



Federal Ministry
of Education
and Research



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Science and Technology – Drivers for a Common Future

**Proceedings of the 3rd Indo-German
Conference on Research for Sustainability:
Water and Waste Management**



RESEARCH

Igniting ideas!

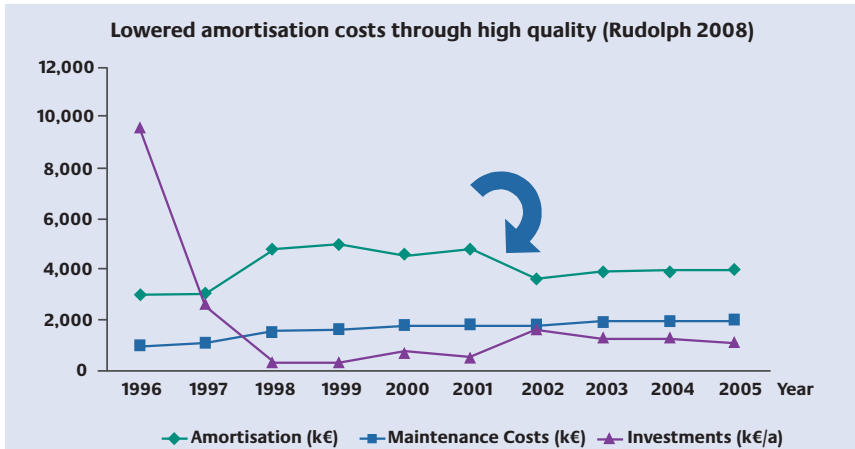
Research on Water Management Technologies in Germany

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Until the German reunification in 1989, the former German Democratic Republic was in a poor state regarding wastewater and solid waste management. A modern and sustainable environmental infrastructure had to be developed in a short time period, in compliance with German and European standards. Unique experiences and know-how had been generated during that time period. Important lessons had been learnt in technologies and management. These lessons could be well utilised by other emerging countries trying to achieve rapid progress in water and sanitation.

One important lesson has been that cheap quality in water and sanitation causes surplus capital and operational costs, as well as poor levels of facilities performance. In contrast, appropriate quality in process technologies as well as in machinery and constructions, may lower amortisation costs, in the long run - as experienced and verified in the case of the joint research and development demonstration project "Industrial Wastewater Plant, Bitterfeld" with 580,000 population equivalents in capacity on demand (see Figure, p.28).



BMBF-Funded Water Technology and Management Research, Status 2009

The German Federal Ministry of Education and Research (BMBF) is currently funding and active in the following fields of water and sanitation, technologies and management:

- **Decentralised (alternative) water systems;**
- **Adaptation of technologies (climate, education, culture) for drinking water supply and sewage treatment;**
- **Integrated water resources management (IWRM);**
- **Retention and degradation processes to reduce contamination in groundwater and soil;**
- **Permeable reactive barriers for groundwater remediation;**
- **Prognosis regarding the entry of noxious substances in groundwater.**

Opportunities for Indo-German cooperation might be best focused on the areas of water reuse, e. g. sewer harvesting (www.uni-wh-utm.de/html/de/)

forschung/vae.html), as well as in lean cost and near-to-nature technologies such as advanced pond systems (www.uni-wh-utm.de/html/de/forschung/abwasserteiche.html), also in integrated water resources management (<http://www.uni-wh-utm.de/html/de/forschung/iwrm.html>), which is a topic requiring a holistic, multidisciplinary approach in research and application.

Other “Hot Topics” in Future Water Research

Other “hot topics”, which will likely dominate future water research sponsored by BMBF, industries and other actors include the following:

- **Water Efficiency (focusing on specific issues such as: Reuse, Non-Revenue Water, Demand Management in urban and rural areas, for industries, settlements, agriculture);**
- **Utility Management, Economics and Finance;**
- **New Disinfection Strategies and Technologies;**
- **Planning Uncertainties, Stage-by-Stage Concepts and Modular Process Technologies;**
- **Climate Change, Adaption of Water Systems, Mitigation, Resilience;**
- **Energy Efficiency (Clean Development Mechanism, Biogas, etc.), Valuables Recovery, Sludge Management;**
- **Infrastructural Vulnerabilities;**
- **ICT, Remote Control Satellite based GIS Automation.**

The figure (p. 30) visualises the cost hierarchy of water production and explains in which situations advanced solutions regarding water efficiency as well as water treatment technologies are appropriate- especially in water distribution and addressing water loss reduction:

- **As long as water production is easy and cheap (i. e. clean water abstraction from mountain springs), there is no need to reduce water losses below approximately 25% and no need for efficient management or technological efforts;**

- Once water production becomes more difficult, such as purification of contaminated surface waters, the economic conditions might make it feasible to reduce water loss reductions down to approximately 7%;
- In cases when water production is even more costly or water is scarce, it might become necessary to enforce water reuse with so-called recycling technologies;
- In regions where the desalination of sea water (DeSal) is the only option left, after attempting less costly options as previously mentioned, the water losses should be below 2% (as in many regions in Germany);
- Perhaps in the future, when the atmospheric water condensation (AtCo), i. e. “air water milking” will be applied, even more has to be done to maintain water efficiency with water re-use and water loss reduction.

