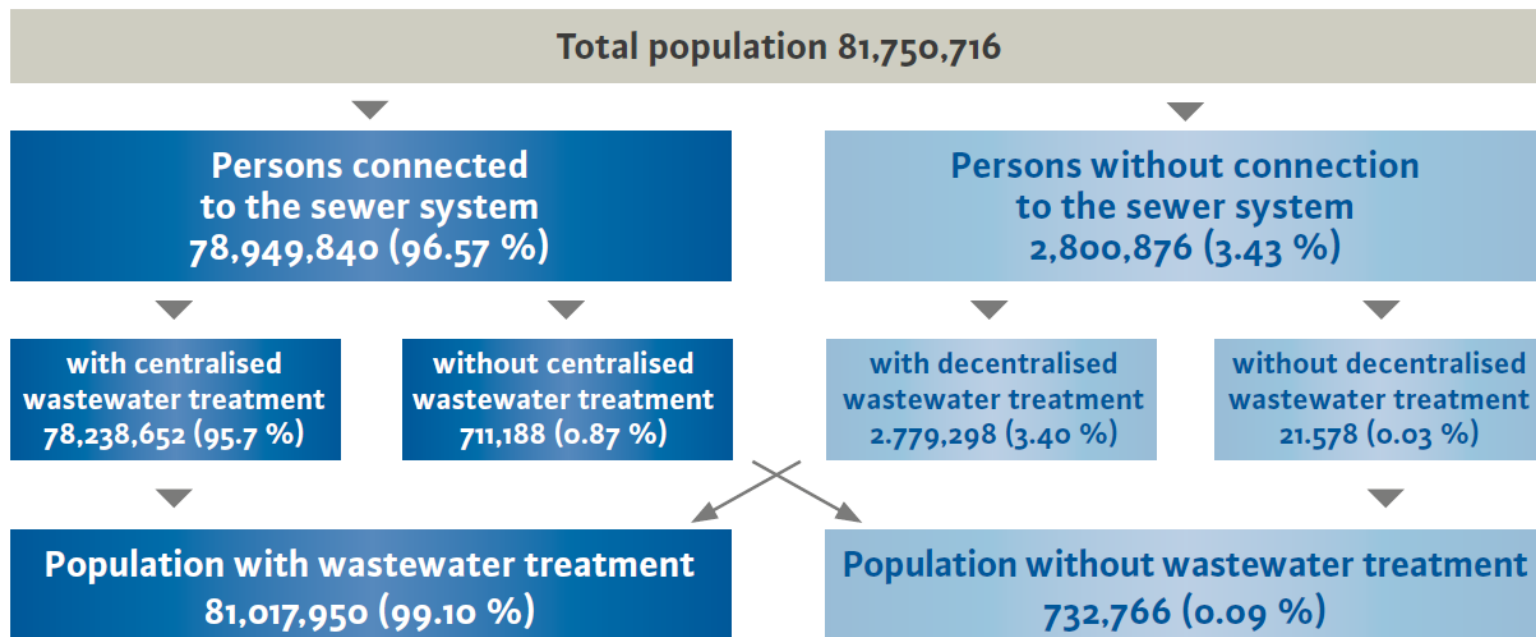
Water for industry continuously decreases due to changed production processes and increasing self-production.

However, facilities are under used.

