



WEF-Nexus and drinking water supply

Solutions Across the Water-Energy-Food Nexus

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BMZ



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WEF-Nexus and drinking water supply

in the context of international water policy and development cooperation

- What are the most significant aspects apart from technology?
- To what extent have these aspects entered into the (sub) national, regional and global Nexus-agenda?
- What are the future needs?





Effective Implementation of **CleanTech** **Regulatory Principles** to be considered

- **Close-to-nature** drinking water supply
 - **Water as a public good**: Limit treatment efforts and costs for personal access
 - Art. 11, p. 3 European Water Framework Directive
- **Prioritizing public drinking water supply** in sustainable water management, e. g.
 - General Comment 15, n°6
 - Several national water laws
 - German Constitutional Court (ref. § 6 1, s.1 n° 4, Water Resources Act, WRA)
- **Minimization of chemicals used for water treatment**, e. g.
 - German Drinking Water Ordinance, § 5 (4), § 6 (3)
- **Minimization of transport energy consumption**
 - **Close-to-point-of-use** water withdrawal (e. g. § 50 p. 2 s. 1 WRA)

Nature of Principles: Strong interlinkages



Sustainable Development Goals Proposal

Goal 6. Ensure availability and sustainable management of water and sanitation for all

6.1 by 2030, achieve universal and equitable access to **safe and affordable drinking water for all**

6.6 by 2020 **protect** and restore **water-related ecosystems**, including mountains, forests, wetlands, rivers, aquifers and lakes...



Linkage with principle of cost coverage and concept of environmental and resource costs

→ EU Water Framework Directive:

*Art. 9, (1.) Member States shall take account of the principle of **recovery of the costs of water services**, including **environmental and resource costs**, ..., and in accordance in particular with the **polluter pays principle**.*

German Federal Environmental Agency (UBA):

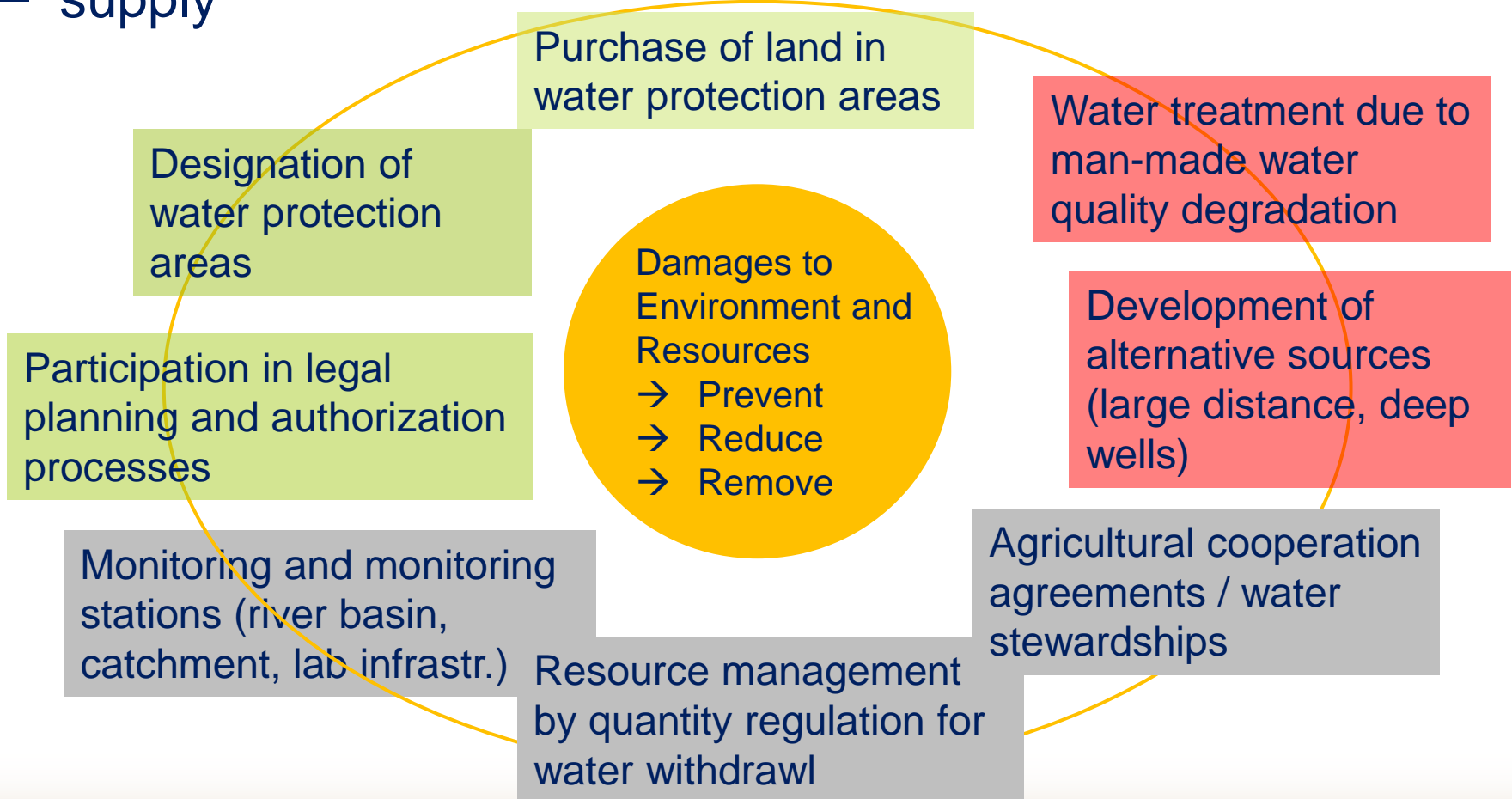
„Assessing Environmental and Resource Costs in the Water Framework Directive: the Case of Germany”

