Economic analysis in Swedish RBMPs

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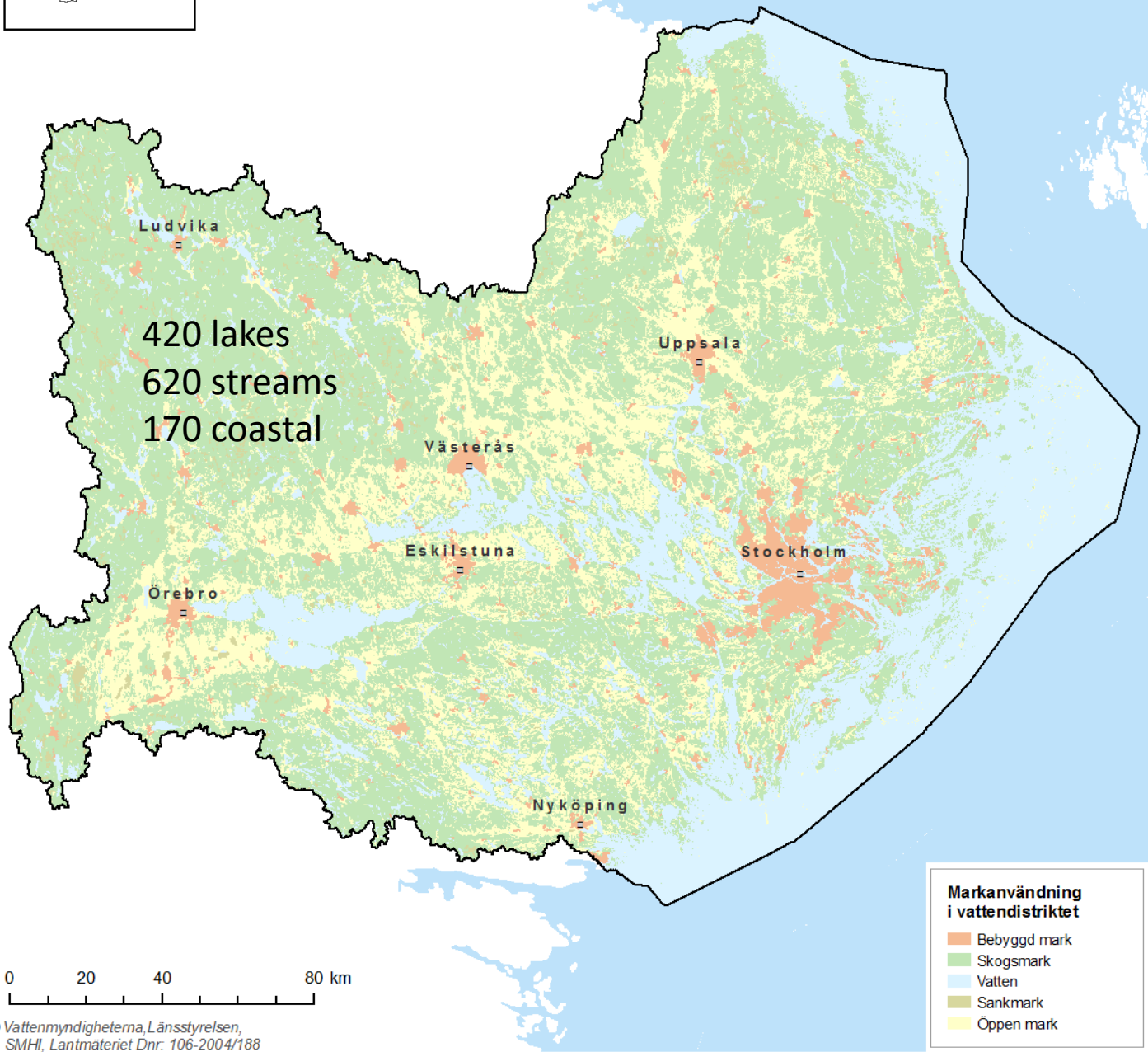
and a short general overview of the Northern Baltic Sea RBD

- 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

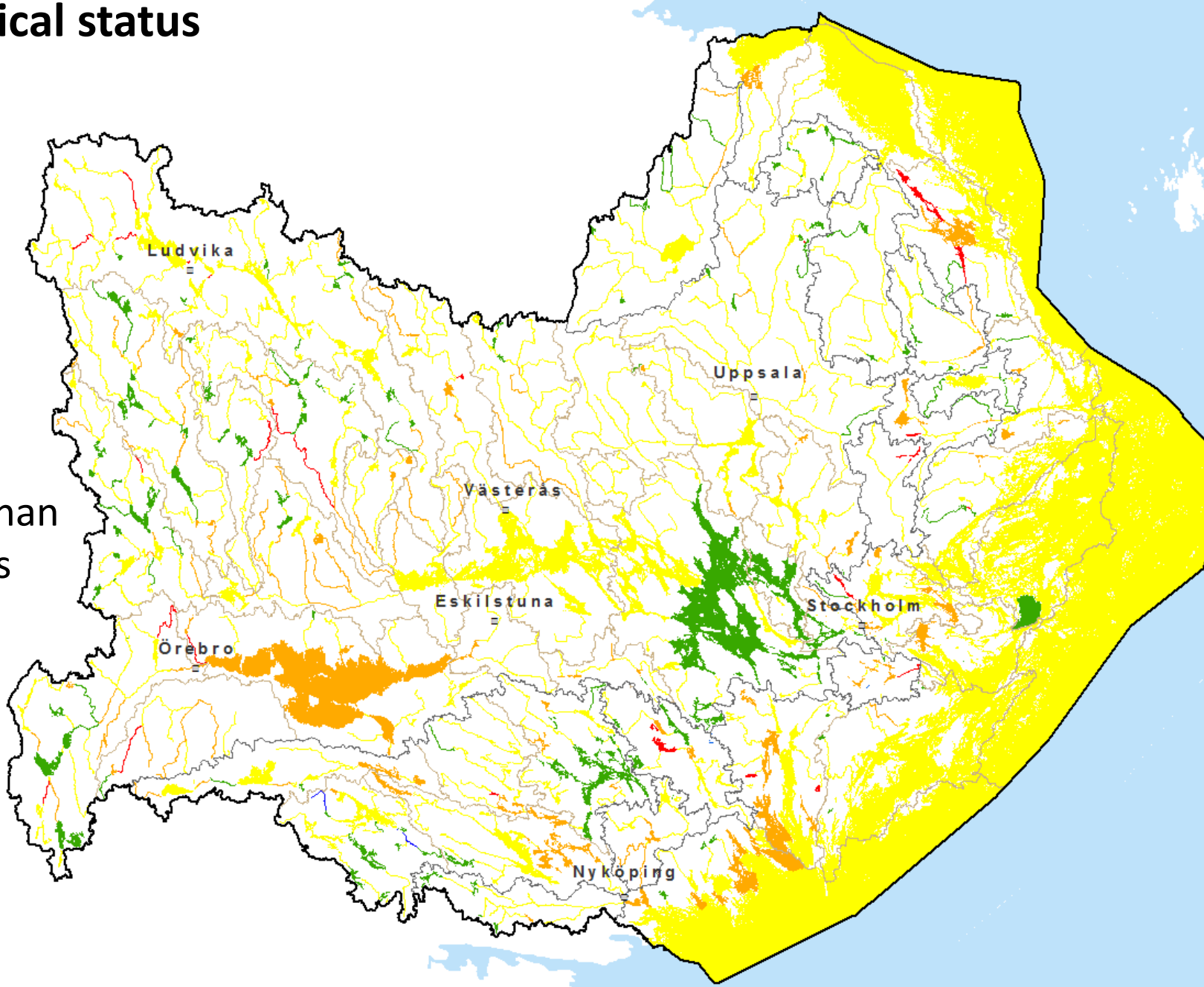
- 3,4 million inhabitants (34 % of pop. in SE)
- 90 % connected to municipal drinking and WWT
- Service sector dominates rather than manufacturing
- Agriculture land 20 %, forest 64 %, water 10 %

