



**Convention of the Protection and Use of
Transboundary Watercourses and International Lakes
Third meeting of the global network of basins working on climate change adaptation
6-7 April 2016**

Progress report of global network of basins working on climate change adaptation

In 2013, the global network of basins working on climate change adaptation was created by the United Nations Economic Commission for Europe (UNECE), in cooperation with the International Network of Basin Organizations (INBO) with the aim to promote cooperation on adaptation in transboundary basins, to compare different methodologies and approaches for adapting to climate change and to promote a shared vision between the participating basins. The network includes on the one hand several pilot basins where UNECE and partners implement activities and on the other hand additional basins which primarily work on their adaptation activities themselves in accordance with the agreed decisions of their governing bodies or with the terms of reference of international projects: The network allows for the exchange of experience, learning from each other, establishing contacts between basins and their experts, discussing challenges and lessons learnt etc. The network includes annual meetings of all basins, regular larger workshops, etc.

The following pilot projects¹ are supported by the UNECE secretariat in the framework of the Environment and Security Initiative (ENVSEC) and in cooperation with other ENVSEC partners such as the United Nations Development Programme (UNDP), and the Organization for Security and Cooperation in Europe (OSCE):

1. Chu Talas Basin, shared by Kazakhstan and Kyrgyzstan, implemented by UNDP and UNECE,
2. Dniester Basin, shared by the Republic of Moldova and Ukraine, implemented by UNECE and OSCE,
3. Neman river basin, shared by Belarus, Lithuania and the Russian Federation.

The following basins are also included in the network:

4. The Rhine basin, shared by Austria, Belgium, France, Germany, Italy, Liechtenstein, Luxemburg, the Netherlands and Switzerland, (activities implemented by the International Commission for the Protection of the Rhine (ICPR),
5. The Sava river basin, shared by Bosnia and Herzegovina, Croatia, Serbia and Slovenia, implemented by the Sava River Basin Commission and UNECE,
6. The project "Dauria going dry" on the Amur/ Argun/ Daursky Biosphere reserve, shared by the Russian Federation, Mongolia and China, implemented by WWF Russian Federation,
7. The Danube river basin, shared by Austria, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Germany, Hungary, Republic of Moldova, Romania, Serbia, Slovenia, Slovakia and Ukraine, implemented by the International Commission for the Protection of the Danube River (ICPDR).
8. The Sahara and Sahel Observatory (OSS) / Consultation Mechanism of the North Sahara Aquifer System (SASS), shared by Algeria, Libya, Tunisia,
9. The Niger basin, shared by Benin, Burkina Faso, Cameroon, Chad, Côte d'Ivoire, Guinea, Mali, Niger and Nigeria : Projects implemented by the Niger Basin Authority,
10. The Congo, shared by Cameroon, Central African Republic, Democratic Republic of the Congo, Republic of the Congo, Equatorial Guinea and Gabon: Projects implemented by the International Commission of the Congo-Oubangui-Sangha Bassin (CICOS),
11. The Senegal, shared by Guinea, Mali, Mauritania, Senegal: projects by the Senegal River Basin Development Authority,
12. The Mekong River Commission Climate Change Adaptation Initiative (MRC-CCAI) on the Mekong River, shared by Cambodia, Laos, Thailand and Vietnam,
13. The Drin, shared by Albania, the Former Yugoslav Republic of Macedonia, Montenegro and Greece.

¹ The pilot projects directly implemented by UNECE and partners and the platform for exchanging experiences are funded by Austria, Finland, the Netherlands, Sweden, Switzerland and the European Commission.

More information about the activities and progress of the pilots and basins 1-11 is included in the annex
².**ANNEX: Description of progress of each pilot project/ basin in the network**

1. Projects addressing climate change in the transboundary Chu-Talas basin

1. Short description of the project/ activities

In 2014 the project “Promoting cooperation to adapt to climate change in the Chu-Talas river basin” was concluded, modelling of possible climate change, the vulnerability study as well as a set of adaptation measures were developed during the project. The new UNECE project (second phase) started only in autumn 2015 and it will closely cooperate with the GEF project “Enabling Transboundary Cooperation and Integrated Water Resources Management in the Chu and Talas River Basins”. Issues of climate change and adaptation to it will be mainstreamed to the Transboundary Diagnostic Study (TDA) and the Strategic Action Plan (SAP) to be developed in the GEF project. Several measures and pilot activities (training with farmers) will be undertaken later in the project implementation.

2. Which climate change impacts are you already experiencing or expecting, such as floods, droughts, impacts on water quality etc.?

The Chu-Talas River Basin is highly vulnerable to climate change and the overall growth of aridity and the declining availability of water resources are the most likely and serious impacts of climate change in the Basin. During the period of instrumental observations, the temperature in the basin increased significantly, with the most dramatic rise observed in the last 20 years. Climate variability and change are already affecting water resources in the region. There had been three consecutive years with insufficient water resources and, in 2014, only half of the usual resources were available in the basin. As a result of the forecasted climate change, glaciers in both basins may be fully exhausted by 2100. Water security is closely linked with political and economic implications (hydropower production vs. irrigated agriculture) that establish a direct link between changes in hydrological regimes and water availability and regional security. These changes are expected in the context of a significant projected increase by mid-century in the demand for water as a result of economic development and population growth. Regulation of flows of the Chu River between Kyrgyzstan and Kazakhstan is an issue already today, particularly in the growing season.

3. Which concrete results did you achieve in 2014-2015 with regards to climate change adaptation?

In the project “Promoting cooperation to adapt to climate change in the Chu-Talas river basin”, in 2014 the final project report was prepared by Kazakh and Kyrgyz national experts. The report is covering physiographic characteristics, analysis of the water resources status and use, economic situation characteristics including water management and projects on research and management of water resources in the basin, current and future vulnerability, expected consumption of water resources and related economic analysis, preliminary options for types of adaptation measures at the transboundary level. A visual summary of results of the project, including maps and graphics was developed, in consultation with the secretariat of the Chu-Talas Commission.

The new project started in September 2015 is building up on the results of the afore-mentioned project. An initial meeting of the project was organized in collaboration with the GEF project “Enabling Transboundary Cooperation and Integrated Water Resources Management in the Chu and Talas River Basins” on December 1, 2015, that reached the following main decisions:

- provide inputs in the development of the Transboundary Diagnostic Analysis (TDA) of the Chu-Talas River Basin under the GEF project by drafting an analysis of potential climate change impacts in the Basin and outlining existing gaps based on implemented studies;
- 3 to 5 adaptation measures for detailed analysis and subsequent implementation will be chosen from a wide list of measures 10-20 after a qualitative analysis of the costs and benefits associated with them.

² Updates provided by the basins; the UNECE secretariat is not responsible for it. Information on the activities in the Mekong (12), the Drin (13) and Lake Victoria Basin has not been provided at the time of preparation of this report.

4. Which major challenges did you face in this work? How did you overcome them?

The initial package of possible adaptation measures was proposed under the project “Promoting cooperation to adapt to climate change in the Chu-Talas basin” (phase I). But measures identified were mostly formulated as general recommendations. During Phase II a qualitative analysis of the costs and benefits associated with adaptation measures has to be done.

Capacity of the Joint bilateral commission and local stakeholders and farmers to support climate change adaptation activities in the basin is also very limited. Lack of resources for adaptation measures implementation is the main problem.

5. Which lessons learned would you like to share with other basins?

Kazakhstan’s and Kyrgyzstan’s cooperation on the Chu and Talas rivers is managed by a Joint bilateral commission. It is a good example of transboundary water cooperation built on a solid institutional and legal basis. It allows discussing problems and finding solutions.

Involvement of local stakeholders on all level of discussion of adaptation measures is crucial for their successful implementation.