Water Losses



Wastewater disposal in Germany in 2010



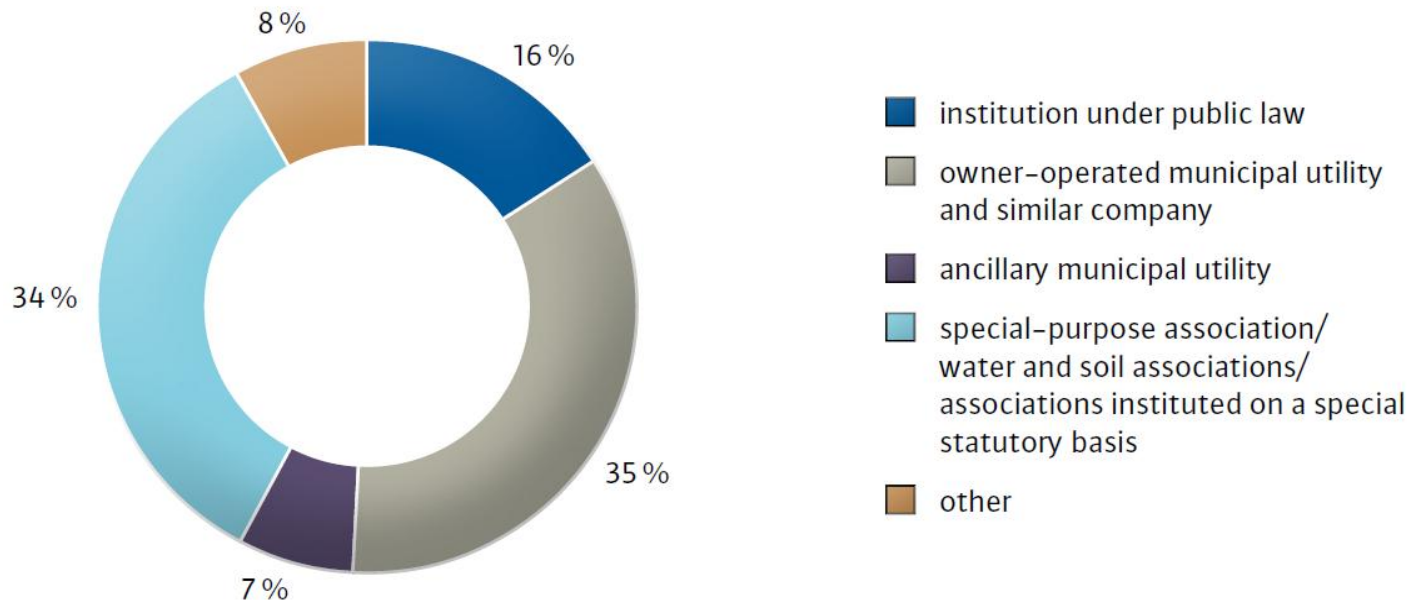
Role of municipalities in Germany

- Self government of municipalities is legally ensured.
- Municipalities are obliged to handle wastewater disposal and may manage their drinking water supply.

- Water supply:
40% private,
60% public

Types of enterprise of wastewater disposal 2014

weighted according to the population connected to the sewerage system



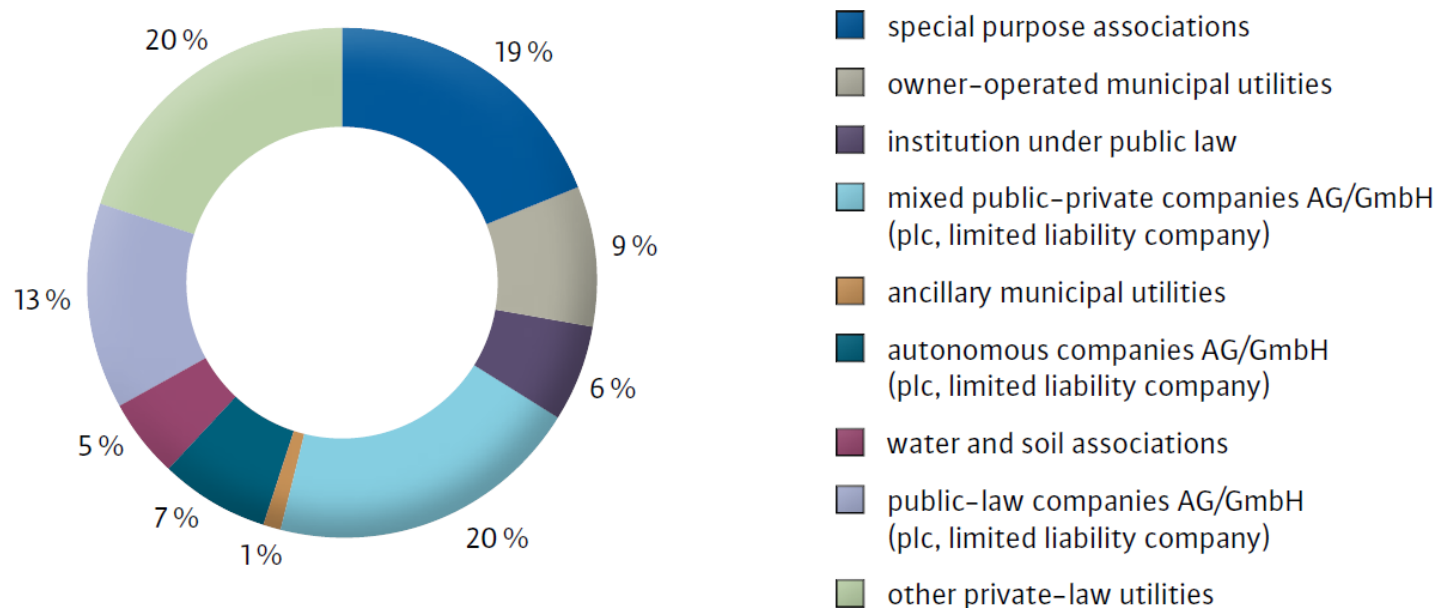
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Types of enterprise in the public water supply 2012