Land use

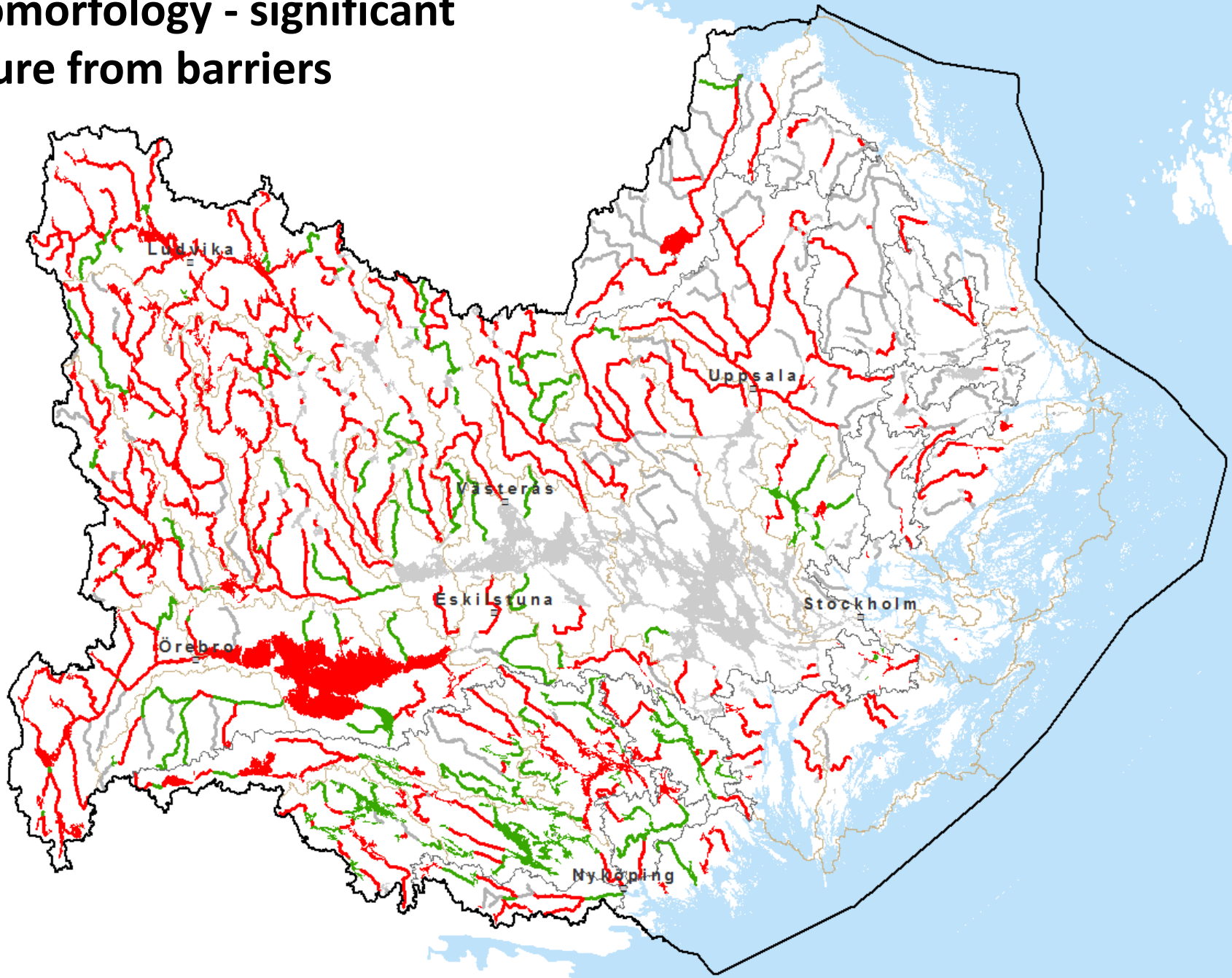


Ecological status

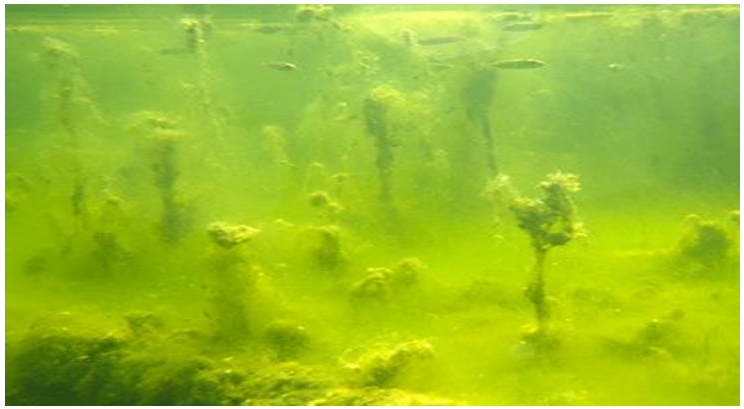
80 % less than good status



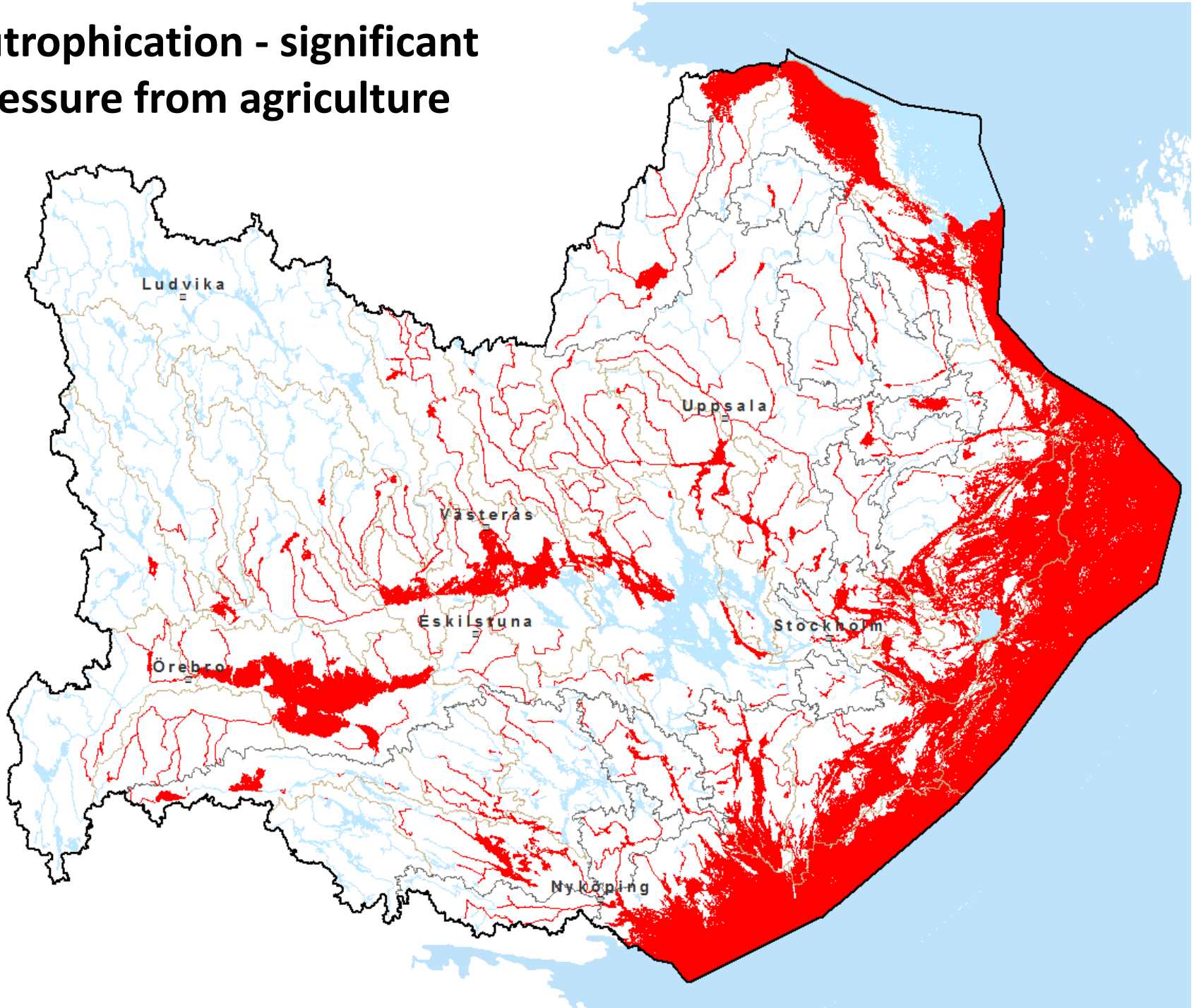
Hydromorfology - significant pressure from barriers



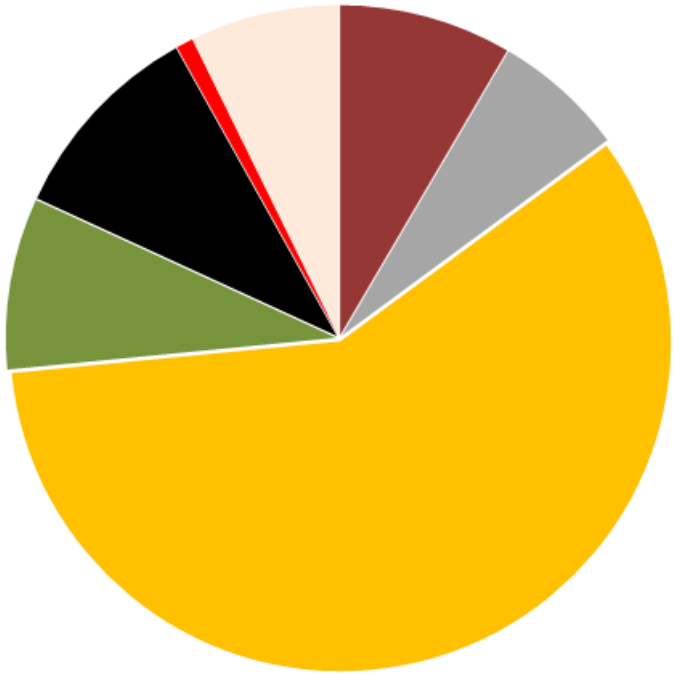
Eutrophication

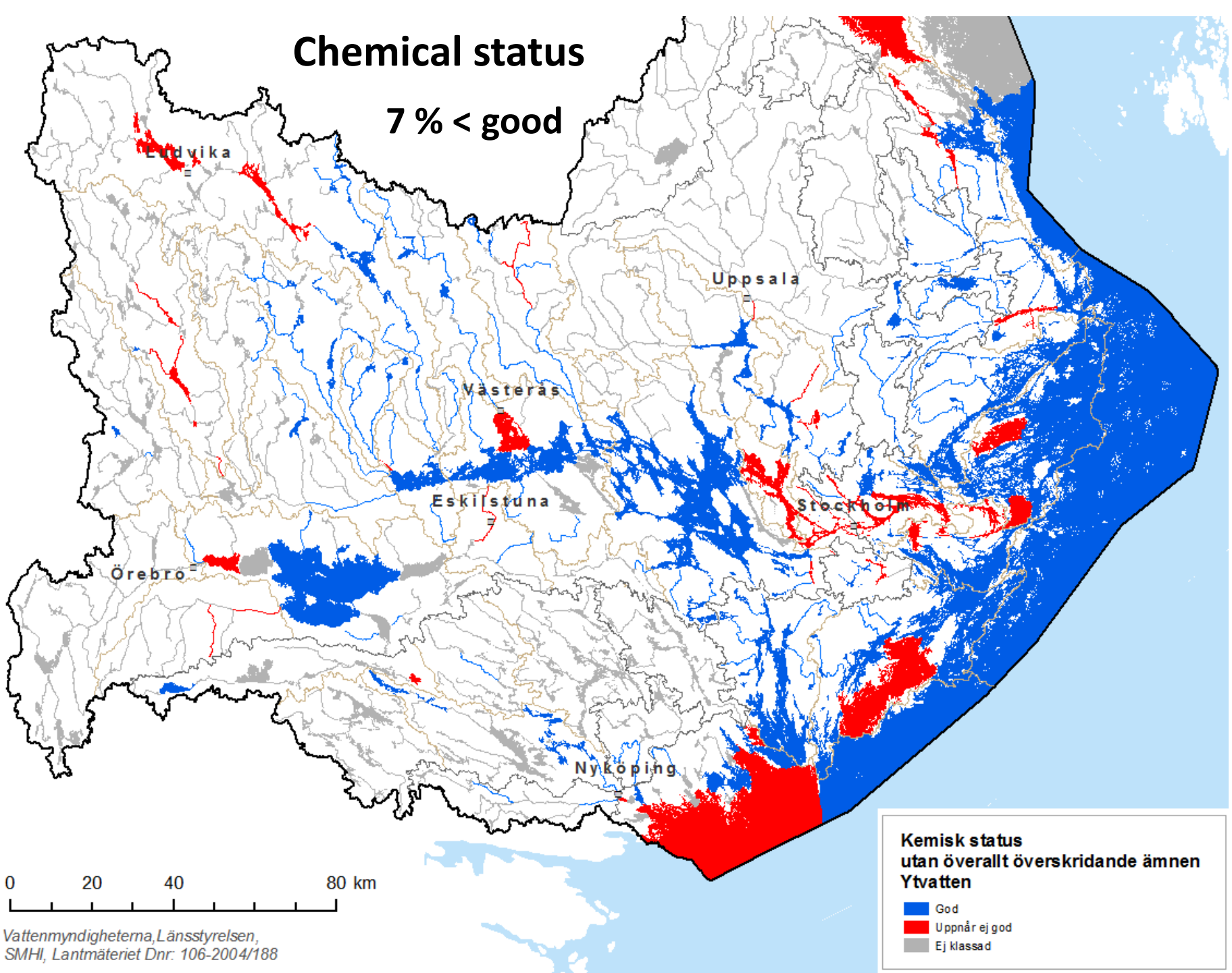


Eutrophication - significant pressure from agriculture



Source apportionment of phosphorus
(Northern Baltic Sea River Basin District)

