Management of the Neman River Basin with Account of Adaptation to Climate Change

Paul Buijs (The Netherlands)

Core group on pilot projects, third meeting

Global Network of basins working on climate change adaptation, first meeting

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POTENTIAL IMPACTS OF CLIMATE CHANGE ON SURFACE WATER QUALITY

Could climate change affect surface water quality?

.... YES!

OBSERVED/EXPECTED IMPACTS

Climate change could affect:

- physical parameters (e.g. water temperature)
- chemical parameters (e.g. nutrients)
- hydrobiological parameters (e.g. phytoplankton, fish)

General Mechanisms

Directly:

- air temperature → water temperature

Indirectly:

- precipitation/melting → surface runoff → water volume → 'dilution capacity'

Approach Neman Basin Study

Descriptive/semi-quantitive with simple methods

Water temperature

- assumed 75% of projected increases in air temperature

Dissolved O_2 solubility

- 'Benson and Krause equations'
- water temperature increase of +5 ^oC → dissolved O_2 decrease about -1 mg/l

Nutrient concentrations

- summer: flow 20% lower → concentrations 1.25 higher

2000 – 2010 data for selected Lithuanian river monitoring sites

(Very) Tentative Findings Neman Basin

Possible impacts of increased air temperature on:

- water temperature
  - could increase with about +1 ^{o}C in summer, +2 ^{o}C in winter
  - might affect e.g. timing of fish spawning season
- dissolved O_2 solubility
  - could decrease with about -0.1 mg/l in summer, -0.7 mg/l in winter

(Very) Tentative Findings Neman Basin

Reduced surface runoff could lead to (significantly) poorer water quality

Notably impacts on hydrobiological parameters difficult to quantify

Some Lessons Learnt

Investigating potential impacts of climate change on surface water quality definitely makes sense

This will though require a/o:

- adequate computer models, properly calibrated
- many data
- thorough knowledge about aquatic ecosystems

THANK YOU FOR YOUR ATTENTION