→ **Environmental and resource costs occur, when water treatment for man-made contamination (degradation) of raw water is necessary**

→ eg. if denitrification is necessary



REAL WORLD External (Environmental and Resource) Costs from the perspective of drinking water supply





Relevance of Economical Indicators

Capital Costs

- Strongly scale-dependent
- **Reality of development context:** National and/or external grants, not included in tariffs

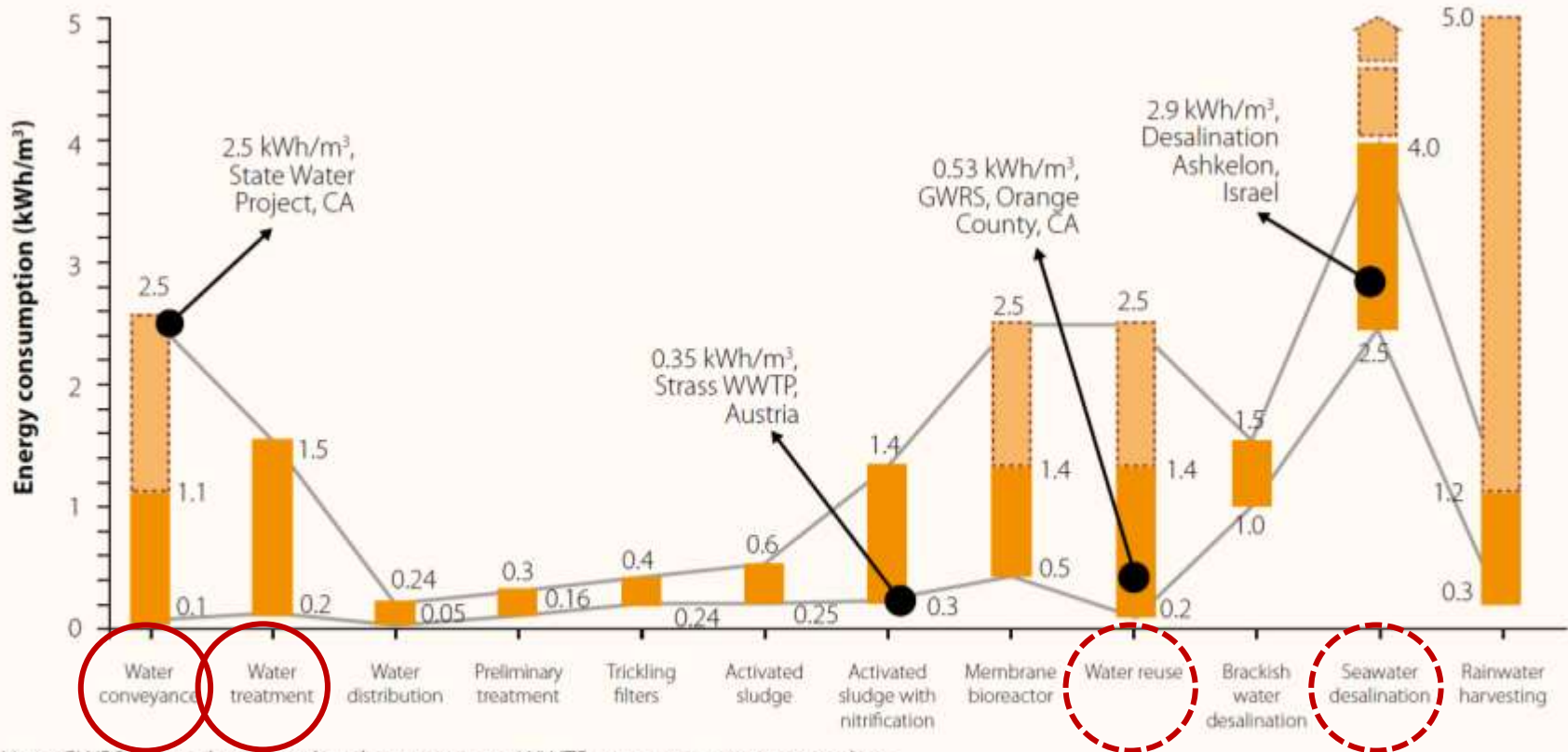
Operating Expenditure (OPEX)* for:

- | | |
|------------------------|------------------------------|
| • Watershed management | 0 to 5 EUR-ct/m ³ |
| • Water withdrawal | 2 to 9 EUR-ct/m ³ |
| • Water treatment | 2 to 8 EUR-ct/m ³ |

* IWW research project, final report 2008, selected German case studies



Energy Footprint in Water Cycle Management



Note: GWRs, groundwater replenishment system; WWTP, wastewater treatment plant.

Source: Lazarova et al. (2012, fig. 23.1, p. 316, adapted from sources cited therein). © IWA Publishing, reproduced with permission.

Source: World Water Development Report 2014, Water and Energy, UNWater



Case of Europe / Germany

- **Intense use of fertilizers for food and bioenergy** production leads to nitrate leakages
- 36% of groundwater monitoring sites show elevated nitrate concentrations, 15% exceed the legal threshold of 50 mg/l
- Increasing number of water suppliers need to remove nitrate to reach drinking water quality
 - Increased energy consumption and treatment costs
- *First Evaluation of EU Nexus Approach (EU-CAP regulation) with limited results*