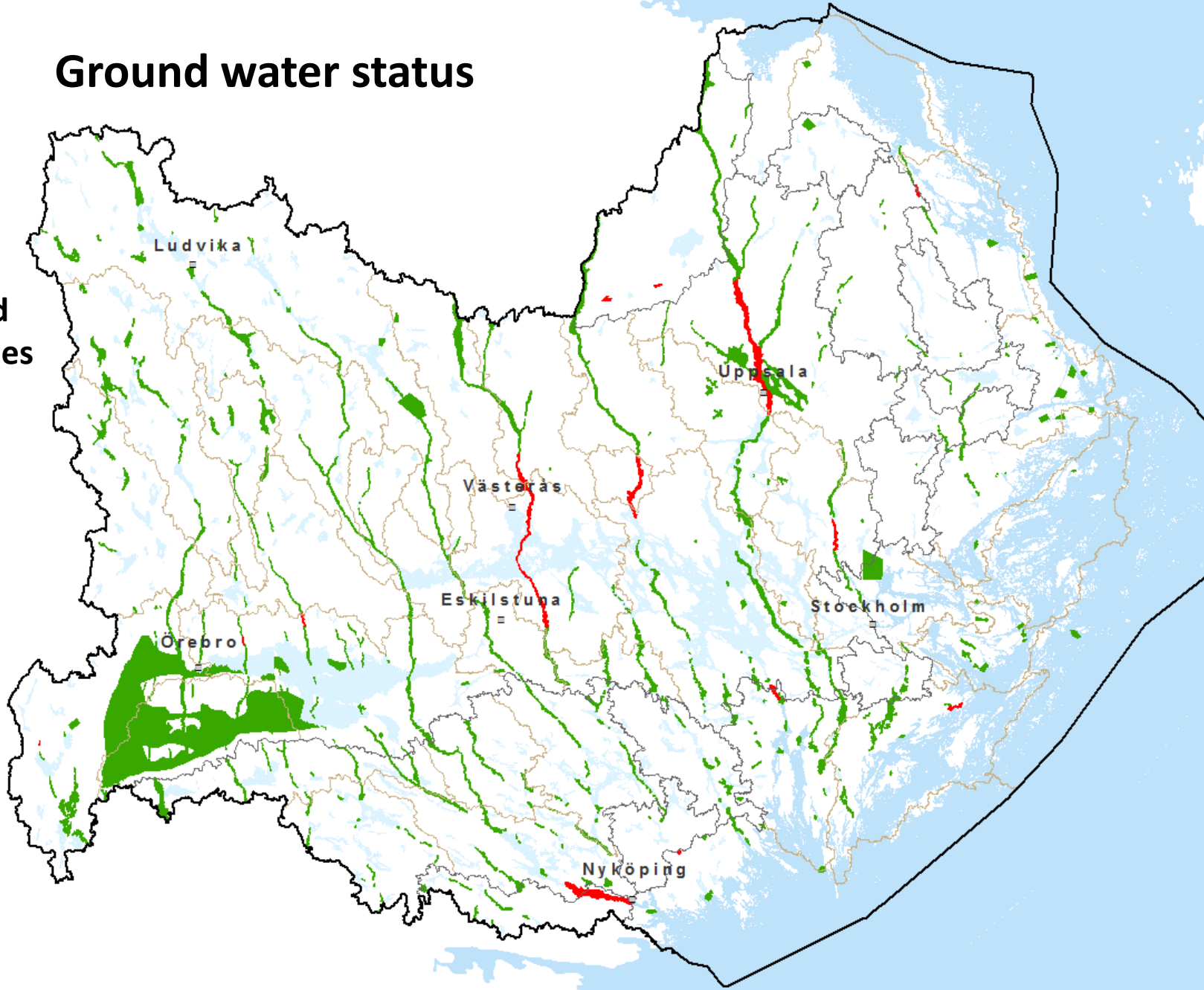



Chemical status
7 % < good
Ludvika
Uppsala
Västerås
Eskilstuna
Stockholm
Örebro
Nyköping
0
20
40
80 km
Vattenmyndigheterna,Länsstyrelsen,
SMHI, Lantmäteriet Dnr: 106-2004/188
Kemisk status
utan överallt överskridande ämnen
Ytvatten
God
Uppnår ej god
Ej klassad

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

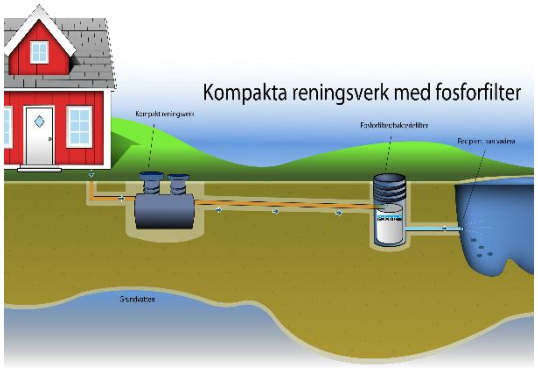
For reducing nutrient loads for about 2000 surface water bodies and for 15 different measures