The key relevant sectoral climate change adaptation plans were developed in Kyrgyzstan, including the one for the Ministry of Agriculture and Melioration, covering water resources. However, these sectoral plans were developed at a national level and do not consider transboundary issues. That is why an establishment of a framework for regular and strategic climate change adaptation actions on transboundary level is particularly timely in the Chu-Talas basin.

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

3 to 5 of priority adaptation measures for financial support of their implementation will be chosen by the UNECE and GEF projects. Having good examples, showing the economic benefits of adaptation measures, local stakeholders will try to finance them themselves, the banks will be more willing provide loans. Also, the attention of governments will be attracted to the need to incorporate adaptation measures into development plans. It will ensure replicability and sustainability of project results.

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

The project aims to establish a framework for regular and strategic climate change adaptation action in the Chu-Talas River Basin and enable the Chu-Talas Commission and local authorities to facilitate climate change adaptation in the basin. Transboundary cooperation in the development of adaptation strategies is necessary to ensure that measures prioritized in Kyrgyzstan (upstream country) do not have unintended effects in Kazakhstan thereby increasing vulnerability and adding controversy over water use.

Assessment and demonstration of adaptation measures benefits at the national and local level. Increased awareness and knowledge of Chu-Talas Commission and other key stakeholders about the needs for adaptation and the adaptation options in the river basin.

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?

Water efficiency will be promoted through the project, in particular as many of the possible adaptation measures involve improvement of water use efficiency in agriculture. Also this project provides an opportunity to deepen the cooperation between Kyrgyzstan and Kazakhstan, in particular with regard to the protection of water ecosystems and monitoring of water quality and quantity.

9. Future planned activities

The following three main directions for activities are included in the project design:

- **Strategic frameworks enabling/facilitating adaptation.** Dialogue on priority measures at the level of the

transboundary basins, possibly leading to the development of adaptation strategy and action plan. Mainstreaming adaptation into key relevant sectors (i.e. agriculture).

- **Demonstration of adaptation measures.** Stakeholder consultation to agree on what measures of basin-wide relevance can be taken in the different sectors. Assessment of economy (e.g. cost and benefits), effectiveness and feasibility of selected adaptation measures. Trial/demonstration of selected adaptation measures of transboundary relevance with local population/civil society organisations (CSOs) for eventual upscaling and/or replication (additional details are provided below in the section on proposed activities).
- **Awareness raising.** Awareness raising about potential impacts of climate change and options for adaptation, building on the previous project and disseminating its findings to different audiences, from local level to international.
- Also the project will provide inputs in the development of the Transboundary Diagnostic Analysis (TDA) of the Chu-Talas River Basin under the GEF project “Enabling Transboundary Cooperation and Integrated Water Resources Management in the Chu and Talas River Basins” by drafting an analysis of potential climate change impacts in the Chu-Talas River Basin and outlining existing gaps based on implemented studies.

10. Contact details

Ms. Ekaterina Sahvaeva, Department water economy and amelioration, Republic of Kazakhstan
Tel.: +99 6312 541411, mob.: +996 5553 5046056

tadar51@mail.ru

Ms. Svetlana Dolgikh, National Hydrometeorological Service "Kazhydromat", Republic of Kyrgyzstan
Tel.: +7 727 267 5217

Svetlana_Dolgikh@mail.ru

Ms. Sonja Koeppel, UNECE
Tel.: +41 22 917 1218

sonja.koeppel@unece.org

2. Adaptation to Climate Change in the Dniester River Basin

1. Short description of the project/ activities

The project “Climate Change and Security in the Dniester River Basin” is an integral part of the larger scale project “Climate Change and Security in Eastern Europe, Central Asia and the Southern Caucasus”. The Strategic Framework for Climate Change Adaptation in the Dniester Basin was developed and launched at a high-level event by the deputy ministers of environment of the Republic of Moldova and of Ukraine. An implementation plan and resource mobilization plan are being developed in wide consultation with the basin stakeholders to ensure mainstreaming adaptation to climate change into the national and local policy. A number of adaptation measures have been implemented in the basin.

2. Which climate change impacts are you already experiencing or expecting, such as floods, droughts, impacts on water quality etc.?

Flooding in the Dniester River basin which happened in 2008 and 2010 caused big damage and do present the consequence of climate change. According to long period observations such flooding could happen once in 10-15 years. Additionally to this during last decades the periodicity of dry years (with unfavorable conditions for agriculture) has increased: every three years from a four year cycle do harm the agriculture. The number of low water years has also increased.

3. Which concrete results did you achieve in 2014-2015 with regards to climate change adaptation?

As one of the main outputs, a Strategic Framework for Adaptation to Climate Change in the Dniester River Basin was developed in 2014-2015, which is one of the first transboundary adaptation strategies in the world. The

document provides a glimpse into expected climate change impacts on the water flow (less quantity and worse quality is expected), human activities (soil fertility might decrease, new pests might appear), nature (less space for species and decrease of the ecosystems productivity) and population (health issues might need much more attention) as well as identifies adaptation measures which are useful from a basin perspective. Priority measures range from those reducing damage from floods, water scarcity and degradation of water quality, to support to ecosystem resilience. The proposed “menu” of measures includes information, organization and investment measures which could be implemented jointly at the basin level, coordinated by the countries or individually (in different basin areas). The Strategy was endorsed by the Ministries of Environment of the two countries and launched by the two deputy ministers of environment at a high-level event in Kiev in April 2015 which also gave a new impetus to the Dniester treaty ratification process.

A Plan for Implementation of the Strategy is currently being finalized to ensure its mainstreaming into national policies and plans as well as financing and implementation of measures. At the same time, a number of adaptation measures have already been finalized or initiated. For example:

- calculation of the current and probable (under climate change impact) water management balance has been performed for the entire basin,
- scientists analyzed the potential for creation of an artificial spawning ground in the Lower Dniester at a Ramsar site “Talmaz wetlands” in Moldova,
- a preliminary model for water reservoir management, considering climate change, has been developed by the Alliance for Global Water Adaptation,
- a feasibility study for restoration of water exchange between the Dniester and floodplain meadows under the road Mayaki-Palanca in a transboundary Dniester delta has been performed;
- some 7000 trees have been planted by youth and conservation organisations in the Lower Dniester, the most southern and the most vulnerable to the climate change part of the basin, and 6 ha of Turunchuk island were planted with forest at a Ramsar site “Lower Dniester” in Transdnistria (Moldova),
- a summer expedition along the Dniester was organized for 60 representatives of Moldovan and Ukrainian youth, NGOs and journalists,
- annually 400 kids and students in 2013-2015 from both banks for the river took part in the art contest “Colours of the Dniester”, having demonstrated their photographs, drawings, verses, etc.

4. Which major challenges did you face in this work? How did you overcome them?

The main problems were about the information and data exchange. They were discussed and a solution was proposed. These problems were discussed during training, seminars, work group meetings and day-to-day communication.

Poor financing of the national programmes and, as a consequence, low implementation rate of such programmes is a big challenge in implementing the planned activities.

5. Which lessons learned would you like to share with other basins?

- Consultation process with the stakeholders from the district levels in both countries is quite complicated;
- The dialog between different sectors (for example energy and ecology) should be strengthened;
- Climate change adaptation measures are not of the high priority for both countries due to fact that there are more urgent and a huge amount of day-to-day activities.
- There are no persons responsible for realization of climate change adaptation measures on the operational level.
- It is necessary to foster cooperation on political and expert levels;
- In many cases, it is easier to operate on the local level achieving good results without national level involvement, which sometimes brings in bureaucracy;
- It is very important to realize concrete activities on the local level with the involvement of population;
- Local producers are aimed at receiving an immediate profit and do not have the strategic approach;
- Rural population is not aware about the problems linked with the climate change.

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

implementation of measures?

The Plan for Implementation of the Strategy and the funds mobilization strategy which are currently being finalized provide an overview of the various funding opportunities at international to local level to practically undertake the adaptation measures.