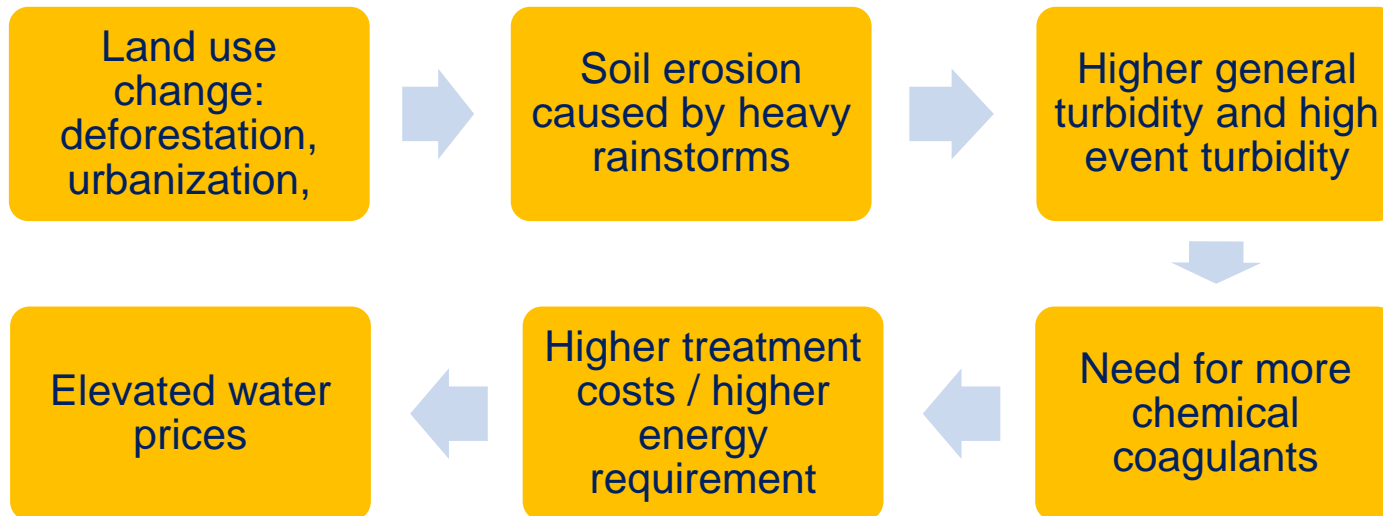


DR Congo

Support of the Water Sector Reform (GIZ)



Example: Water supply for Kinshasa, capital of DR Congo → watershed degradation increases water treatment costs





Lebanon

Protection of the Jeita-Spring



Objective: **Reduce pollution risk** for the drinking water supply of Beirut by:

- 1. Impact assessment** of wastewater treatment facilities
- 2. Implement groundwater protection zones** for Jeita and other springs (including landuse restrictions)
- 3. Monitoring system** for water quality and quantity
- 4. Proposal for an improved water conveyance system**



Source: BGR



Key Messages

- I. **Bias towards energy and food production needs** in the WEF-Nexus agenda
 - More room for **specific drinking water supply needs**
- II. Need to **critically examine principle of cost coverage when OPEX include externalities**, in particular
 - within the context of drinking **water supply to the poor**
 - when instruments of **social security are absent**
- III. R&D work needed to develop simple **monitoring systems on externalities from other sectors**, in particular energy and other materials consumption (OPEX benchmarking)
- IV. Develop **WEF-Nexus policies to prevent externalities** and to **internalize costs** (e.g. levees on energy and food production) in developing countries



Thank you for your attention!

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Regulatory Framework in Germany

- Duty of water supplier to keep raw water as clean as possible to minimize treatment effort
- Methods applied are:
 - Land use plans
 - Cooperation with other watershed actors, e.g. industry, farmers
 - Agriculture: Counseling about fertilizers and financial reimbursement for lost yield





Water Supply Bogotá, Colombia

- Drinking water from high-elevation wetland ecosystem
- Good raw water quality (only chlorinated and seldom needs sand filters)
 - Low treatment costs
- Watersheds are threatened by agriculture and climate change
- Conservation trust fund to protect ecosystem by The Nature Conservancy, a charitable environment organization
 - Watershed protection can save water treatment facilities \$4 million per year



"Laguna Chisacá - Philipp Weigell CC



Pakistan (financial cooperation)

Qutta Water Project

Water and Sanitation Program in Gilgit Baltistan and Chitral



- Pakistan is defined as water scarce country (below 1,100 m³ per capita)
- Reasons are: excessive groundwater abstraction, salinity, low efficiency in the water distribution, contamination of water resources
- Textile industry uses and pollutes 70% of all water withdrawals
- Cities incur increasing costs for pumping and alternative supply sources; Impeding successful development projects



→ Upcoming GIZ project: Water Efficiency in the
Textile Sector