Structure liming

Adjusted manure application

Two-stage ditches

Lime-refill in sub-surface drainage

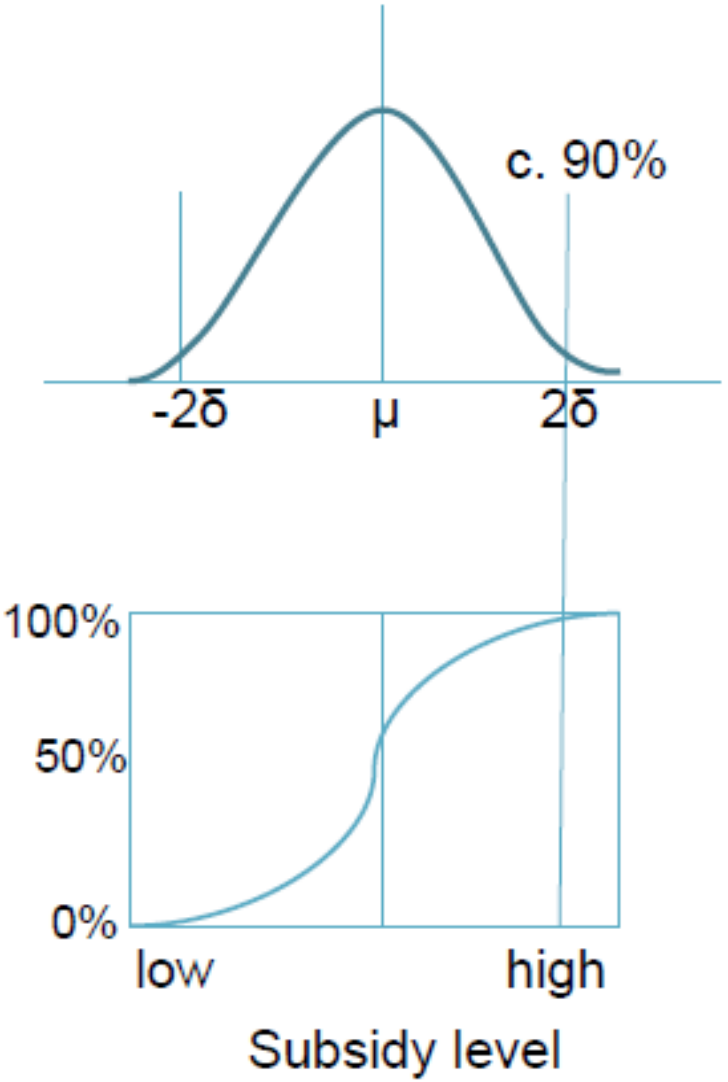


Improved sewage treatment in WWTP and for rural houses

Constructed wetlands and P-sedimentation ponds

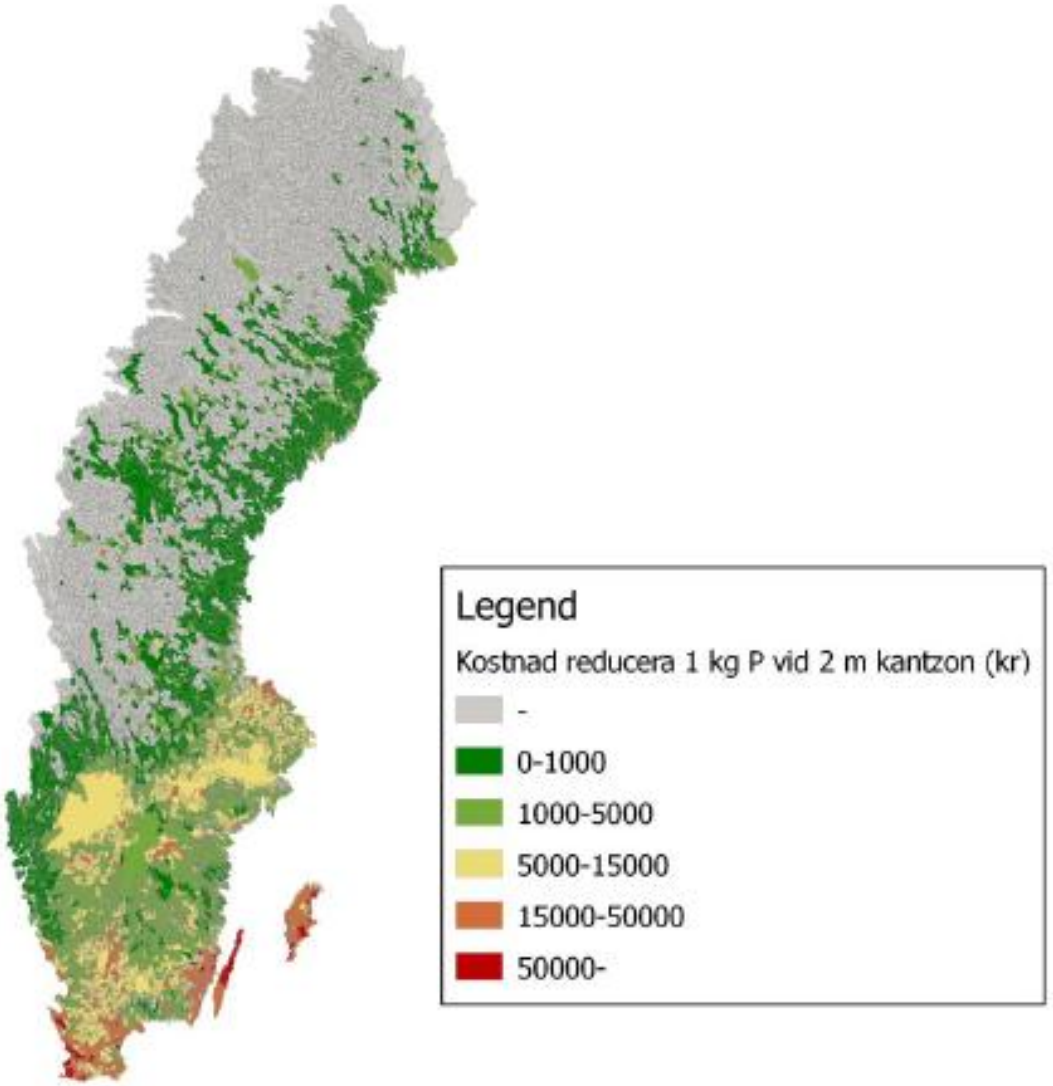
Cost per hectare for income loss from buffer zones (90%)

PO8	€ cost/yr
1.GSS	719
2.GMB	462
3.GNS	347
4.SS	239
5.GS	239
6.MSS	148
7.NN	114
8.ÖN	95
Sweden	458