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

The Republic of Moldova has approved the National Climate Change Adaptation Strategy though there is not enough information about the transboundary basins in this document. Adaptation to climate change has been included into the INDC by the Republic of Moldova.

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?

All climate adaptation measures should reflect the interests of all interested sectors-stakeholders, but the priority should be given for the environmental issues. Organization of the national discussion forums for climate change adaptation.

9. Future planned activities

Further implementation of of climate change adaptation measures, finalization of the implementation plan and the fund mobilization strategy and their mainstreaming into national policy.

10. Contact details

Bejenaru Gherman, State Hydrometeorological Service of the Republic of Moldova

Tel.: +373 77 35 30, mob. : + 373 600 64 000

gherman.bejenaru@meteo.gov.md

Pencov Mihail, Apele Moldovei

Tel.: +373 79 004 213

penkovmihails@gmail.com

Nabivanets Iurii, Hydrometeorology Research Institute of Ukraine

Tel.: +380 44 525 87 80, mob.: +380 67 986 10 47

krava@uhmi.org.ua

Babych Mykola, ex-Deputy Head of the State Water Management Committee of Ukraine

Tel.: +380 44 464 60 71, mob.: +380 95 015 08 78

mykola.babych@gmail.com

3. Pilot project on river basin management and climate change adaptation in the Neman river basin**1. Short description of the project/ activities**

Aim of the project (implemented by United Nations Economic Commission for Europe under Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Water Convention) and UNDP Belarus, with funding from Finland and Sweden through the Environment and Security Initiative (ENVSEC): The overall objective of the project is to improve integrated river basin management and transboundary cooperation in times of a changing climate in the Neman river basin. The project aims to strengthen the capacity to adapt to climate change of the countries sharing the Neman river through supporting dialogue and cooperation on the needed steps to design an adaptation strategy in the transboundary context. It will aim to reach a common understanding on future water availability and water use taking into account possible climate change impacts.

2. Which climate change impacts are you already experiencing or expecting, such as floods, droughts, impacts on water quality etc.?

The climate change forecasts until 2050 for the Neman River Basin (NRB) proved of an average increase on air temperature in the basin with increase to the maximum in summer and in winter. The largest precipitation is forecast in the cold season of the year, while in the second half of summer and also at the beginning of autumn the precipitation will actually remain unchanged or will even decrease.

The forecast summer surface runoff may decrease in the NRB and it may increase to the maximum in the winter season. The problem of low-water periods leading to droughts is more relevant for the NRB. The forecast reduction in the minimum runoff in the summer and autumn seasons may be more significant in the future than its reduction over the last 50 years. Low-water periods may result in deterioration of the state of the environment and recreational potential of surface water bodies and adjacent areas. In addition, the possible increase in the frequency and duration of dry seasons may increase the risk of a substantial reduction in the summer runoff of small rivers, which would result in lower water levels and deterioration of their water quality and recreational potential. Spring floods are not a priority problem in the NRB, except the Neman headwaters in Belarus, western Lithuania and Kaliningrad Oblast of the Russian Federation. However, despite the fact that the flood problem is not the most urgent as regards the larger part of the NRB, it is relevant since floods cause substantial economic damage, specifically to agricultural production.

3. Which concrete results did you achieve in 2014-2015 with regards to climate change adaptation?

Final versions of the Strategic Framework for the Neman River Basin Adaptation to Climate Change is prepared for publish in Russian, in Lithuanian and in English and was published in February – March 2016. Results of the pilot project were presented in the Seventh World Water Forum in April 2015 (Republic of Korea) and in the United Nations Publication “Water and Climate Change Adaptation in Transboundary Basin: Lessons Learned and Good Practices” (2015). Results of the Pilot Projects and future activities in the frame of transboundary cooperation on water resources management and adaptation to climate change in the NRB were discussed in meetings with participation of scientists, experts and decision-makers. Participants from the Republic of Belarus, the Republic of Lithuania and the Kaliningrad oblast of the Russian Federation appreciated the outcomes of the project and use of its results in national climate change policies, the design and implementation of strategies and adaptation plans as well as water management policies and plans, as appropriate.

The Technical Protocol on cooperation in the field of water resources protection and use in the NRB between the Ministry of Environment of the Republic of Lithuania and the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus was prepared.

The following meetings were organized in n 2014-2015:

- Stock-taking conference on 19-20 June 2014 Vilnius, Lithuania;
- Enhancing technical cooperation in the Neman river basin – expert meetings for representatives of Lithuania and Belarus: 30-31 October, 2014, Vilnius, Lithuania and 16-17 December 2015, Minsk, Republic of Belarus.

4. Which major challenges did you face in this work? How did you overcome them?

The financial deficit for implementation of adaptation measures on the national levels is the major challenge on the national levels. There were no significant challenges in the frame of the Neman pilot project realization phase. The dominant problem in the Neman River Basin between countries in communication is different status of membership – EU and non EU members with additional procedures for visa application etc.

5. Which lessons learned would you like to share with other basins?

Experience in creation of the Informational Platform in Internet included join basic meteorological and hydrological data base for assessment and forecast of climate change (Belarus and Lithuania).

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

Financing of climate change activities within the entire NRB basin in the frame of international cooperation is planned under International projects.

Financing of the implementation of adaptation and other water management measure will be under realization of the NRB National Management Plans (Belarus, Lithuania) from the national budget, local budget and other not national sources including private companies and international projects.

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

Adaptation measures will be included in the national Neman River Basin Management Plan (Belarus).

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

Project results and recommendations were considered by the hydropower sector which is vulnerable to climate change (especially for calculations of the ecological water releases in the low-water).

9. Future planned activities

Joint project for Neman RBMP is prepared (Lithuania and Belarus) with future project activities in Belarus with using Lithuanian experience including:

- Comparison and harmonization of the water bodies designation and typification, assessment systems of status of surface water bodies and groundwater;
- Designation of water bodies in the NRB;
- Classification and presentation of status of surface water and groundwater bodies;
- Identification of significant pressures and impacts of human activity on the status of surface water bodies and groundwater;
- Harmonization of environmental objectives;
- Comparison and harmonization of monitoring programmes;
- Coordination of measures to reach the environmental objectives for the water bodies of the in the NRB.

10. Contact details

Mr. Vladimir Korneev, Central Research Institute for Complex Use of Water Resources, Belarus

Tel.: +375 17 263 4833

v_korn@rambler.ru

Ms. Sonja Koeppel, Manager of the project at UNECE

Tel. : +41 22 917 1218

sonja.koeppel@unece.org

4. Rhine river basin/ International river basin district Rhine (IRBD)

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 2d 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 adaptation can be found here:

- Climate change adaptation strategy: http://www.iksr.org/fileadmin/user_upload/Dokumente_en/Reports/219_en.pdf
- New RBMP (will be available soon in English): <http://www.iksr.org/en/water-framework-directive/river-basin-management-plan-2015/index.html>
- New FRMP: <http://www.iksr.org/en/floods-directive/flood-risk-management-plan/index.html>

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 work plan 2016-2021.

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

Adrian Schmid-Breton

International Commission for the Protection of the Rhine - www.iksr.org

Kaiserin-Augusta-Anlagen 15, DE – 56068 – Koblenz, Germany

Tel.: +49 261 94252 22

adrian.schmidbreton@iksr.de

5. Projects in the Sava River Basin

1. Short description of the project / activities

Following the implementation of the pilot project *Building the link between flood risk management planning and climate change assessment in the Sava River Basin* (finalized in 2013), whose outcomes were presented at the second meeting of the global network of basins working on climate change adaptation (Geneva, 13-14 Feb. 2014), three relevant projects were implemented / finalized in the reporting period:

- Project Water – Food – Energy – Ecosystems Nexus Assessment in the Sava River Basin, implemented within the Programme of Work for 2013–2015 under the UNECE Water Convention
- Danube Water Nexus Project – Sava Case Study, implemented by the EC Joint Research Center (JRC)
- Project Water and Climate Adaptation Plan for the Sava River Basin (WATCAP), implemented by World Bank.

