Prioritisation of measures for water pollution control in river basin management
discussing European and African aspects

Jörg Londong,
Bauhaus-Universität Weimar, Germany
Starting in Europe

Historical development of central water supply and sewerage and multi-step treatment systems, with nutrient elimination (about 5 to 10 €/m³ water or 200 to 400 €/person and year or simply 1€ a day)

It works but:

• it is expensive
• it must be organized sufficiently
• it took a long time of establishing (some generations)
• we have no more bathing waters
• we do not make use of waste
Water Framework Directive

- Reaction on deteriorated waters
- Unified conditions in EU
- Establishing a process of co-ordinated actions
- Improvement of participation processes
Good Status = good biological status

Biological Compounds

- Composition and abundance (absence) of waterflora
- Composition and abundance (absence) of bentic invertebrate fauna
- Composition, abundance (absence) and age of fish
Influence on the process of implementation of the WFD

- Implementation of WFD to national law
- Basin analysis, first description of status
- Monitoring program
- Measures program
- Set up of measures
- Result of measures
- Good status

Possibilities to influence the process of implementation

Influence of administration on process of implementation
Experiences from Eastern Germany and Croatia

Not having invested in a special solution yet opens new chances

Frog Leaping
Frog Leaping in South Africa

Mobile antenna mast Durban
17 Theses for prioritisation of measures for integrated water management

1. preference for focal points of pollution loads
2. most important focus is drinking water supply and its deterioration by deficient wastewater collection and treatment
3. improving and conserving water quality in tourist areas is important for tourist industry and hereby helps the country to comply with its financial obligations caused by water protection in the whole country
4. measures must contribute to achieve the objectives of water protection
5. no waste water concept without waste sludge and residual material utilisation concept, faecal sludge (septic tanks) and faeces (dry toilets) of decentralised solutions have to be implemented in plans of measures
6. centralised and decentralised options of collection and treatment of waste water have to be concerned, adapted solutions of collection, e.g. vacuum or pressure sewerage and new resource orientated sanitation technologies have to be integrated into concepts under investigation
7. stepwise development of systems with minimised reserves eventually as interim solutions
8. construction of drinking water supply and waste water handling in parallel, flushing toilets without sewers and treatment will cause water born diseases
9. construction of treatment plants and sewerage in parallel, it is one operational unit
10. industrial wastewater must be pre-treated onsite, avoid dilution (as it is no solution for pollution), pollution control must be integral part of production
11. measures at source have priority over end-of-pipe-solutions
12. storm water has to be managed, combined sewerage has to be avoided, general and advanced requirements for combined sewage and storm water treatment may have a overwhelming influence on costs especially for sensitive (small) waters
13. in many cases elimination of oxygen consuming compounds (BOD, COD, NH₄) has priority
14. advanced nitrification and denitrification will improve waters only if there is no significant influence of combined sewer overflows
15. with regard to slowly flowing and stagnant waters phosphorus elimination at medium and large treatment plants may have the most significant contribution
16. from river ecological demands it is not possible to formulate requirements for nitrogen elimination at sewage treatment plants
17. for an efficient integrated water management and a co-ordinated rehabilitation of river catchments regional or superior forms of organisations are advisable
1. preference for focal points of pollution loads

Industrial pollution Photo: UNISA

Durban South Africa

Arusha
most important focus is **drinking water supply** and its deterioration by deficient wastewater collection and treatment
improving and conserving water quality in tourist areas is important for tourist industry and hereby helps the country to comply with its financial obligations caused by water protection in the whole country.

Death of Crocodiles Jan. 2009

Olifants River, Kruger NP, SA
no waste water concept without waste sludge and residual material utilisation concept, faecal sludge (septic tanks) and faeces (dry toilets) of decentralised solutions have to be implemented in plans of measures.
stepwise development of systems with minimised reserves eventually as interim solutions

But: watch thesis 5
construction of drinking water supply and waste water handling in parallel, flushing toilets without sewers and treatment will cause water born diseases
construction of treatment plants and sewerage in parallel, it is one operational unit
industrial wastewater must be pre-treated onsite, avoid dilution (as it is no solution for pollution), pollution control must be integral part of production.
measures at source have priority over end-of-pipe-solutions
infrastructure, which is different from the traditional

The implementation of the new concept will demand an infrastructure, which is different from the traditional. In many cases (concepts) waste has to be kept separate at source and has to be transported separately to different places.

urine diversion

biogas plant

membranes
storm water has to be managed, combined sewerage has to be avoided, general and advanced requirements for combined sewage and storm water treatment may have a overwhelming influence on costs especially for sensitive waters.
storm water has to be managed, combined sewerage has to be avoided, general and advanced requirements for combined sewage and storm water treatment may have a overwhelming influence on costs especially for sensitive waters

There are +28 stormwater outlets leading into the Durban Bay, This is only one.
with regard to slowly flowing and stagnant waters phosphorus elimination at medium and large treatment plants may have the most significant contribution
Integrated Water Resources Management

Self purification by aeration