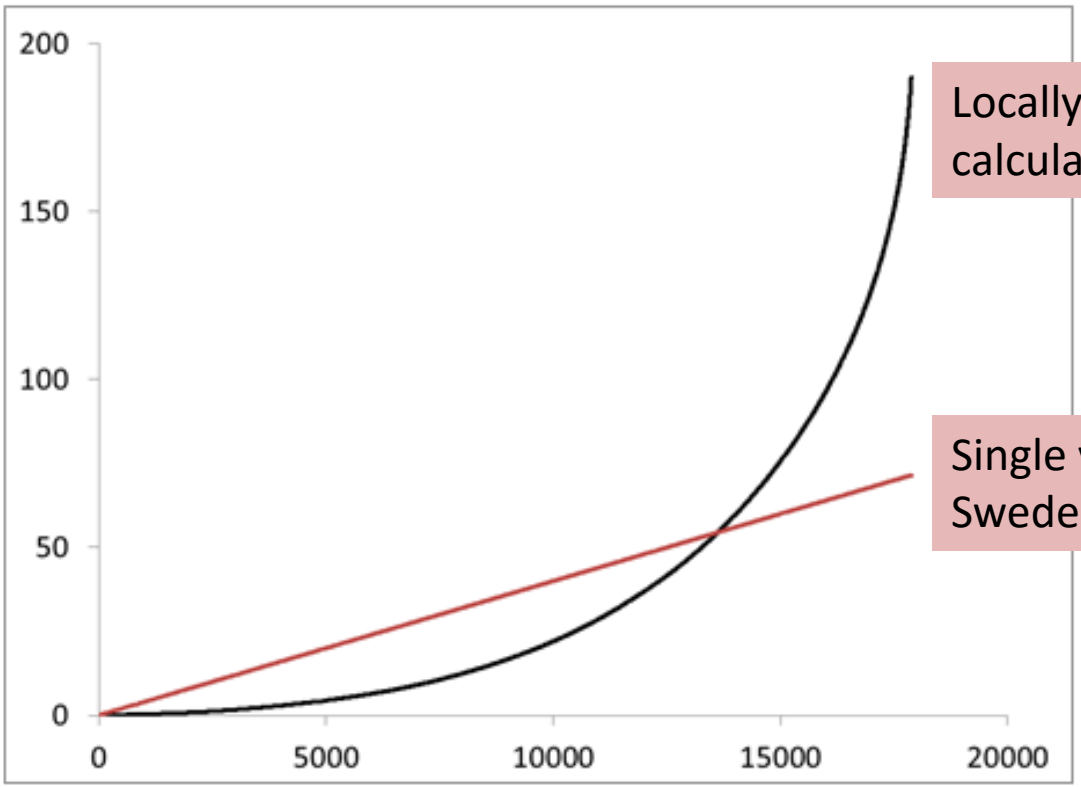


https://www.teagasc.ie/media/website/publications/2015/Collentine_D.pdf

Cost for reducing 1 kg P with 2 m buffer zone

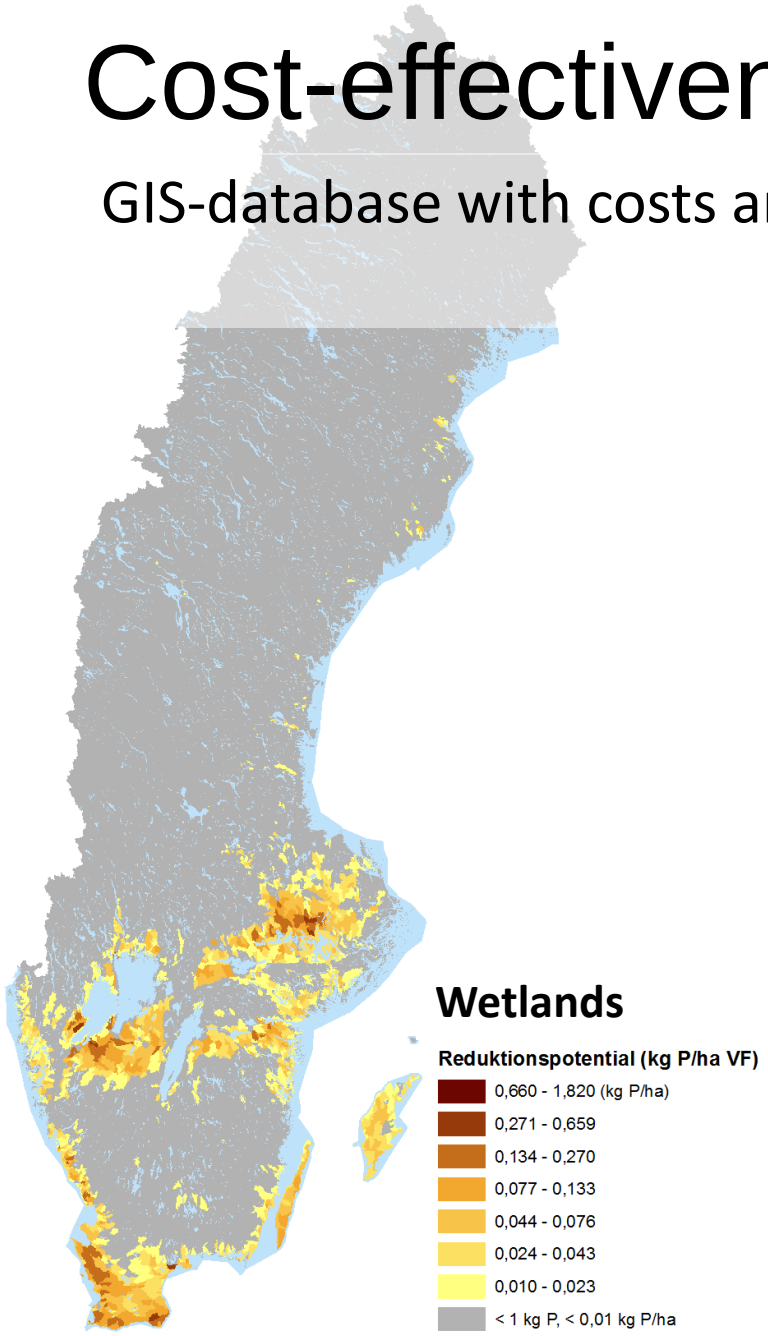


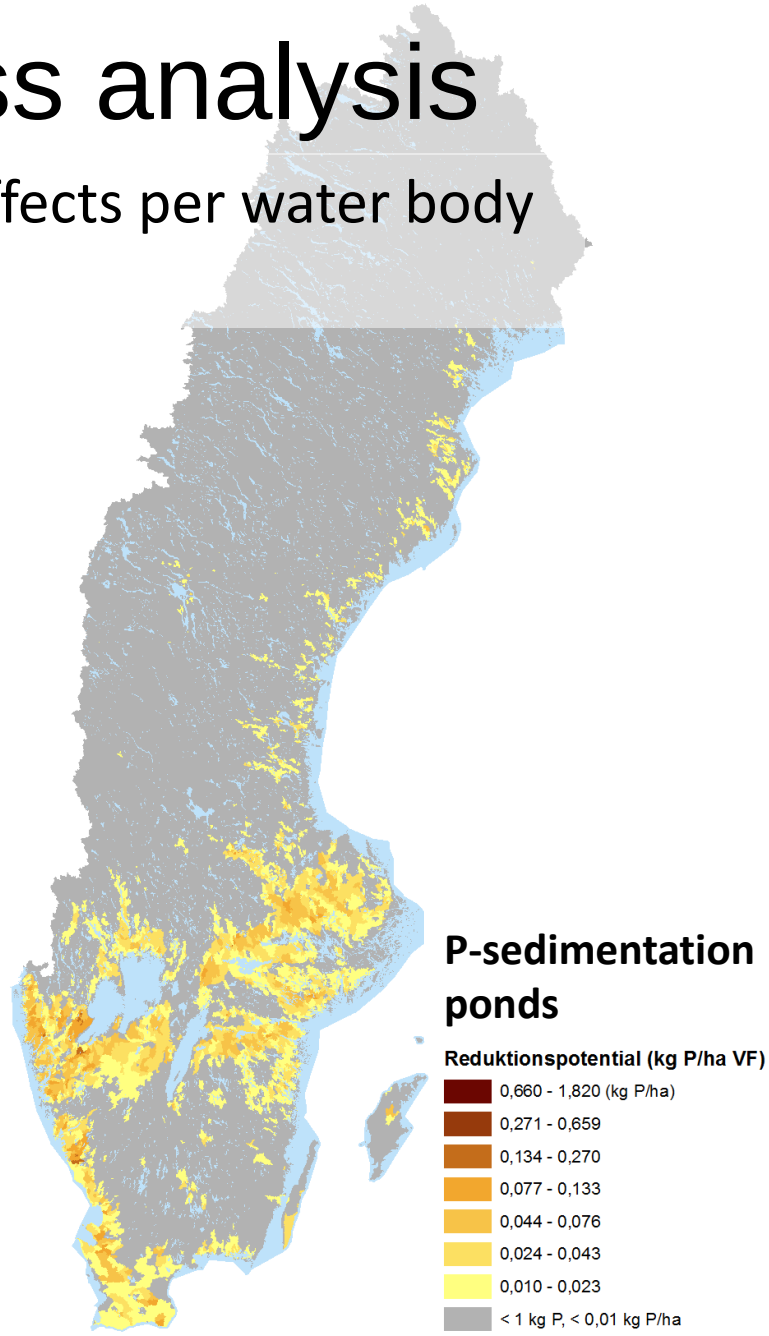
Marginal cost curve for buffer zones



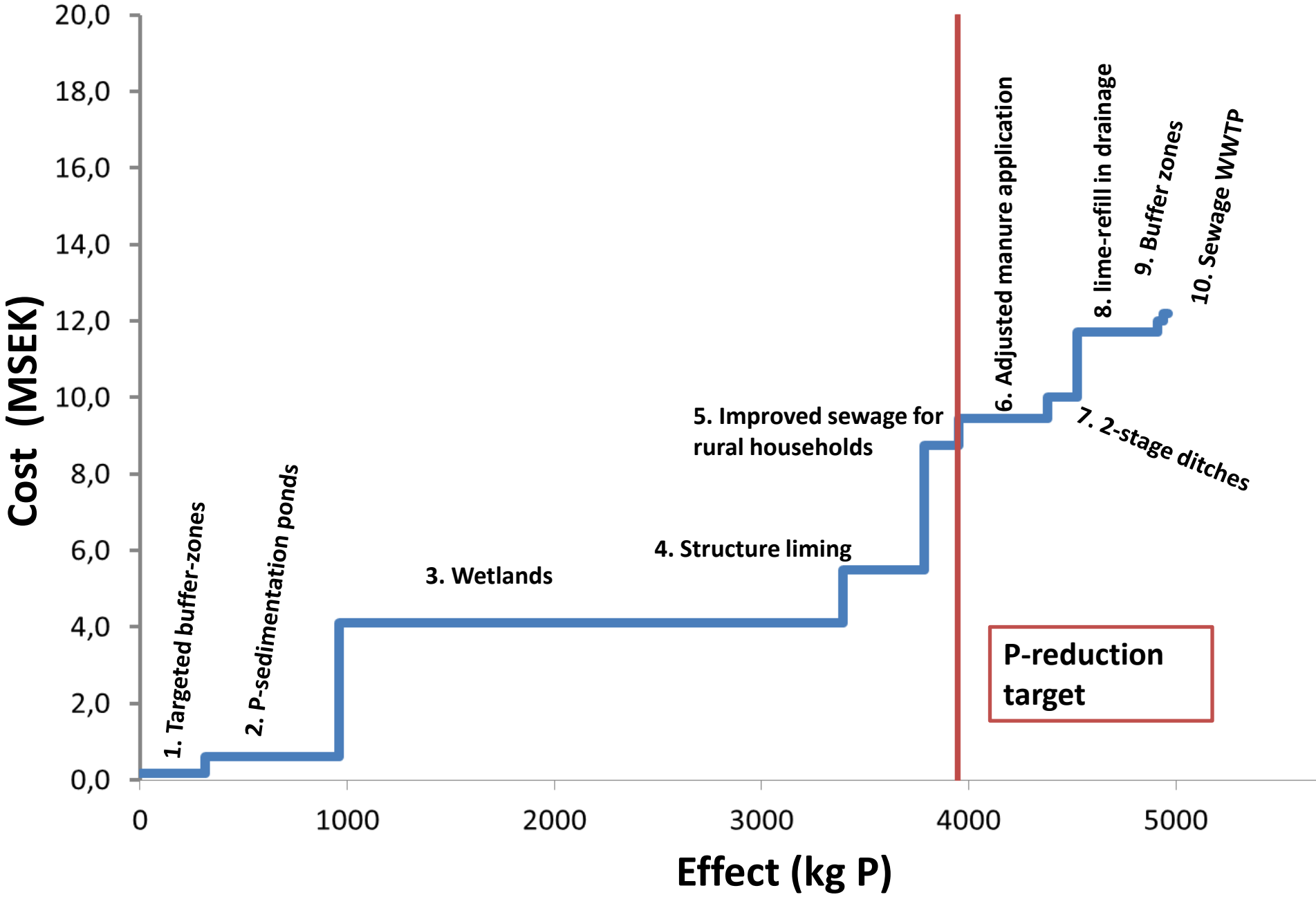
Cost-effectiveness analysis

GIS-database with costs and effects per water body

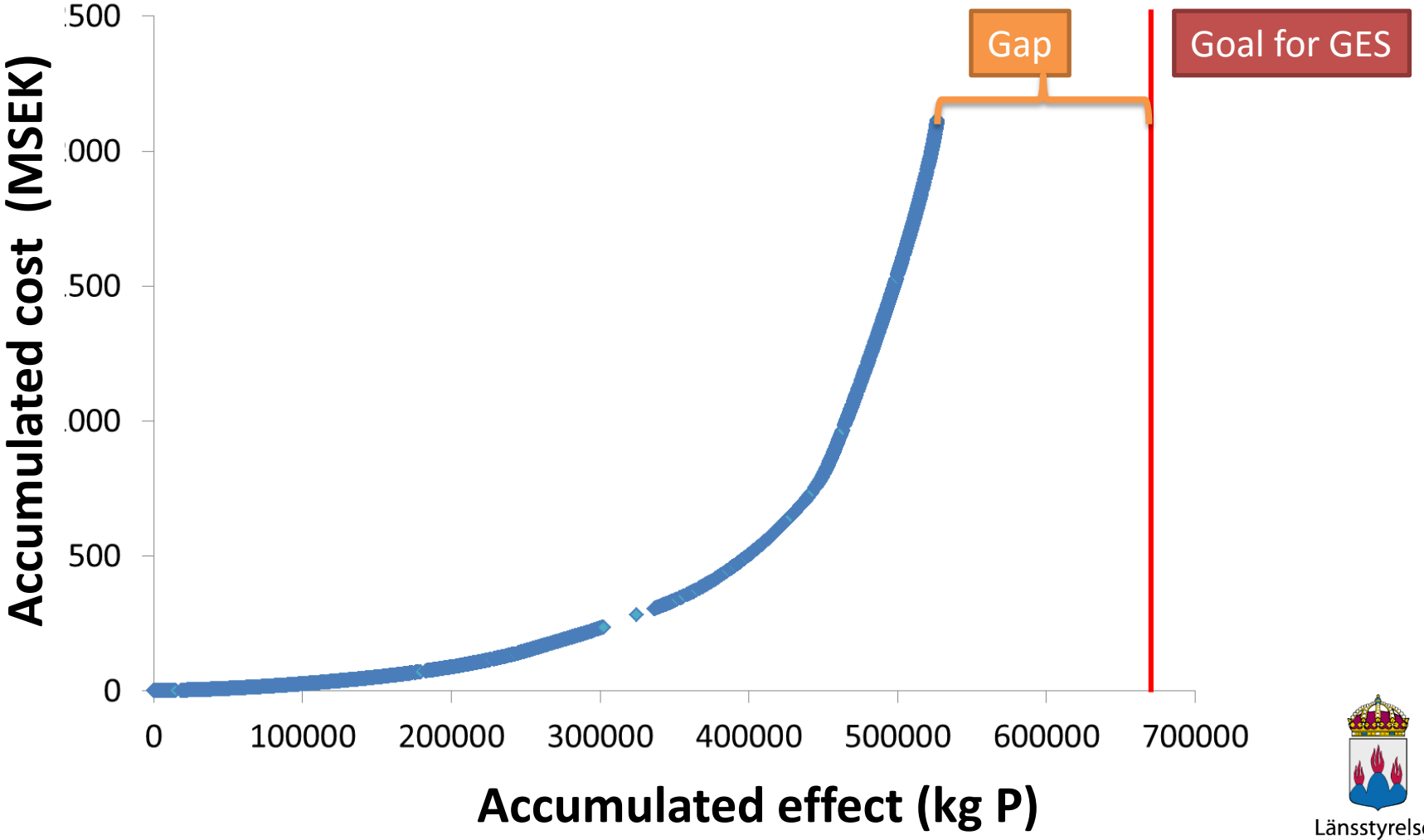