One of the objectives of the nexus assessment was to identify policy measures and actions that could alleviate negative consequences of the nexus and help to optimize the use of available resources under future environmental and climate constraints. Based on a number of climate simulations conducted in both nexus projects, it was concluded that adapting to climate change is a key challenge faced by the riparian countries.

Following the endorsement at the 7th Meeting of the Parties to the UNECE *Water Convention* (Budapest, 17-19 Nov. 2015), the UNECE project findings were made available on the UNECE web-site as a chapter of the publication *Reconciling resource uses in transboundary basins: assessment of the water-food-energy-ecosystems nexus* (<http://www.unece.org/index.php?id=41427>), while the extended version of the Sava nexus assessment report is being prepared for publishing. Results of the JRC nexus activity have been incorporated into the UNECE reports.

The WATCAP project aimed to assess impacts of climate change on the water sector and to propose options for adaptive management actions for the most important water sub-sectors, and resulted in the following main outcomes:

- Analysis of historic climate trends (2010)
- Climate modelling (2011; 2012-2013)
- Hydrological modelling (2012-2013)

- Hydrologic model of the Sava river basin, used to assess the hydrologic response of the Sava River Basin to future climate scenarios, which was distributed to authorities in the Parties on a CD (2014)
- Consultation with stakeholders on the draft project outcomes through the ISRBC web-site (July – Sep. 2014)
- Stakeholder workshop to present the final draft outcomes of the project with the special emphasis on Guidance Notes for climate adaptation of different sectors (11 Nov. 2014)
- A hands-on training of experts from national institutions on the use of the hydrological model (12-13 Nov. 2014)
- Guidance Notes on climate adaptation of various water sub-sectors (navigation, hydropower, agriculture, flood protection, economic evaluation of climate change impacts)
- WATCAP Report, along with the annexes containing all outcomes.

Following the formal endorsement of the project by the World Bank in Nov. 2015, all outcomes of the project were made available on the ISRBC web-site (http://savacommission.org/project_detail/18/1).

2. Which climate change impacts are you already experiencing or expecting, such as floods, droughts, impacts on water quality etc.?

There were several flood events in various parts of the basin during the years 2014-2015, the major one being the disastrous flood of May 2014, that hit three countries of the basin. The comprehensive report on the May 2014 flood is available at <http://savacommission.org/publication>.

3. Which concrete results did you achieve in 2014-2015 with regards to climate change adaptation?

Finalization of the WATCAP project, including a set of *Guidance Notes* on climate adaptation of various water sub-sectors (navigation, hydropower, agriculture, flood protection, economic evaluation of climate change impacts).

4. Which major challenges did you face in this work? How did you overcome them?

- Limited funds for a comprehensive elaboration of adaptation measures.
- Limited involvement of national institutions of the member countries from all relevant sectors into the process of consultation on the proposed adaptation measures.

5. Which lessons learned would you like to share with other basins?

Strong involvement of national institutions of the member countries from all relevant sectors is needed in order to agree upon adaptation measures than will be implementable on the ground.

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

Basin-wide projects are financed from external sources (i.e. EC, UN organizations, regional commissions and specialized agencies, international financial institutions, bilateral donors). The external sources will also be targeted for implementation of climate adaptation measures.

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

Through the mechanisms developed within the framework of the ISRBC, such as the Meeting of the Parties (ministerial level), ISRBC itself, expert groups of ISRBC, consultation activities in the basin including contacts with relevant national institutions

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?

Through implementation of the activities described under the item 1.

9. Future planned activities

At the 7th Meeting of the Parties to the UNECE *Water Convention* (Budapest, 17-19 Nov. 2015), the ISRBC expressed, on behalf of its member countries (Bosnia and Herzegovina, Croatia, Serbia and Slovenia), an interest

for implementation of a follow-up project dealing with climate change in the Sava River Basin, in the framework of the *Programme of Work for 2016–2018* under the *Water Convention*.

The primary aim of the proposed project is to develop a *Programme for Preparation of the Climate Adaptation Strategy for the Sava River Basin*, planned to be conducted by the ISRBC in future.

The project will build on the outcomes of the UNECE pilot project on climate change (2013), the UNECE nexus assessment in the Sava River Basin (2015) and the complementary nexus project implemented by JRC (2015), the WATCAP project (2015), as well as national climate adaptation strategies and plans of the ISRBC member countries, and other knowledge and information, planned to be summarized by means of a desk study within the same project. The project will also seek synergies with the relevant activities going on at the Danube level, in the framework of the ICPDR.

The project findings will be considered to be incorporated into major plans for the Sava River Basin, i.e. the updated *Sava River Basin Management Plan*, to be prepared within the 2nd cycle of river basin management planning in accordance with the European *Water Framework Directive* (initiated in 2015), as well as into the first *Flood Risk Management Plan for the Sava River Basin*, the preparation of which is expected to start in the course of this year.

In addition, a follow-up project on the nexus assessment in the Drina River Basin (the largest sub-basin of the Sava Basin) has just started under the UNECE *Water Convention*, and will be implemented through 2016.

10. Contact details

International Sava River Basin Commission
Kneza Branimira 29, 10000 Zagreb, Croatia
Tel.: +385 1 488 69 60
isrbc@savacommission.org

6. Dauria Going Dry

1. Name and short description of the project/ activities

Dauria Going Dry pilot project, initiated by Rivers without Boundaries Coalition, Dauria International Protected Area (DIPA) and WWF under auspices of the UNECE Water Convention, aimed at harmonizing transboundary river protection and management in river basins flowing from Dauria Ecoregion (initially Eastern Dauria -the upper Amur river- basin).

The key question that the project addresses is how to prevent destruction of Daurian natural ecosystems, enhance their resilience and save globally endangered species in circumstances of intensive economic development and climatically caused periodical water deficit at the region.

The project seeks to develop and promote science-based adaptation measures to complex cycling climate of Dauria region, which is severely affected by global warming. The project addresses domestic and international policy-making, as well as selected conservation and monitoring practices in the field through:

- Strategic assessment of river management options in the light of ecosystem-based adaptation to climate change;
- Establishing wetland monitoring system;
- Enhancement of protected areas network as one of key adaptation measures;
- Awareness raising program on climate change adaptation in transboundary context and preventing maladaptive development of large infrastructure in the name of "climate adaptation measures".

From 2014 the pilot project has expanded further into the Western Dauria - Baikal Lake basin, where we cooperate with Buriat Regional Organization for Baikal (BROB), Plotina, Baikal Environmental Wave, Pacific Environment and several other groups.

Acute crisis in Lake Baikal water management triggered by climate change and impacts of hydropower that has

become obvious since winter 2014/2015 makes us apply for pilot project status, because developing solutions for problems of Baikal require involvement of world-wide expertise and support of international organizations. The project mobilizes expert community and civil society to support and promote science-based adaptation measures for management of Lake Baikal, through:

- Strategic assessment of the Lake Baikal water management options in the light of ecosystem-based adaptation to climate change;
- Public participation in development of Irkutsk reservoir operational rules, other regulations governing the Lake Baikal water management;
- Public support to implementation of the World Heritage Convention, that requires to develop comprehensive management and monitoring system for the Lake Baikal;
- International cooperation to enhance Lake Baikal basin water management practices with findings and techniques developed in other lake/river basins.

2. Which climate change impacts are you already experiencing or expecting, such as floods, droughts, impacts on water quality etc.?

Extreme droughts and floods are more and more pronounced in the region.

