1. Short description of the project/activities
Implementing the climate change adaptation strategy of the Rhine basin and mainstreaming it into the work of the International Commission for the Protection of the Rhine.

2. Which climate change impacts are you already experiencing or expecting, such as floods, droughts, impacts on water quality etc.?
During the 20th century and depending on the region in the Rhine catchment, temperature changes varied between +0.5°C and +1.2°C and were thus slightly above the global average of +0.6 to +0.9°C. The rise in temperature was more distinct during the winter than during the summer and more important in low altitude (<500 m) than in higher altitude.

Precipitation during winter time has increased in the entire Rhine catchment (+10 to +20%). The increase was slightly less in the Alps. Summer precipitation has hardly changed (between -5 to +5%).

Thus, all discharge parameters MQ (mean discharge) and NM7Q (low water discharge) at the gauging stations along the main stream of the Rhine tend to increase (mostly +10 to +15% for MQ; +15 to +20% for NM7Q). During summers, MQ and NM7Q decrease by up to 8%. Mainly, this is an effect of rising temperatures (more evaporation) combined with stagnating precipitation and coincident reduced snow volume in the Alps.

The mean flood discharge (MHQ) evaluated for entire hydrological years (Nov.-Oct.) indicates an increase by about +10%. A more close consideration of data shows that this is not due to an increase of extreme peak flows (highest mean daily runoff) but due to frequent moderate and great floods.

At some gauging stations of the Rhine and tributaries the development of parameters is different, sometimes opposite and can neither be aligned with the changes in the hydro-meteorological constraints nor with the discharge pattern at other gauging stations.

According to studies, by the middle of the 21st century, up to 20% higher discharges are to be expected during winters in the Rhine catchment and up to 10% lower discharges are expected during summers, while regional variations may occur. Thus effects of climate change modify the discharge pattern of the Rhine and its tributaries. Presumably, periods with floods or low flow will become more frequent and more distinct. Floods may be higher and last longer and thus cause damage more often and to a greater extent. Low flow may limit navigation as well as water supply. In addition, low flow reduces groundwater recharge and affects the quality of groundwater. A rise in air temperatures leads to higher water temperatures which again – together with low flow – might result in countless ecological and chemical changes of water bodies.

3. Which concrete results did you achieve in 2014-2015 with regards to climate change adaptation?
Publication of a new climate change adaptation strategy for the Rhine basin and publication of the 2nd River Basin Management Plan (RBMP) as well as 1st Flood Risk Management Plan (FRMP) for the international Rhine basin. Both last plans include chapters/texts on climate change effects and adaptation.

More information on the work of the ICPR regarding climate change impacts and adaption can be found here:

4. Which major challenges did you face in this work? How did you overcome them?
Our main challenge was to develop a common, interdisciplinary and transboundary adaptation strategy. Another challenge is to mainstream/integrate the climate change adaptation strategy (different fields: ecology, water quality, flood and low water) in the running plans (RBMP and FRMP) as well as the new mandate and
5. **Which lessons learned would you like to share with other basins?**

There are and will always be some uncertainties about climate change impacts but the Rhine countries think that the trends were/are robust enough to act and develop an (international) adaptation strategy. We learned so far that a mix of top-down and bottom-up measures (from the transboundary/international level to the national and regional level and vice-versa) is the best option when developing an adaptation strategy. It is also very important not to reinvent the wheel: try to use available, realized or planned measures, e.g. the one linked to the Water Framework Directive and Floods Directive implementation or coming from “old” programmes (e.g. ICPR’s Action Plan on Floods since 1998).

6. **How do you finance your climate change activities within the basin? How do you plan to finance implementation of measures?**

The different States members of the ICPR are financing the Commission which a little amount is then dedicated for the organization of meetings of the working/expert groups working on climate change and work on the reports. Furthermore different activities related to CC are being implemented and financed directly on the national level but benefit to the ICPR.

7. **How did you link transboundary climate change adaptation to adaptation activities at other levels, such as the national level?**

By national/regional reporting through our delegates in our meetings, by doing summaries of national adaptation strategies, by giving priority to the measures that are linked to European directives and have transnational effects. Besides, we also consider that when national activities and measures are being added together it leads to a reduction of the vulnerability to climate change.

8. **How did you link transboundary climate change adaptation to adaptation activities of sectors such as adaptation in energy, in agriculture, in transportation or urbanisation?**

Different sectors are represented through national delegations, observers and NGOs (nature conservation, flood management, drinking water ...). But more work could be done to integrate other sectors into our discussion on adaptation measures (agriculture, spatial planning, energy production...). By identifying potential adaptation measures we try to think about win-win measures with other non-water related sectors.

9. **Future planned activities**

- Work on the implementation of the 2d RBMP and the FRMP (both running from 2016 to 2021).
- New working mandates and programmes for 2016-2021 are being prepared which include work on the following of the climate change adaptation strategy, the actualization of climate change effects knowledge and work on the topic of low water.

10. **Contact details**

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