Niedersächsisches Ministerium
für Umwelt, Energie und Klimaschutz

Cost-effectiveness of measures
- proceedings and findings in Lower Saxony

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Theoretical foundations meet practical water management experiences

Theoretical foundation:

What is required and how can it be classified within the methodical context?

- Several questions concerning the frame, e.g.: Which costs are referred to?
- How can economics support the achievement of the Directive‘s objectives?

Which methods exist to fullfill the requirement?

- Subordinated concept: cost-benefit-analysis
- A range of methods for valuation:
  - » Cost-effectiveness-analysis, value-benefit-analysis, cost-benefit-analysis, cost comparison method, multi-criteria-analysis

Water management in practice, focus on surface waters:

By 2008 there were already more than 2000 potential measures identified in an iterative process, a first expert based selection led to a prioritization of about 700 measures that present the programmatic approach up to 2015.

What kind of verification for cost-effectiveness/cost-efficiency do we want to follow?

- Itemized approach?
- Approach for overall social cost-benefit?
- Etc.?

→ And which approach will be the best in terms of practicability and efficiency?

Project on cost-effectiveness

Study with following structure:

1. Performance of **cost-effectiveness-analysis** in line with the guidance documents and economic literature
   - → Selection of two case studies (for surface waters)
   - → Performance of cost-effectiveness-analysis for each considered site

2. Identification and **analysis of existing institutions (structures and processes)** that lead to selection and prioritization of measures:
   - → In order to seek further mechanisms that ensure the efficient achievement of the Directive‘s objectives
   - → To assure the use of existing institutions and identification of potentials for optimization
   - → Application of organizational efficiency as a meta criterion

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Case study 1 (measure for passability)

Location: commuity in the RBD Rhine

Objective: passability in the river Dinkel: comparison of 4 alternative measures with the aim of the re-establishment

Method: cost-efffectiveness-analysis

Basis: feasibility study

measure	*Passability fishfauna*	*passability benthos*	*Appealing design*	*Possibility for canoe passing*	*Time frame*	*average (business) cost [€]*	*Economic costs*
I: installation of small steps	-	+	o	-	Short term	No cost estimation	Marginal
II: „Riegelbauweise“	-	+	o	-	Short term	No cost estimation	Marginal
III: roughened spillway	+	+	o	-	Short term	~ 177.000	Marginal
IV: bypass channel	+	+	+	-	Short term	~ 193.000	Marginal

Case study 2: fruit growing sector as a water user

- **Location:** largest fruit-growing area in northern Lower Saxony („Altes Land“)
- **Objective:** combination of securement of water provision for water users and improvement of hydromorphology
- **Method:** cost-effectiveness-analysis
- **Basis:** feasibility study, **Identification of measures**:

1. Establishment of a tributory (add. water body)
2. Embankment widening
3. Re-establishment of the old tidal creek
4. installing disturbing elements (dead wood or rocks)

→ precondition for performing a CEA is the existence of comparable measures that have the same objective, in this case only one potential measure was feasible

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Case study 2: effectiveness

measure	***Add. Water supply [in m³]***	***Ecological quality elements***					***Ecological effectiveness***	***time***
		Macro-phytes	*Phyto-benthos*	*Phyto-plankton*	*Macro-zoo-benthos*	*Fish-fauna*		
I: Seitengewässer	56.700	+++	++	+	+++	+++	12	kurzfristig

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Case study 2: cost-effectiveness

measure	*Ecological effectiveness*	*add. water supply [m³]*	*Time*	*Investment costs [€]*	*Cost of maintance [€/year]*	*Macro-economic costs*
1. Tributory	12	56.700	Short term	1.500.000	650	low