2001-2011 has been extremely dry period, when habitats available to wetland species shrank dramatically, competition between nature and humans for water was very pronounced, aridization of huge expanses of grasslands affected agriculture, etc. Then in the Eastern Dauria new wet phase came and in 2013 Amur river had the largest flood in history of instrumental measurements that seriously affected 4 regions in Russia and 3 provinces in China. In 2015 Sino-Russian Lake Khanka water level has risen far beyond expected levels and flooded surrounding rural areas.

In the Western Dauria the drought continues. Crisis is unfolding due to unpreparedness of Angara river hydropower cascade and riparian municipalities to extreme drought caused primarily by climatic changes/fluctuations on Mongolian territory in 1998-2015. Management response is haphazard and aimed at preserving status-quo, rather than protecting lake ecosystem or local communities. This is complicated by serious rise in Lake Baikal water temperature and lack of sewage treatment in coastal facilities. By 2013 Lake Baikal near-shore waters have massive outbreak of exotic *Spirogyra* algae killing native sponges and other endemic water-purifying species.

In addition, fearing climate change impacts, Mongolian Government made unilateral decision to build several large reservoirs in Selenge river basin for electricity generation and inter-basin water transfers, which further threatens Lake Baikal ecosystem and well-being of local population. In 2015 Mongolia contracted French GDF-Suez and Chinese Gezhouba companies for construction of Egiin Hydro on large tributary of Selenge River.³

3. Which concrete results did you achieve in 2014-2015 with regards to climate change adaptation?

Eastern Dauria (Amur Basin)

- Launched an international research and nature conservation program “Impact of climate change on ecosystems of Daurian ecoregion and ecosystem-based adaptations” of Dauria International Protected Area.
- Established more than 280 plots of long-term ground and remote-sensing monitoring of flora and fauna on wetland ecosystems and existing anthropogenic pressure in Russia, Mongolia and China. Analyzed and published data collected through Dauria Transboundary Ecological Monitoring Network.
- Published first report on strategic assessment of river and wetland conservation and management in the light of climate adaptation in Dauria: “Adaptation to climate change in the river basins of Dauria: Ecology and Water Management” was published in [Russian](#), [English](#) and Chinese.
- Conducted [initial analysis](#) and prepared recommendations for basin-management plan for transboundary Kherlen River Basin focusing on ecosystem-based adaptation issues and avoiding negative transboundary impacts. (2014-2015)⁴
- Based on monitoring results prepared report “*Transboundary Lakes of the Torey Depression*” (2015)

Western Dauria (Lake Baikal Basin)

³ <http://www.eghpn.mn/en/>

⁴ https://www2.unece.org/ehlm/platform/download/attachments/32702467/Kherlen%20RiverReport_%20Final%20Draft%20032015.pdf?version=1&modificationDate=1440914433190&api=v2

- In a course of several multi-stakeholder workshops held in 2013-2014 developed consensus based proposal for step-by-step monitoring and design of Lake Baikal water regime management system. Our proposal was supported by several institutes from Russian Academy of Science and Buryat Republic Government.
- In February 2016 RwB submitted critique of the new Draft of Rules of Lake Baikal water level regulation posted for discussion by the Government.
- Assisted local citizens in Buryatia and Mongolia in formulating a scientifically and legally valid complaint to the World Bank Inspection Panel on dams planned in Selenge Basin and developed policy dialogue with various facets of WB management.⁵
- Assisted IUCN and World Heritage Committee in preparation of decisions of the 39th Session (Bonn-2015)⁶;
- Expert support to public hearings and consultations on hydropower dam projects and reservoir management regulations in Russia and Mongolia. Last hearings held on Feb 8, 2016 in Kabansk);
- Developed regular public consultations with Yenisei-Angara Basin Council and Evrosibenergo Co. in Russia and MINIS Project and Ministry of Environment and Green Development in Mongolia. Our suggestions were incorporated in TOR for environmental impact assessments for Shuren and Orkhon dams⁷;
- Published a book by S.G. Shapkhaev (BROB) on climate adaptation issues in hydropower planning and management in Siberia.
- At EU-Russia Civil forum developed and endorsed an appeal: "Russia and the European Union Need to Improve the Climate Adaptation of Water Ecosystem Management".
- In cooperation with Greenpeace developed and disseminated appeal "Lake Baikal and Climate" at Climate COP in Paris⁸

4. Which major challenges did you face in this work? How did you overcome them?

- Competition for water between neighbouring countries facing climate change which makes bilateral negotiations difficult.
- Hostility of officials towards experts/activists who suggest to assess risks of water-management decisions.
- Severe lack of ecosystem monitoring data for Baikal despite its World Heritage status.
- We overcome challenges with communication/education efforts (e.g. highlighting advances in other countries, etc).

5. Which lessons learned would you like to share with other basins?

- The greatest environmental impacts may come not from climate change per se, but from shortsighted and haphazard infrastructure development for "climate adaptation/mitigation", which in a long run turn to be maladaptation.
- Proper adaptation strategy should first of all include monitoring of ecosystem response to hydrological changes
- Ecosystem-based adaptation has several decisive advantages over excessive infrastructure measures: preserving option for the future, sustaining resilience of natural systems, avoiding conflicts, saving money and synergy with biodiversity preservation.

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

Our work mostly funded by grants. Implementation of recommendations is reliant on state budget and WB funding.

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

- Prepared recommendations to amend national planning system for reservoir management
- Regularly interact with Russian-Mongolian working group on water management and other bilateral mechanisms.

8. How did you link transboundary climate change adaptation to adaptation activities of sectors such as

⁵ ewebapps.worldbank.org/apps/ip/Pages/ViewCase.aspx?CaseId=107

⁶ <http://whc.unesco.org/en/decisions/6279>

⁷ <http://www.minis.mn/n/b/82>

⁸ <http://www.transrivers.org/2015/1602/>

adaptation in energy, in agriculture, in transportation or urbanisation?

- Project staff served key experts in basin-wide assessment of hydropower development options in Amur basin, that led to better decision-making by Russian and Chinese companies.
- Project staff played key role in protected area planning. E.G. in 2015 a wildlife refuge was established on Shilka, Argun and Upper Amur river in Russia, that serves to preserve resilience of river ecosystems in the face of climate change.
- Energy is the key sector for water management in both countries, we conducted research and promote various renewable energy alternatives to dam building in Selenge basin.
- Fisheries agency experts participate in our work and we jointly plan adaptation measures.

9. Future planned activities. In 2016-17 we plan to:

1. Complete Strategic Environmental Assessment of Zabaikalsky Province Development Programme till 2030 with full consideration of climate change adaptation measures.
2. Prepare for publication a comprehensive guide on flood management as climate adaptation measure for Amur River Basin
3. Continue preparation of "Dauria Steppe" nomination for Russian-Mongolian joint World Heritage Site with climate change resilience as one of central topics.
4. Prepare recommendations on flow release regimes of the Middle Amur reservoirs (on the Zeya and Bureya rivers) in order to adjust to the conditions of recurrent floods and reduce impact on ecosystems;
5. Continue ecosystem monitoring.
 - Develop initial roadmap for Strategic Environmental Assessment of Lake Baikal basin water management issues as first step of management system planning (as prescribed by WHC in 2015).
 - Organize public participation and control in EIAs for hydropower projects and reservoir regulation rules
 - Assist introduction of climate adaptation considerations into national policies of Russia and Mongolia
 - Development exchange of experts and managers on comparative large alpine lake management (e.g. Lac Leman, Badenzee).
 - Through awareness raising mobilize international constituency for protection of the Lake Baikal in the face of climate change and growing human impacts.