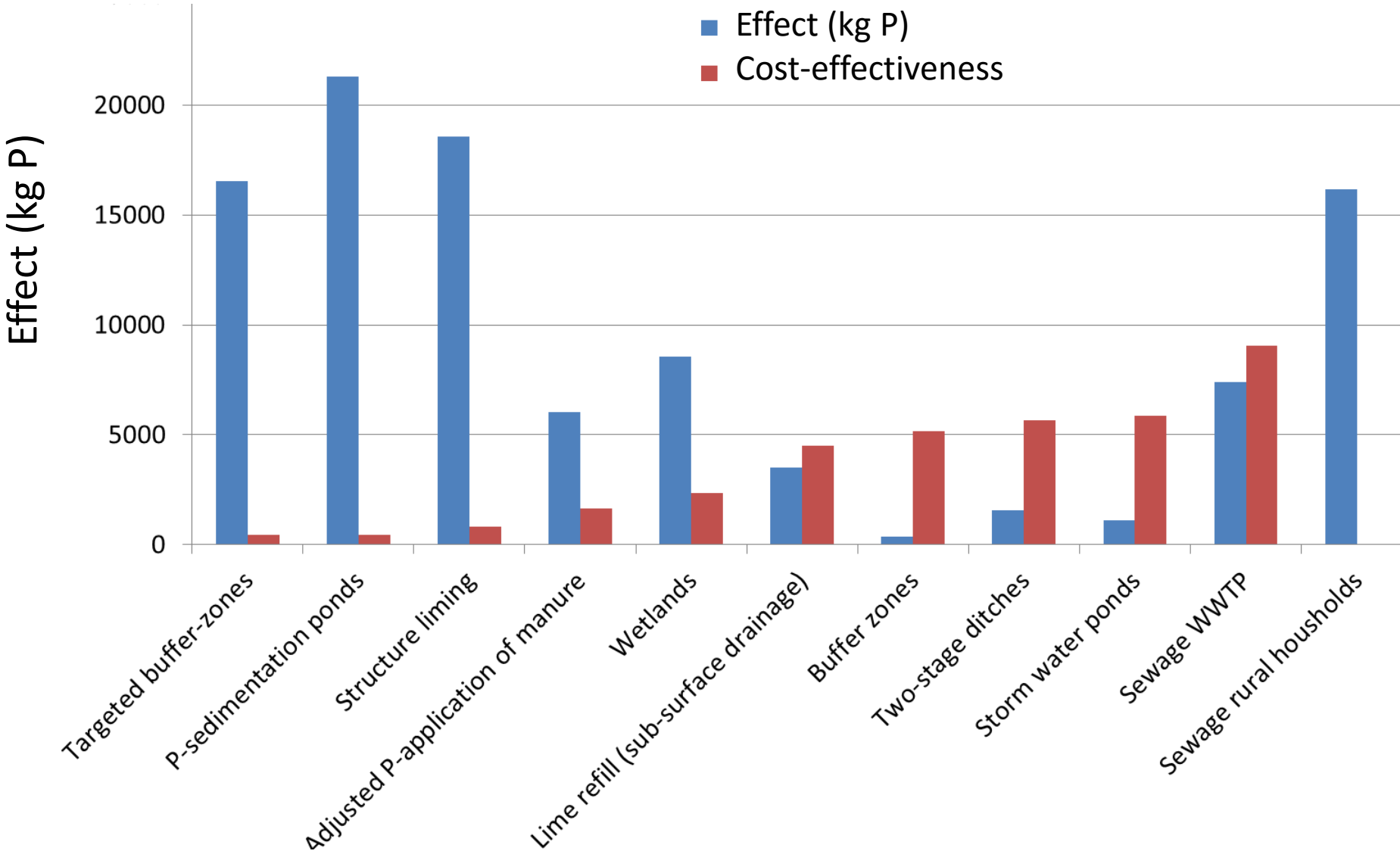


Cost-effectiveness analysis for each water body

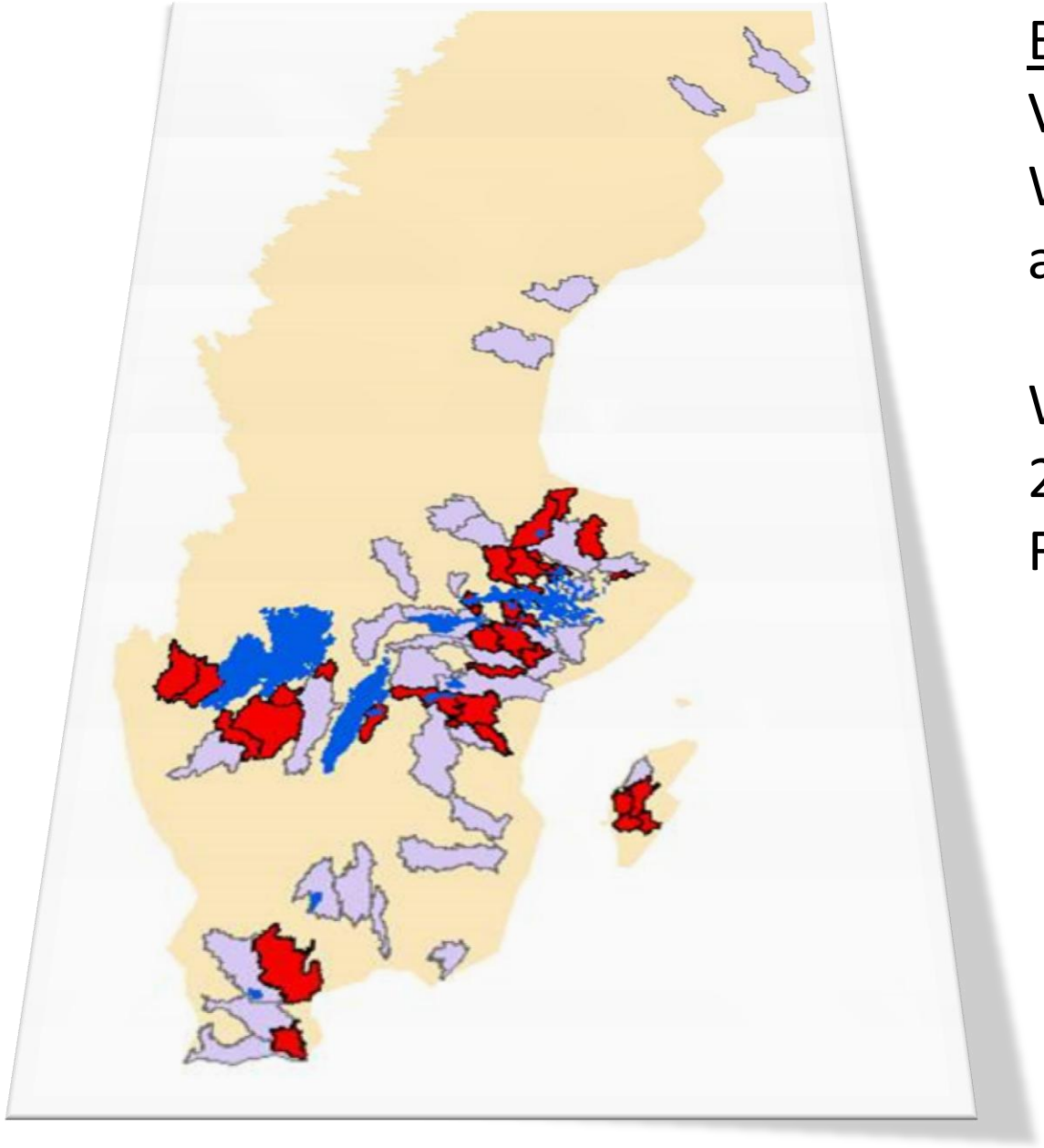


All analyzed measures against eutrophication




Effect (kg P)
Cost-effectiveness
Effect (kg P)
20000
15000
10000
5000
0
Targeted buffer-zones
P-sedimentation ponds
Structure liming
Adjusted P-application of manure
Wetlands
Lime refill (sub-surface drainage)
Buffer zones
Two-stage ditches
Storm water ponds
Sewage WWTP
Sewage rural housholds

