Economic analysis in Swedish RBMPs
Economic analysis in Swedish RBMPs and a short general overview of the Northern Baltic Sea RBD

• Quick overview of the RBD, status and pressures
• Economic analysis
  - Cost effectiveness
  - Cost benefit
  - Affordability
  - Financing (including PPP)
• Conclusions
• Wishes for the future work
Short facts of the Northern Baltic Sea RBD

- 3.4 million inhabitants (34 % of pop. in SE)
- 90 % connected to municipal drinking and WWT
- Service sector dominates rather than manufacturing
- Agriculture land 20 %, forest 64 %, water 10 %
Land use

420 lakes
620 streams
170 coastal
Ecological status

80% less than good status
Hydromorphyology - significant pressure from barriers
Eutrophication
Eutrophication - significant pressure from agriculture
Source apportionment of phosphorus (Northern Baltic Sea River Basin District)

- Sewage from rural households
- Storm-water runoff
- Agriculture
- Forest
- Municipal Sewage (WWTP)
- Industry
Chemical status

7% < good

Kemisk status
utan överallt överskridande ämnen
Ytvatten
Ground water status

570 ground water bodies
3 % < good
Economic analysis

- Cost-effectiveness
- Cost-benefit analysis
- Affordability analysis
- Cost-recovery for water services
- The use of PPP
- Financing of measures
Cost-effectiveness analysis
For reducing nutrient loads for about 2000 surface water bodies
and for 15 different measures

Structure liming
Adjusted manure application
Two-stage ditches
Lime-refill in subsurface drainage

Improved sewage treatment in WWTP
and for rural houses

Constructed wetlands and P-sedimentation ponds
Cost per hectare for income loss from buffer zones (90%)

<table>
<thead>
<tr>
<th>PO8</th>
<th>€ cost/yr</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.GSS</td>
<td>719</td>
</tr>
<tr>
<td>2.GMB</td>
<td>462</td>
</tr>
<tr>
<td>3.GNS</td>
<td>347</td>
</tr>
<tr>
<td>4.SS</td>
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<td>5.GS</td>
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<td>6.MSS</td>
<td>148</td>
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<td>7.NN</td>
<td>114</td>
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<tr>
<td>8.ÖN</td>
<td>95</td>
</tr>
<tr>
<td>Sweden</td>
<td>458</td>
</tr>
</tbody>
</table>

https://www.teagasc.ie/media/website/publications/2015/Collentine_D.pdf
Cost for reducing 1 kg P with 2 m buffer zone
Marginal cost curve for buffer zones

Accumulated cost (MSEK) vs. Accumulated effect (kg P)

- Locally based calculation
- Single value for whole Sweden
Cost-effectiveness analysis
GIS-database with costs and effects per water body
Cost-effectiveness analysis for each water body

- **Cost (MSEK)**
- **Effect (kg P)**

1. Targeted buffer-zones
2. P-sedimentation ponds
3. Wetlands
4. Structure liming
5. Improved sewage for rural households
6. Adjusted manure application
7. 2-stage ditches
8. Lime-refill in drainage
9. Buffer zones
10. Sewage WWTP

P-reduction target
All analyzed measures against eutrophication
Costs-benefit analysis

**Benefits based on**
Value transfer from **WTP-studies in Denmark and Norway**

Willingness to pay:
28 - 32 € per household
For good ecological status
Catchments where costs are significantly higher than benefits

- Costs 3 times > benefits

Extended deadline to 2027:
- > 700 water bodies (30 %)

Next cycle probably use the “Leipzig model” for CBA
Analysis of affordability per sector – the Simpler method

Cost for personnel/Added value

High efficiency

Low efficiency

Capital cost / Added value
Performance with costs of measures
Performance without costs of measures
Affordability – effect of costs of PoM on sustainability of businesses

Agricultural enterprises

Genomsnitt 2013-2014
Affordability – effect of costs of PoM on sustainability of businesses

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value added</td>
<td>12 980 559</td>
</tr>
<tr>
<td>Cost for agriculture in PoM if PPP is applied</td>
<td>428 000</td>
</tr>
</tbody>
</table>

That is 3 % of value added
Affordability

Influence of the costs in the PoM on companies competitiveness

- Agriculture
- Forestry
- Industry
- Hydro-electric power production
- Municipalities
Cost-recovery of water services

1. Only municipal drinking water production and distribution and waste water treatment are defined as water services in Sweden.

2. Resource costs are assumed non-existent (negligible problems with water quantity).

3. Environmental costs: for N and P 85 M€* (costs for environmental chemicals not estimated). Expenditures on environmental protection (value added): 190 M€

4. That is, full cost-recovery is claimed to be accomplished for environmental costs.

* Mean value from WTP-studies (Contingent valuation method)
Cost-recovery of water services

Comparison of water price for domestic use:

<table>
<thead>
<tr>
<th>Country</th>
<th>Price (€/m³)</th>
<th>Range (€/m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Catalonia</td>
<td>2,6</td>
<td>(1 to 3)</td>
</tr>
<tr>
<td>Sweden (Västerås)</td>
<td>3,5</td>
<td>(2 to 7)</td>
</tr>
</tbody>
</table>

Comment:

- Ground water from eskers but with artificial infiltration of water from lakes
- Distribution costs are higher because of less population and less pop. density
Cost-recovery of water services

Comparison of water price for domestic use:

Catalonia 2,6 €/m³ (1 to 3 €/m³)
Sweden (Västerås) 3,5 €/m³ (2 to 7 €/m³)

Comment:
- Ground water from eskers but with artificial infiltration of water from lakes
- Distribution costs are higher because of less population and less pop. density
Use of PPP

Municipal drinking water supply (and waste water treatment) is covered by water fees to more than 99 %

Nitrates directive – sensitive areas partly adopted to WFD

UWWT directive – > 95 % P purification (0,2mg/l)
> 70 % N purification  (10 mg/l)

Sewage from rural households

Cost for licensing inspection and enforcement
Financing

PPP
- new legislation?

- households:
  higher water tariffs, treatment of sewage from rural households (enforcement of current legislation)

Additional EU or national funding
- more funding or different prioritization in the Rural Development Program?
- EU-LIFE-IP!!
Conclusions

Important with sound economic analysis:

- A basis for transparency (e.g. who will have to pay and how much)
- argumentation based on facts rather than feelings
- important if to justify exemptions

Hopefully it can also be used to:

- implement the most appropriate measures
- to develop appropriate policy instruments
Wishes for the future

More comparisons of methods and benchmarking within EU

- cost-effectiveness and examples
- cost-benefit analysis (and related exemptions)
- affordability (and related exemptions)
- Financing and the use of PPP (especially in the agriculture, the water and sewage treatment sector)
- Cost recovery – benchmarking and methods applied
Economic analysis - Catalonia

Areas for consideration

1. Development/application of methodology for benefits to be used for:
   - motivating costs of measures and “unpopular” policy instruments
   - transparent setting of disproportionate costs

2. Development/application of methodology for calculation of resource costs of water services (especially important in countries with water stress)

3. Development/application of methodology for affordability for most important sectors (e.g. agriculture, industry)
Economic analysis - Catalonia

Areas for consideration

4. Cost-effectiveness analysis including measures from more sectors than urban waste water treatment (e.g. agriculture and industry)

5. Extended description of the cost recovery – transparency to improve decision making.