10. Contact details:

Dr. Eugene Simonov, Coordinator, Rivers without Boundaries International Coalition / simonov@riverswithoutboundaries.org / www.transrivers.org

Oxana Nikitina, Coordinator for Freshwater Ecosystem Conservation and Sustainable Hydropower, WWF-Russia / onikitina@wwf.ru

Dr. Vadim Kiriliuk and Dr. Tatiana Tkachuk, Daurusky Biosphere Reserve / Dauria International Protected Area (DIPA) / vkiriliuk@bk.ru , tetkachuk@yandex.ru

Dr. Sergey Shapkhaev, Director, Buriat Regional Organization for Baikal (BROB), Ulan-ude / shapsg@gmail.com

Alexander Kolotov, Plotina NGO, Coordinator Rwb-Russia, Krasnoyarsk, Russian Federation / kolotov@plotina.net

Sukhgerel Dugersuren, Director- OT Watch - Coordinator Rwb-Mongolia, Ulaan Baatar, Mongolia / dsukhgerel@gmail.com

7. ICPDR Strategy on Adaptation to Climate Change

1. Short description of the project/ activities

The need to take the necessary steps to adapt the water sector to climate change was recognised by the countries of the Danube River Basin. Therefore, the International Commission for the Protection of the Danube River (ICPDR) was asked by the Ministers of the Danube countries to prepare a Climate Adaptation Strategy for the whole basin. The Strategy was finalised and adopted in December 2012. It is based on a scientific research study which summarises all relevant available information on climate change and expected impacts on water for the Danube. The most important tools for implementing climate change adaptation measures are the River Basin and Flood Risk Management Plans for the Danube River Basin. Both Plans were finalised and adopted in December 2015, addressing the 6-years water management period until 2021. The adaptation and upgrade of monitoring programs

is ongoing.

As next steps it is planned to update the ICPDR Strategy on Adaptation to Climate Change in 2018, taking into account the latest scientific knowledge and approaches on climate change adaptation.

The Climate Change Adaptation Strategy and Study are online available following the link:

<http://www.icpdr.org/main/activities-projects/climate-change-adaptation>

The River Basin and Flood Risk Management Plans for the Danube River Basin for the period 2015-2021 are available at: <http://www.icpdr.org/main/management-plans-danube-river-basin-published>

2. Which climate change impacts are you already experiencing or expecting, such as floods, droughts, impacts on water quality etc.?

Catastrophic flood events but also droughts occurred during the last years in the Danube River Basin. However, distinguishing between climate variability and climate change appears to remain generally a challenge.

A research study elaborated for the Danube River Basin, which provided the basis for the Danube Climate Change Adaptation Strategy, indicated that impacts on water related sectors are triggered by temperature and precipitation changes. Higher temperature is expected with a gradient from northwest to southeast. Generally, seasonal precipitation changes with a decrease in summer and an increase in winter precipitation are expected. Regarding floods, although local and regional increased heavy rainfall might occur, there is no clear picture for changes in flood magnitude and frequency. An increase of water temperature and increased pressures on water quality are expected. Changes for ecosystems and biodiversity are predicted with shifts of the aquatic and terrestrial flora and fauna. But also positive effects are projected, such as a reduction of ice days on rivers or longer vegetation periods.

3. Which concrete results did you achieve in 2014-2015 with regards to climate change adaptation?

Key tools for implementing climate change adaptation measures are the River Basin and Flood Risk Management Plans for the Danube River Basin. Both Plans were finalised and adopted in December 2015, addressing the 6-years water management period until 2021. The Plans include water management measures which were discussed and agreed in the context of climate change. The proposed measures of the Joint Program of Measures went through a "climate check" of the ICPDR Expert and Task Groups. Respective chapters on climate change adaptation and on the way forward were adopted.

Furthermore, the ICPDR Climate Change Adaptation Strategy highlights in its guiding principles that an investigative monitoring programme for climate change shall be set. The strategy considers the effective long-term monitoring (to enable climate change signals to be identified and reacted to in due course) as being one of the key implementation issues. Danube countries selected candidate sites for climate change impacts monitoring, including information on the available data series and evaluations. Different parameters were agreed to be monitored in the frame of the Danube Transnational Monitoring Network (TNMN) to investigate climate change impacts, like for instance water and air temperature, discharge, water level, pH and oxygen.

Political support for further work on climate change adaptation was secured. In February 2016 the Danube Declaration was adopted at the Ministerial Meeting organised by the ICPDR. As next steps it is planned to update the scientific knowledge base and subsequently the ICPDR Strategy on Adaptation to Climate Change in 2018. The detailed planning for this upcoming work is currently ongoing.

4. Which major challenges did you face in this work? How did you overcome them?

Inhomogeneous data base and information on climate change and expected impacts in the basin. In order to overcome this challenge a scientific study for the whole basin was elaborated, summarising existing data and information on climate change and adaptation. The study is planned to be updated with latest scientific research results.

Uncertainties on expected impacts are posing a challenge for the discussions on adaptation measures. In line with

the ICPDR Strategy on Adaptation to Climate Change, the Program of Measures of the River Basin Management Plan went through a “climate check”. Although statements on climate change bear a certain degree of uncertainty, adaptation has to start now with a priority on win-win, no-regret and low-regret measures which are flexible enough for various conditions. Therefore, the Program of Measures at this stage generally does not include specific measures which are solely dealing with the effects stemming from climate change. In contrary, it clearly reveals that the measures which are targeted towards the improvement of water status and sustainable water management generally help to increase the resilience against climate change effects. This is for instance the case for measures addressing the reduction of pollution from point and diffuse sources. Increased capacities of sewer system storages or measures to control soil erosion are in particular relevant for potential increased heavy rainfall events. The reduction of pollution also helps to ensure and maintain low concentration levels of contaminants during extended drought and low flow conditions.

With regard to water quantity issues, the River Basin Management Plan includes measures to achieve and maintain good quantitative status of groundwater bodies. This is a pre-requisite to ensure a balanced management of abstraction and groundwater recharge, what is a key requirement for sustainable water management as well as a response to climate change. In some countries, specific efforts are taken at the national level to protect future possible locations of water accumulation reservoirs for irrigation purposes in order to increase the resilience of the agricultural sector.

Hydromorphological measures like fish migration aids or the re-connection of wetlands and floodplains are increasing the resilience of the ecosystem. With regard to the latter, multiple benefits also in terms of increased water retention capacities and therefore flood mitigation can in addition be encountered.

In general, due to effects of climate change on multiple water-related sectors, there is a need to further gain clarity on climate impacts across sectors and to further integrate this knowledge into inter-sectoral cooperation activities, e.g. in the exchange with flood risk management, inland navigation, hydropower or agriculture. This will help to better shape programs of measures in order to facilitate win-win solutions or to achieve adequate trade-offs. Furthermore, it will allow to better target activities on emerging and new issues which might be in need to be addressed at the basin-wide level, like this is already the case for the issue of water scarcity and drought.

5. Which lessons learned would you like to share with other basins?

A shared legal framework for integrated water resource management like the Danube River Protection Convention, EU Water Framework Directive and Floods Directive are crucial for taking the required steps on climate change adaptation. Climate change is therefore an additional key argument in support of transboundary water management approaches.

Following an adaptive approach is needed which provides sufficient flexibility – programs of measures, including adaptation measures, have to be regularly updated within a cyclic planning approach once new scientific evidence and understanding on climate change and related impacts becomes available. This with the objective to increase resilience and to decrease vulnerability within the river basin.

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

Financing of the implementation of measures is done by the individual countries through their river basin and flood risk management plans. Measures are in many cases co-financed by EU and other international funding instruments.

Coordination of measures over the borders is done in the frame of the ICPDR, that is also financed by the countries. Germany took lead for the elaboration of the ICPDR Strategy on Adaptation to Climate Change and financing the scientific study which is a key element of ICPDR’s climate adaptation approach.

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

The link is established through the involvement of national representatives in the international working groups of

the ICPDR for the Danube basin-wide level. This allows to take national issues and experiences on board in the international, basin-wide planning process, and vice versa.

