Evaluating Economic Policy Instruments for Sustainable Water Management in Europe

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Working group 4

Summary. Case studies on water quality issues of relevance to the System of Environmental-Economic Accounting for Water (SEEAW)

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Case studies – water quality issues hydroeconomic modeling

3 cases:
• Household tax on water consumption in Odense River Basin Denmark – modified
• Nitrate tax
  • Odense River Basin, Denmark, and
  • Seine-Normandy Basin, France

2 questions:
• How would EPIs perform?
• Transferability of case studies?
Household tax on water consumption in Odense

Indirect effects on water quality?

Design of EPI:
- BAU DKK 5 kr. /m³ levied on water consumption
- Scenario 1: increase tax rate by 25% of tax value every 10 years
- Scenario 2: increase tax rate by 50% of tax value every 10 years

Modeling:
- future water use, based on population and per capita use of water
- estimate price elasticity to measure response to tax increase
- model impact on water quality through changes in water quantity

Results:
- demand quite inelastic, but does lead to water savings - enough to affect water quality?

Issues discussed:
- Low tax rate realistic and why change every 10 years?
- Less water consumption →, less discharge. BUT stable amount of contaminants. Possible upstream improvements?
Nitrate tax – Odense River Catchment

Direct effects

Danish case
Design:
• BAU 6.22 kr per pg
• Scenario 1: a tax rate on mineral N of 20 DKK kg
• Scenario 2: a tax rate on mineral N of 40 DKK kg

Modeling:
• Economic modeling: Optimization of farmer response in terms of crop distribution and input of fertilizer
• Environmental modeling: effects on water quality

Results:
• Decrease in use of fertilizer use proportional to tax level
• Change in crop distribution

Issues discussed
• Financial crisis: farmers go out of business?
• Other EU policies (CAP) etc. incorporated in the modeling?
Direct effects on water quality

EPI design
Nitrogen tax on input; but also compare with payment for environmental services

Case study approach
• Characterize farms and their use of fertilizer. Modeling
• Differentiate farm types based on crop systems, soil and input
• Model response to tax and PES, Assess also distributional effects and social equity
• Model environmental impact in a hydrological model

Results: not yet
• Difficult to get farmers to participate
• Social acceptability

Issues discussed:
• Tax on leakage instead of on input
• Use of models
Transferability

Value of hydroeconomic models, tools and water accounts:
• Not specific modeling of outcomes
• But knowledge generated for assessment of different types of EPIs
• Generate list of parameters to consider and information necessary for each type of EPI

Design issues, e.g.
• Hydroeconomic models can provide scenarios and sensitivity analyses.
• What objectives?
• What information needed?
• Behavioural model – constraints on optimization

What to learn from case studies on EPIs more generally?
Implementation issues. Institutional context?
• Monitoring and enforcement (tax collection? Exchange of information)
• Other policies in place: add on or replacement
• Other policy areas: interactions with land use policies, climate change and adaptation etc.