Shares related to water output



Waste Water Treatment

According to generally accepted best available technology

- ▶ 1. Purification stage: Mechanical processes (adsorption, filtration, stripping) with grill, sand filtration, primary sedimentation tank
- ▶ 2. Purification stage: Microbiological processes, decomposition of organic components (aerobic & anaerobic), elimination of organic Nitrogen & Phosphorus
- ▶ 3. Purification stage: Abiotic-chemical processes (oxidation, precipitation) to further eliminate Phosphorus
- ▶ 97% of the municipal wastewater is treated at highest EU standard: biological treatment with nutrient elimination.
- ▶ Waste water treatment plants achieved removal of 81% of nitrogen and 91% of phosphorous

Challenge: Micropollution

100,000 compounds are registered in the EU; 25% evaluated for their ecotoxicity (Fent, 2003)

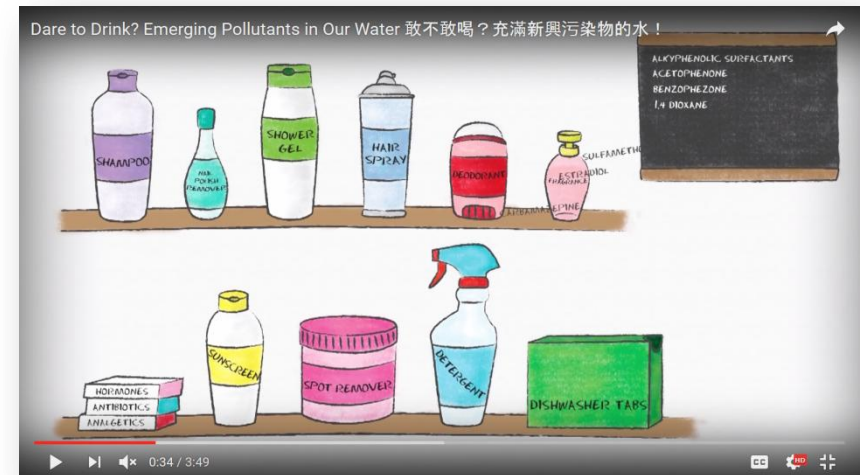
- ▶ Personal hygiene products, pharmaceuticals, pesticides, paint
- ▶ Potentially toxic or carcinogenic

Which effects do they have?

- ▶ Endocrine disruptors

Techniques are known

- ▶ Managed aquifer recharge, advanced oxidation techniques, hybrid membrane filtration, bioassays



<https://www.youtube.com/watch?v=v8ihsQYOos>

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Thank you for listening!

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References (1)

Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit (BMU). *Erfahrungsbericht 2011 zum Erneuerbare-Energien-Gesetz (EEG-Erfahrungsbericht) gemäß § 65 EEG*. Vorzulegen dem Deutschen Bundestag durch die Bundesregierung. Entwurf vom 03.05.2011.

Büro für Technikfolgen-Abschätzung beim Deutschen Bundestag (TAB). *Herausforderungen einer nachhaltigen Wasserwirtschaft: Innovationsreport*. Working report no 158. Draft. Berlin: May 2013.

Cooley, H. & P. Gleick. *Urban Water-Use Efficiencies: Lessons from United States Cities*, in: P. Gleick: *The World's Water 2008–2009 - The Biennial Report of Freshwater Resources*, Island Press, 2009, ISBN 10:1-59726-504-7

Fent, K. *Ökotoxikologie: Umweltchemie, Toxikologie, Ökologie ; 63 Tabellen*. Stuttgart [u.a.]: Thieme, 2003.

Kraemer, R.A. & F. Jäger. *Germany*. In: *Institutions for Water Resources Management in Europe*. pp. 183-325. F.N. Correia (Ed.). Vol. 1. Rotterdam: 1998.

References (2)

Richter, S., J. Völker & T. Dworak. *Die Wasserrahmenrichtlinie: Auf dem Weg zu guten Gewässern-Ergebnis der Bewirtschaftungsplanung 2009 in Deutschland*. Bundesministeriums für Umwelt, Naturschutz und Reaktorsicherheit, Wasserwirtschaft, Bonn: 2010.

Statistisches Bundesamt (German Federal Statistical Office). *Umwelt: Öffentliche Wasserversorgung und öffentliche Abwasserentsorgung 2010*. Fachserie 19 Reihe 2.1.1. Wiesbaden: 2013.

Umweltbundesamt (UBA). *Ökologischer Zustand der Gewässer*. <https://www.umweltbundesamt.de/daten/gewaesserbelastung/fliessgewaesser/oekologischer-zustand-der-fliessgewaesser>. 2015.

Umweltbundesamt (UBA). *Umweltbundesamt: Bedeutung der Wasserkraft in Deutschland*. <http://www.umweltbundesamt.de/wasser/themen/fluesse-und-seen/fluesse/belastungen/wasserkraftnutzung.htm>. 2008.

UNDP. *Human Development Report: Beyond scarcity: Power, poverty and the global water crisis*. United Nations Development Programme, New York. 2006.

Wirtschafts- und Verlagsgesellschaft Gas und Wasser mbH (wvgw). *Profile of the German Water Sector*. Bonn: 2015.