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 and are directly involved in the water management planning processes for the Danube River Basin. This was the case during the elaboration of the ICPDR Strategy on Adaptation to Climate Change, as well as for the elaboration of the Danube River Basin and Flood Risk Management Plans, which are key tools for taking climate adaptation measures. The involvement of sectors is crucial for taking informed and balanced decisions.

9. Future planned activities

As next steps it is planned to update the scientific knowledge base and subsequently the ICPDR Strategy on Adaptation to Climate Change in 2018. The planning for this work is currently ongoing. More targeted activities on droughts are launched in parallel with the elaboration of a report on the droughts which hit parts of the Danube River Basin in 2015.

10. Contact details

For further information please consult the ICPDR website <http://www.icpdr.org> or get in contact with the ICPDR Secretariat:

Mr Raimund Mair

Technical Expert River Basin Management

Tel.: +43 1 26060 5333

Raimund.Mair@unvienna.org

8. Integrating the impacts of Climate Change into the management of the North-Western Sahara Aquifer System (NWSAS) / Identification of the CC impacts observed and current adaptive Capacity

1. Short description of the project/ activities

The North-Western Sahara Aquifer System, better known under the French acronym « SASS », extends over a total area of more than one million km². The NWSAS is a transboundary aquifer shared by Algeria (700 000 km²), Libya (250 000 km²) and Tunisia (80 000 km²). With a view to ensuring sustainable development in the region, OSS, in partnership with the three countries concerned, have elaborated, in a first phase, studies that helped a better hydraulic understanding of the NWSAS. However, given the increasing demands for water, notably for agriculture, and the urgent necessity to preserve a little renewable resource, OSS implanted a study on water valorisation. The study was of a socio-economic nature and consisted in an analysis of the farmers' operation, and especially the irrigator's real behaviour, based on surveys aimed at more than 3000 farmers. The surveys analysis allowed to identify the major constraints against water productivity, to assess the economic impacts of these constraints and to deduce recommendations for a better valorisation of the NWSAS water resources. The results of this study fed into a number of recommendations for a more sustainable agriculture and a better preservation of the aquifer's resources.

With the aim of consolidating the results obtained by the socio-economic study, OSS, in partnership with the GWP and the three beneficiary countries, have conducted a study aiming at integrating climate change impacts across the most vulnerable to rain fall areas, notably the plain of Tunisian Jeffara and the north region of the basin (Biskra, Jerid), for the implementation of complementary surveys integrating the climate change dimension in order to:

- Identify the impacts of climate change observed;
- Analyse current adaptive capacity

2. Which climate change impacts are you already experiencing or expecting, such as floods, droughts, impacts on water quality etc.?

The surveys allowed to make the following observations:

<ul style="list-style-type: none"> ▪ Degradation of water quality ▪ Increase of wind frequency ▪ Increase of sand storms frequency
<p>3. Which concrete results did you achieve in 2014-2015 with regards to climate change adaptation?</p> <p>The surveys allowed to identify the farmers' adaptation options:</p> <ul style="list-style-type: none"> ▪ Introduction of livestock breeding ▪ Abandonment of crops with high water needs ▪ Increase of water consumption ▪ Introduction of water saving irrigation techniques
<p>4. Which major challenges did you face in this work? How did you overcome them?</p> <p>No particular challenge for this study</p>
<p>5. Which lessons learned would you like to share with other basins?</p> <p>The farmers have a significant adaptive capacity in facing climate change which should be strengthened</p>
<p>6. How do you finance your climate change activities within the basin? How do you plan to finance implementation of measures?</p> <p>The funding resource are of two orders :</p> <ul style="list-style-type: none"> ▪ International cooperation for the studies and the farmers' dynamics. ▪ Countries funds (public and private) for the infrastructures (irrigation, ...)
<p>7. How did you link transboundary climate change adaptation to adaptation activities at other levels, such as the national level?</p> <p>There was no link with the adaptations at the national level as they were not studied in-depth at the national level</p>
<p>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?</p> <p>There was no link with the adaptations at the national level as they were not studied in-depth at the national level</p>
<p>9. Future planned activities</p> <p>A study on water and food security within the framework of the NEXUS: the energy factor will be integrated.</p>
<p>10. Contact details: djamel.latrech@oss.org.tn</p>

9. Investment Plan for the Strengthening of Resilience to Climate change in the Niger Basin (abbreviated as Climate Resilience Investment Plan - CRIP)

<p>1. Short description of the project/ activities</p> <p>The Niger Basin is an expansive region in West Africa that is home to more than 112 million people throughout the nine countries of Benin, Burkina Faso, Cameroon, Chad, Ivory Coast, Guinea, Mali, Niger, and Nigeria. The Niger River and its tributaries are vital lifelines providing drinking water, irrigation, aquaculture, energy, and transport to these nine riparian countries. Heavy reliance on natural resources, combined with ongoing conflicts, and political instability make it one of the most fragile river basins in Africa. Over 70% of the population lives in areas where food security depends on unreliable rainfall and highly variable inter-annual and intra-annual river flows. Climate variability has long been a challenge and an obstacle for development in the Basin.</p> <p>The Niger Basin countries recognize that the shared nature of their water resources presents an opportunity for a collaboration and coordination that will derive greater resilience-building outcomes. The Investment Plan for the Strengthening of Resilience to Climate Change in the Niger River Basin (abbreviated as Climate Resilience</p>
--

Investment Plan - CRIP) was prepared and will be implemented by the Niger riparian countries and the Niger Basin Authority (NBA), one of the oldest African intergovernmental agencies, created in 1964 in Niamey, Niger. The CRIP includes 246 actions that are divided in two packages:

(1) the Knowledge Package including (i) Measures to enhance knowledge and strengthen response to climate and hydrological risks, (ii) Measures to assess vulnerability, communicate, and raise awareness, (iii) Measures to strengthen capacity and integrate adaptation into bodies and management instruments of the national and regional institutions of the Basin;

the Sectoral Investment Package including (i) Measures targeting vulnerability to water stress

(ii) Measures targeting vulnerability to flooding, (iii) Measures targeting vulnerability to soil degradation

(iv) Measures targeting vulnerability to degradation of the grazing land, (v) Measures targeting vulnerability to degradation of the ecosystems , (vi) Measures targeting vulnerability to deterioration of the water quality

(vii) Measures targeting vulnerability linked to the rising sea-level, (viii) Measures strengthening resilience (e.g. generation of jobs, revenues, etc.).

Actions were culled from the NBA's Operational Plan, member countries' National Adaptation Programs of Action (NAPAs) and National Adaptation Plans (NAPs), as well as country proposals. This comprehensive basin-approach to addressing development and resilience is widely considered a best practice, but rarely implemented in the developing world due to the urgency of development needs as well as resource and capacity constraints. Yet in light of the rapidly advancing effects of climate change and the certain devastation that these impacts will bring to the most vulnerable countries and communities in the world, the CRIP is a bold and necessary step toward concerted action for a sustainable future in the Niger Basin.

Full implementation of the plan is estimated to cost USD \$3.11 billion. The plan will mobilize funding from a wide array of sources, some of which have committed support early in the Plan's development process. Additional funds will be mobilized with the support of regional and multilateral partners, such as the NBA member countries, the African Development Bank, and the World Bank. In practice, the CRIP will bring together adaptation measures planned in the Niger River Basin and help to mobilize complementary adaptation financing, including from specialized climate funds. All financing for the investment plan is aligned and consistent with existing plans at the regional and national levels.

2. Which climate change impacts are you already experiencing or expecting, such as floods, droughts, impacts on water quality etc.?