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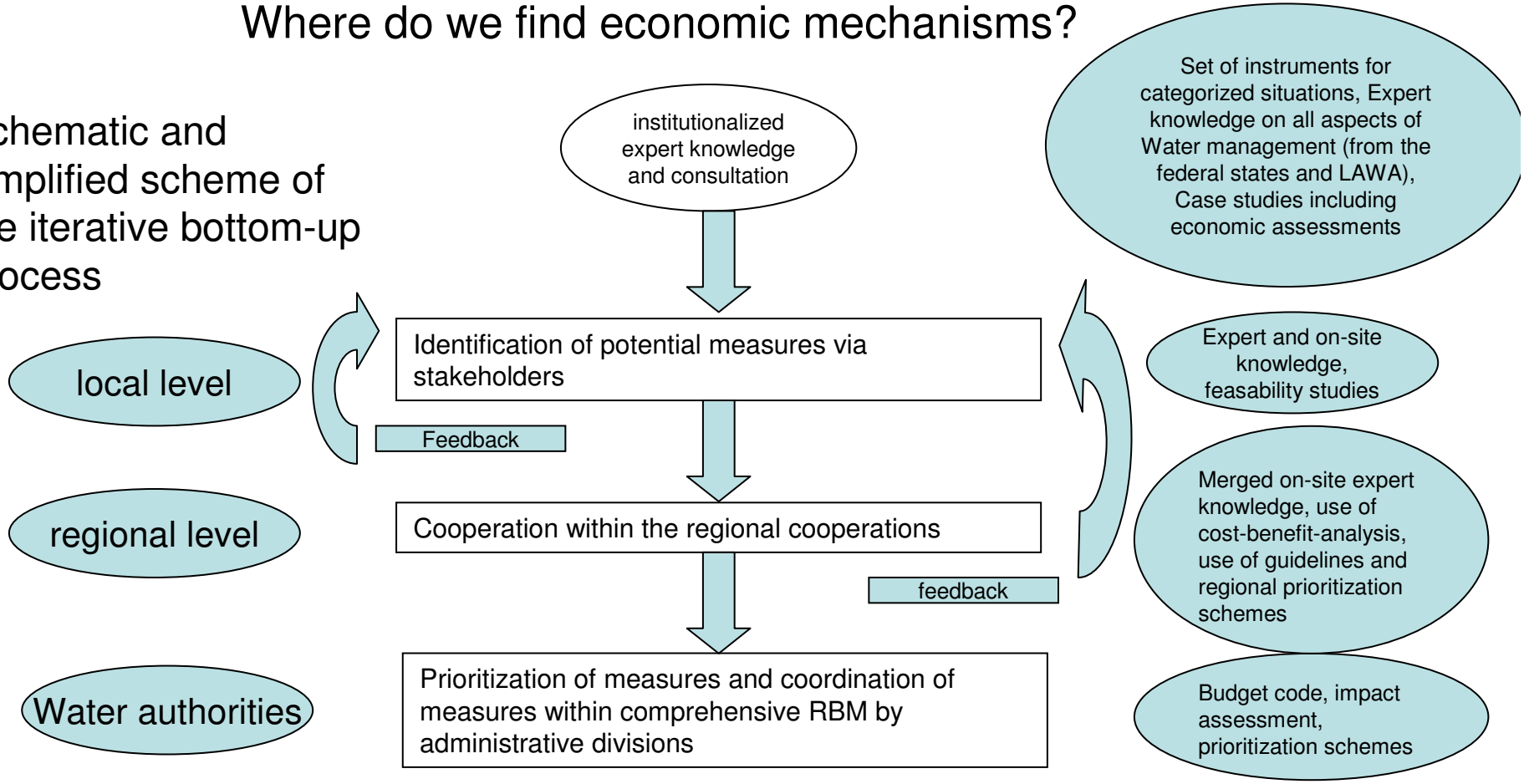
Procedural approach: analysis of existing institutions

How are measures identified and prioritized?
Where do we find economic mechanisms?

Schematic and simplified scheme of the iterative bottom-up process



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Conclusions from the CEA project

- In Lower Saxony the identifcation process for measures varies between water type (ground and surface waters). The study shows:
  - Measures for ground water bodies have been identified and selected through other institutions and mechanisms as those for surface waters.
  - Explicit CEA for single sites shows that the existing institutions provide mechanisms that assure an efficient outcome (cost-effective measures).
  - → **But there is no golden standard:** cost-effectiveness of measures can not be identified with standardized criteria within the different categories of waters nor for different sites.

- Concerning the method:
  - Proof of cost-effectiveness can be fulfilled
  - precondition for performing a CEA is the existence of comparable measures that have the same obejective (e.g. passability), this is not the case in most areas.
  - An itemized analysis of all single sites/regions is not a practical solution

- Findings:
  - Cost-effectiveness is not the single nor the ultimate criteria for the selection or prioritization of a measure.
  - Institutions play a significant role in the process of identification and prioritization of measures

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Lessons learned and ideas for further procedure

Lessons learned:

- experience show the strength of the proposed method, but also the limitations when it comes to practical water management challenges.
- time-consuming and cost-intensive for bottom up processes with very limited additional information

→ so far fulfilling the economic requirement only provided little extra information for decision making

Further procedure:

- Scheme for requirement of explicit CEA for measures
- The advanced procedures of WFD water management are linked with the procedural approach
- Methodic substanciation of the procedural approach

What are the needs:

- focus on practical needs: what are the problems, where can economics help and how?
- consideration of water management procedures and structures →therefore maybe new methodologies? Example I-Five

First ideas:

- further integration of economics into the planning process?
- not only customizable but also standardizable economic based systems for decision support?
- look into other economic disciplins, e.g. organizational efficiency, adapted controlling of public authorities (water management administration)

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Scheme for requirement of CEA

As part of the latest guidance document