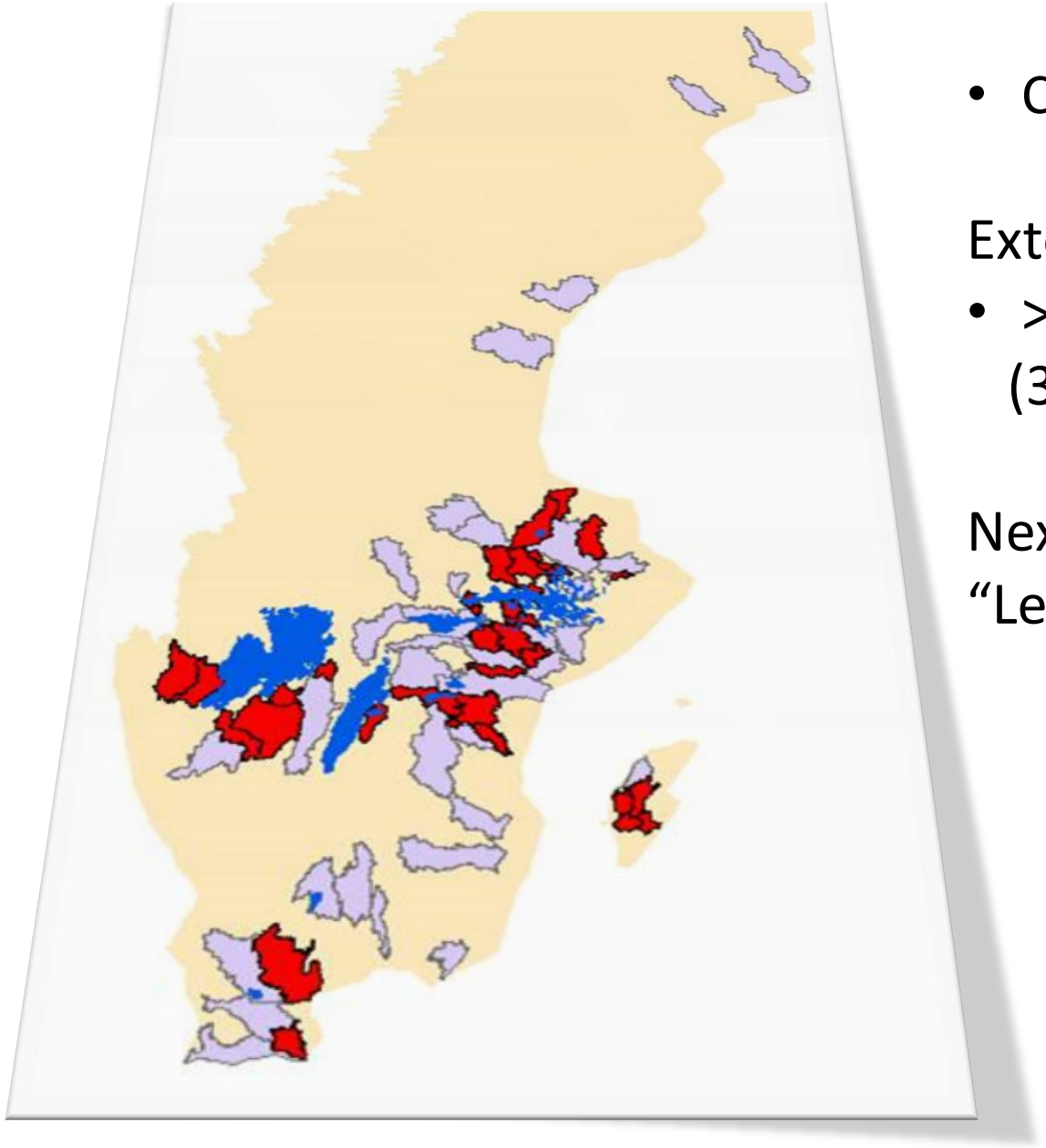
Costs-benefit analysis



<u>Benefits based on</u>
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



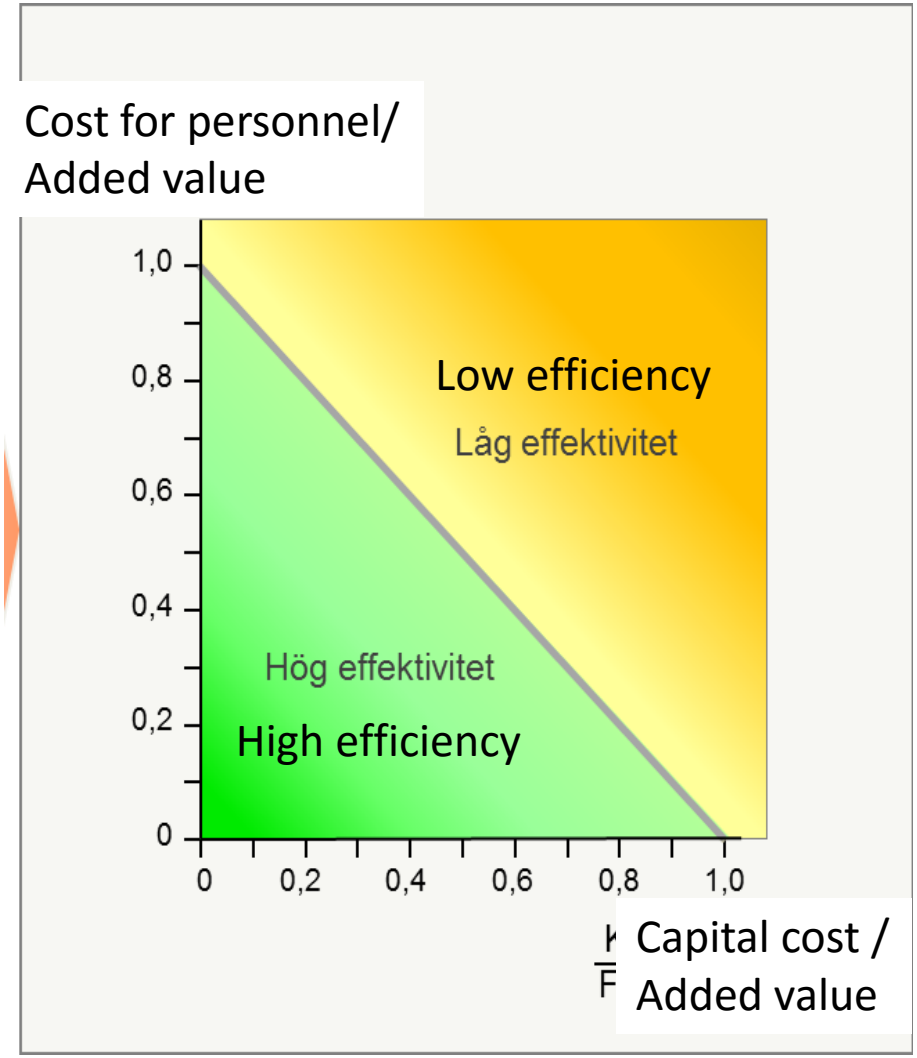
- Costs 3 times > benefits

Extended deadline to 2027:

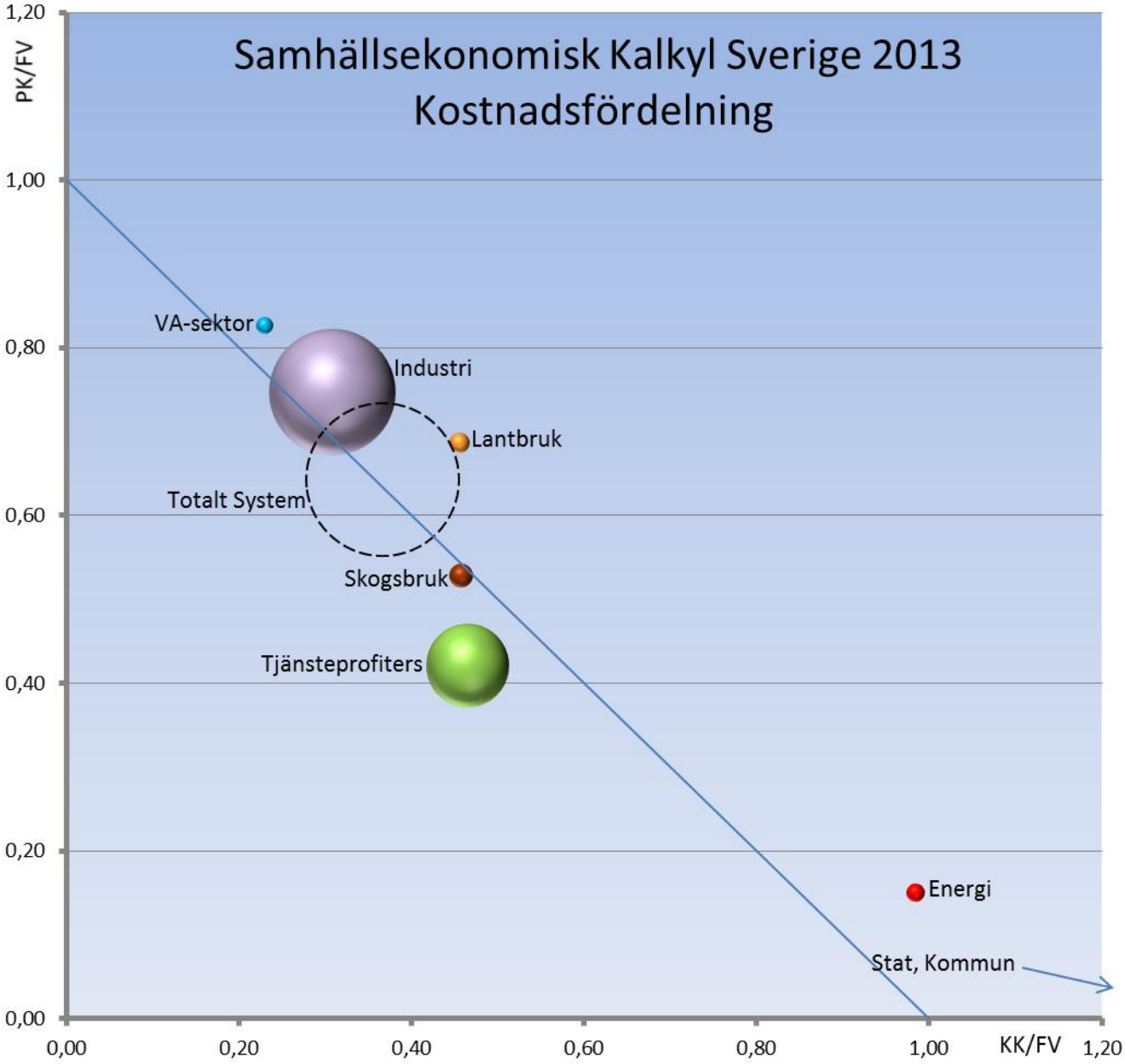
- > 700 water bodies (30 %)

Next cycle probably use the “Leipzig model” for CBA

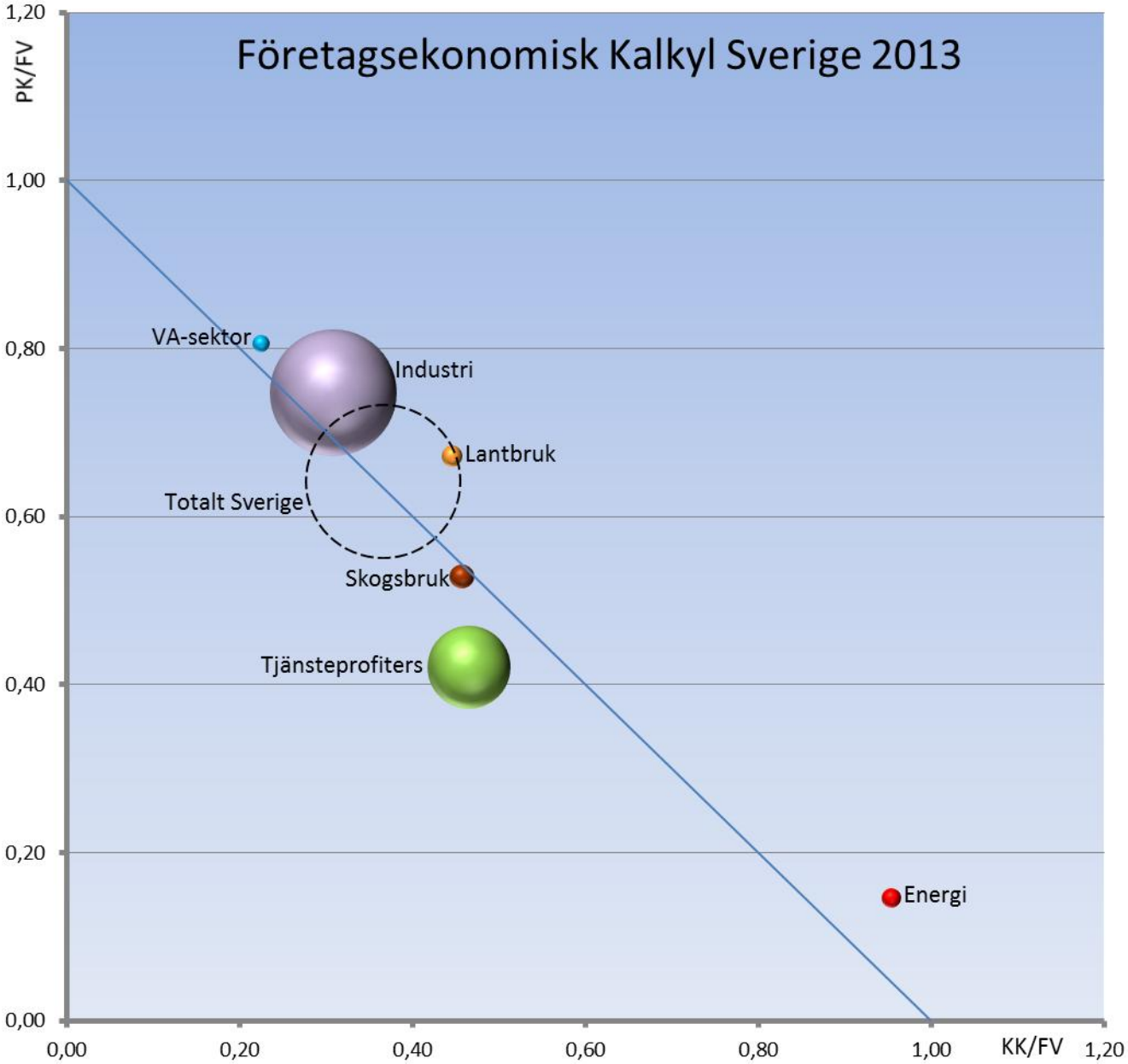
Analysis of affordability per sector – the Simpler method



