Translating research into policy - the ICPR perspective

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ICPR - organization

**founded in 1950** as an intergovernmental organization

**6 members:** Switzerland, France, Germany, Luxemburg, Netherlands, European Union

**Observers:**
1. **Countries:** Austria, Liechtenstein, Belgium (Wallonia)
2. **Other river basin commissions**
3. **Non-governmental organizations – NGO‘s (17):**
   - nature conservation, flood protection, drinking water industry, chemical industry
4. **Other intergovernmental organizations (IGO's), Navigation, ...**
The Rhine catchment area

3rd biggest European river

9 countries: Italy, Austria, Liechtenstein, Switzerland, France, Germany, Belgium, Luxemburg, the Netherlands &: European Union

Koblenz ICPR
The flood hazard: Rhine hydrography

3 main climatic regions:

Downstream of Cologne:
Northern German and Dutch lowlands

Between Basel and Cologne:
Low-mountain a. uplands

Catchment upstream of Basel:
Pre-Alps and Alps
Rhine hydrography

Mean annual discharge - BASEL:

1,000 m³/s

Lowest discharge: 202 m³/s (Feb.)

Maximum in June

Extreme flood 1881: 5,280 m³/s

Flood 1999: ca. 5,000 m³/s (May)

Mean annual discharge at the D/NL border:

2,200 m³/s

Lowest discharge: 620 m³/s (1947, Nov.)

Minimum in autumn (Sept./Oct./Nov.)

Extreme flood: 12,600 m³/s (1926, Jan.)

Flood 1995: ca. 12,000 m³/s (Jan./Feb.)
60 years ICPR - Important issues

- **Water quality aspects** = water protection and emission reduction (since 1950 - 2010 - 2027?)
- **Ecological restoration** with salmon reintroduction programme (since 1987 – 2010 – 2027?)
- **Water quantity aspects**: floods and droughts (since 1995 – 2010 – 2027?)
- **Groundwater quality and quantity** (since 2001 – 2027?)
- **Climate change aspects** (since 2007 - ????)
- **Adaptation strategies** (first results 2011/2012?)
The development of the ICPR was guided by a process of “learning by doing”... and considerably influenced by some major disasters like:


**Question:**
Do we need new “disasters” for implementing measures to reduce negative impacts of climate change?
Conference of Rhine Ministers: October 2007

**General assignment to the ICPR:**

Record the changes of the runoff patterns and of water temperature in the Rhine catchment caused by climate change

**Assignment to the EG KLIMA:**

Draft a "Study of scenarios for the runoff patterns of the Rhine including water temperature"

= Prepare the development of precautionary concepts and adaptation strategies
ICPR: Climate change

- Starting point for climate change discussions within the ICPR: Ministerial Meeting in 2007
- Establishment of an Expert Group (KLIMA) under the responsibility of the Working Group on Floods
- Main Tasks of the EG KLIMA:
  - providing scientific basis
  - developing hydrological scenarios
- Cooperation with the CHR and other ongoing projects in different countries in the Rhine catchment
Climate change impacts – Why?

influence the following parts of water management:

• Flood protection
• Water supply
• Water protection
• Hydromorphology
• Different uses:
  ➢ Navigation
  ➢ Hydropower
  ➢ Cooling water
  ➢ Drinking water
  ➢ Agriculture
ICPR: Main steps

... towards an adaptation strategy

1. Literature evaluation 2008/2009
   Summary synthesis of available literature

2. Accompany ongoing research projects 2008-2010
   Results of the projects RheinBlick2050, KLIWA, KLIWAS, etc.

   Summary of the results of all studies and deduction of possible scenarios: Final report of the EG KLIMA

4. Development of adaptation strategies as of 2011
   in cooperation with the other technical groups of the ICPR
1st Phase

Summary synthesis of available literature

✓ Prepared by an independent consultant
✓ Extensively discussed in the Expert Group (KLIMA) and the Working Group on Floods (WG H)
✓ Findings presented to Heads of Delegation
✓ Published as ICPR - Report Nr 174 on www.iksr.org in German, French and Dutch
✓ Summary available in English
Summary of results for the Rhine catchment

Climate projections (until 2050) show:
• Rise of temperature in winter/summer
• Rise of water temperature
• Precipitation: wetter winters, drier summers

Possible consequences:
Winter: increase of runoff
Summer: decrease of runoff

Scientists only provide information in terms of mean values
Summary of results

- Wetter winters, drier summers
- Increased winter runoff, decreasing summer runoff
- Results in form of bandwidth are more reliable than concrete values
- Bandwidth for average runoff is more robust than for extreme runoff
- Tendencies of the changes are very clear
- Conclusions of literature survey are re-confirmed
2nd phase: Rheinblick2050:

**Added value**

- Narrowing down uncertainties
- Use of a common method for the entire Rhine catchment (multi-model approach)
- Testing of different Bias-corrections: there is no optimal Bias-correction
- Given the great remaining uncertainties, indicating a bandwidth is more honest and at the same time a support for decision making!
EG KLIMA – First indications
Signals of climate change during the 21st century for the near (- 2050) and far future (- 2100)
Qualitative evaluation: Bandwidth of change in % for different sub-basins

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<th>Explanation</th>
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<td>A great majority (~ 80%) of projections indicates a decreasing tendency</td>
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3rd and 4th phase:

Final report of the EG KLIMA (until April 2011):

"Study of scenarios for the discharge pattern of the Rhine"

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Basis for drafting precautionary concepts and adaptation strategies for water management
Preparation of the 4th phase:

Potential impacts of climate change

In different fields of water management:
- Water quantity: WG Floods
- Water quality: WG Substances
- Fauna & Flora: WG Ecology

→ Need of an interdisciplinary approach!
Climate change potential impacts on water quantity?

More Floods?
=> More flood mitigation or protection?

Low water?
=> Water supply for man & ecosystem?
Climate change: Potential impacts on water quality?

**Increased runoff / intensive precipitation:**

- Increase of input of contaminants from diffuse sources
- Increase of input by overloaded sewage systems
- More frequent floods
- Remobilisation of historic contaminations from sediments
Low water:

- Impacts on uses (navigation, drinking water supply)
- Concentration effects
  - Quality of drinking water?
  - Stressor for fish & other organisms
- Fish migration is hampered
Climate change: Potential impacts?

Increase of water temperature:

- Stressor for indigenous species
- Change of migration /reproduction patterns & distribution of fishes
- Change in populations & food webs?
- Increase of species of (subtropical) neobiota?
- Lower oxygen concentration

=> Need to reduce anthropogenic inputs of energy (cooling water)?
Concluding remarks

- There is a well developed knowledge and experience for the Rhine catchment.
- Nevertheless, scientists only provide information in terms of mean values!
- More information about the developments of water temperature is required.
- More information about extreme floods and droughts is required...

... possible in 5, in 10, in 20 or 30 years?

Need of a “no regret policy” and flexibility!
ICPR and Climate Change

Measures taken and planned since 1998/2000 to implement the

- Action Plan on Floods
- Programme Rhine 2020
- WFD

... already point in the right direction!
... will however not be sufficient!
... efforts must be intensified!
... and hopefully without new disasters!

We know enough in order to act!