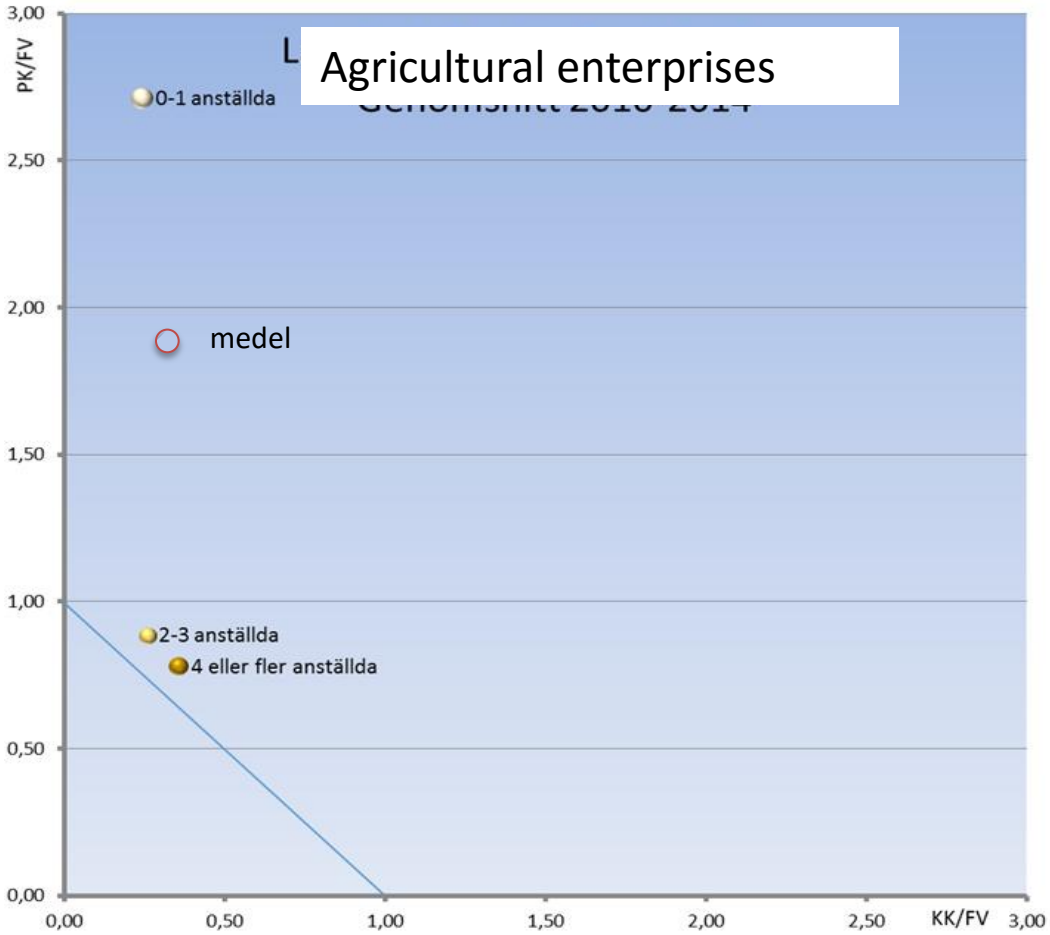
Performance with costs of measures



Performance without costs of measures



Affordability – effect of costs of PoM on sustainability of businesses



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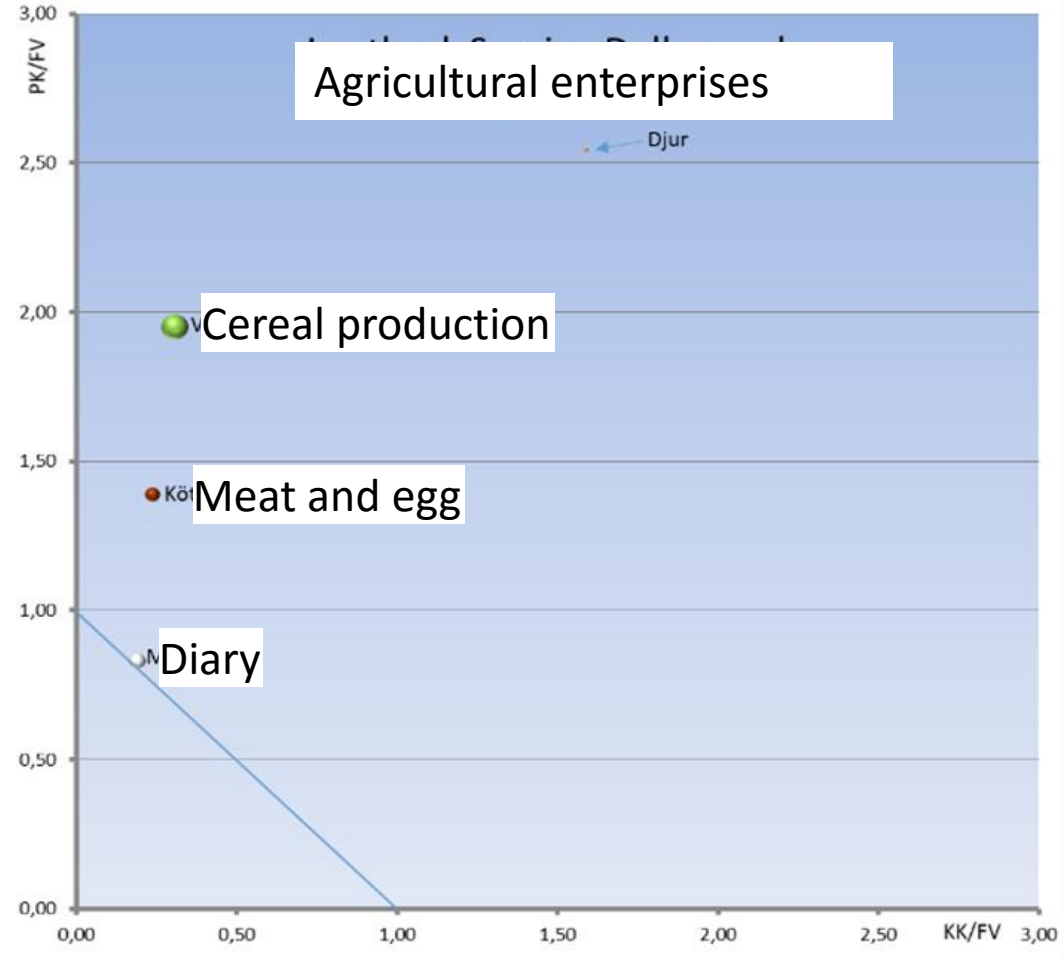


Agriculture	Total
Value added	12 980 559

Cost for agriculture in PoM if PPP is applied 428 000

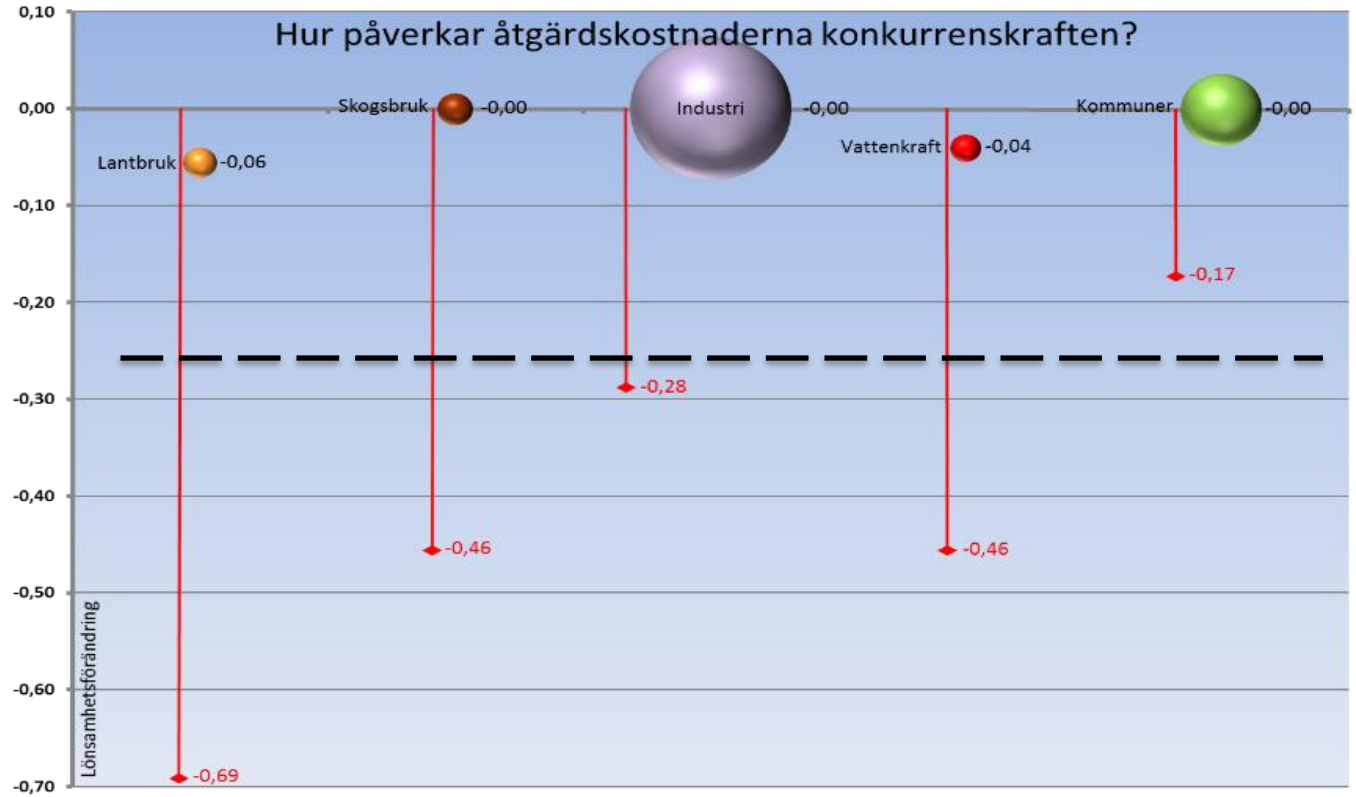
That is 3 % of value added

Länsstyrelsen
Västmanlands län

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:

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

Cost-recovery of water services

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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 purication (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.