Floods, droughts and land degradation

3. Which concrete results did you achieve in 2014-2015 with regards to climate change adaptation?

- Development of 3000 ha of irrigated perimeter
- Protection of 11,000 km of river bank
- restoration of 39 000 ha of degraded land
- reforestation of 1200 ha of agroforestry
- support in traditional fishing (fishing equipment, storage equipment)
- Production of more than 60 T/year of fish
- Development and improvement of tools and more efficient methods

4. Which major challenges did you face in this work? How did you overcome them?

- weak capacity of executing Agencies
- Security issue in some areas
- Lack of hydro climatic data in quasi real time

5. Which lessons learned would you like to share with other basins?

- A good knowledge of the impacts of climate change on the natural resources
- is required for a better planning of development, especially, the actions of adaptation to climate change
- Political will, solidarity and equity are key issues in the management of
- trans-boundary water resources
- The participation of the users in the decision-making process is necessary for the consensual planning of

<p>the sustainable development of the basin</p> <ul style="list-style-type: none"> ▪ Dialogue, consultation, transparency and sharing of relevant information are ▪ conducive to the creation of an atmosphere of confidence among the stakeholders and thus, facilitate a concerted management of shared waters
<p>6. How do you finance your climate change activities within the basin? How do you plan to finance implementation of measures?</p> <p>Climate change activities are financed by Member countries contributions and donors (grant and loans). To finance the NBA CRIP we plan to organize a Donors Ronde Table on August, 30th 2016 in Abuja (Nigeria).</p>
<p>7. How did you link transboundary climate change adaptation to adaptation activities at other levels, such as the national level?</p> <p>Adaptation activities at national level need coordination at transboundary level to avoid “maladaptation”. We also need forecasting tools at transboundary level to help decision making for floods and droughts management at national level.</p>
<p>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?</p> <p>Transboundary climate change adaptation must promote inter sectorial coordination. In fact, adaptation in Energy at national or local level can have negative impact downstream on adaptation in others sectors such as in agriculture, and lead to maladaptation.</p>
<p>9. Future planned activities</p> <ul style="list-style-type: none"> ▪ Donors meeting on the Integrated Program for Development and climate change adaptation in the Niger basin (in May 2016), under preparation with African Development Bank, West African Economic and Monetary Union, African Water Facility and ICA. The implementation of this program is planned to start in 2016 ▪ Donors round table to mobilize funds for the implementation of the CRIP
<p>10. Contact details:</p> <p>SE/ABN: secretariat.abn@gmail.com Dr Abdou Guero: abdou.guero@gmail.com</p>

10. Development of the Master Plan for Water Development and Management of the International Commission of the Congo-Oubangui-Sangha (CICOS) for the next five years 2016 – 2020

<p>1. Short description of the project/ activities</p> <p>The SDAGE provides the operational plan of CICOS in the water sector. It sets the guidelines, the objectives and the measures to be implemented to support development and sustainable management of water resources at basin level. As inclusive document of IWRM in the Congo Basin, the scope of the SDAGE goes beyond the mere aspect of environmental protection. It has a wider thematic application scope than SDAGE conducted in other basins that primarily focus on achieving environmental goals.</p> <p>The development and implementation of the SDAGE are designed based on a participatory approach, through the implementation of National and Regional Dialogue Platforms (PCN and PCR).</p> <p>PCN and PCR form the mechanics of the participative approach in the Congo basin. They constitute the primary mean for CICOS to inform, consult and involve stakeholders into the SDAGE development process.</p> <p>The development of the SDAGE has been possible thanks to funding from German cooperation through GIZ under the GETRACO project which is led by the German consulting firm GFA from 18 August 2014 to 31 March 2016.</p>
--

2. Which climate change impacts are you already experiencing or expecting, such as floods, droughts, impacts on water quality etc.?

Main sectoral challenges resulting from the assessment:

- Increase coverage rates (supply and sanitation): Climate change will have little impact on drinking water and sanitation sector;
- Increase hydroelectric production: it is expected that impacts of climate change will reduce river flows during the next century. This impact may indeed bring down the production potential, but facing other challenges to address in the next decades, it can be considered minor. It will probably take a very long time before the impacts of climate change constitute a real obstacle to the continuation of the hydroelectric development of the basin;
- Irrigation development: impacts of climate change will have relatively limited effects on irrigation sector and agriculture sector as a whole;
- Improve inland waterway transport capacity: from all of the water sub-sectors, navigation is undoubtedly the one that will suffer most from impacts of climate change, and this has already begun with a loss of navigability on the Oubangui and Sangha rivers. The challenge for this sector will be to assess at best infrastructures sizing and type and required investments to restore and sustainably preserve navigability conditions taking into account the most likely evolution according to climate models;
- Sustainable use of fish resources: climate change may have effects on aquatic wildlife because of river flow decreases and temperature variations. The potential magnitude of these effects is still very poorly perceived, but it is not expected that drastic changes will occur in the next decades for this production sector;
- Pollutant control in the industrial sector: given the low need of industries and mines in relation to available resources, impacts of climate change will not have significant influence on activities from a water resources perspective;
- Wetlands protection: for the environment, instability and unpredictability resulting from climate change, with the increase of extreme or violent events, can submit sensitive areas to threats such as landslides caused by erosion. However, from a more positive point of view wetlands and forests, peatlands, may provide significant carbon sinks, which could be long-lasting valued on the carbon market related to climate change.

3. Which concrete results did you achieve in 2014-2015 with regards to climate change adaptation?

- Establishment of National Dialogue Platforms (PCN), in each CICOS Member State and creation of a Regional Dialogue Platforms (PCR) which includes representatives from the PCN;
- Development of assessments of the water sector in the CICOS area having identified key sectoral challenges;
- Formulation of a Shared vision of the development of the water sector in the CICOS area by 2035, and its structuring into strategic objectives;
- Formulation of an Action Program (PdM) 2016 – 2020 aiming at making water an actual sustainable development and growth factor for all in the basin.

4. Which major challenges did you face in this work? How did you overcome them?

The most significant challenges:

- Collection, use, and dissemination of information on water,
- Operating procedures of National and Regional Dialogue Platforms (PCN / PCR),
- Increase in hydroelectric production,
- Improvement of inland waterway transport capacity.

All these challenges are taken into account in the formulation of the Action Program (PdM) 2016 – 2020.

5. Which lessons learned would you like to share with other basins?

Below are some lessons learned:

- Importance of participation of the various levels of actors (global, regional, basin, local)
- Importance of links between assessment, Shared vision, objectives, PdM, and activities....

- PdM activities will be implemented through the PCN in order to strengthen national capacities for transboundary water management;
- PdM activities must be associated with global and interregional initiatives developed based on national programs;
- Development issues in the different sectors will be addressed, by complementing and supporting national and multilateral development initiatives.

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

Potential funding sources are :

- Contributions of CICOS member States and regional institutions;
- Support of Financial and Technical Partners (PTF), under different forms;
- German cooperation has already expressed its interest to continue supporting CICOS for the implementation of the PdM.

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

In the adaptation to climate change process, CICOS has to take a role of advisor, facilitator and mediator towards its member States. National adaptation plans (NAPs) developed by States do not sufficiently address aspects related to water, according to the transboundary perspective represented by CICOS. In order to identify better impacts of climate change at the Congo basin level, concerted joint actions should be identified and implemented, as a complement to those already planned in the NAPs.

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?

CICOS aims at achieving a Transboundary adaptation plan to climate change (PTACC) in order to assess impacts of climate change on water resources according to different IPCC scenarios, and to provide adequate adaptation strategies and measures. The PTACC will provide a basis for further implementation of identified measures.

9. Future planned activities

- Fundraising for the Implementation of the Action Program (PdM). The amount to be found in order to implement the PdM is USD 34 579 565;
- Implementation of the project "Strengthening of the hydrological monitoring of the Congo for an IWRM taking into account adaptation to climate change" under the CZZ2054 Funding agreement, signed between AFD and CICOS on 2 December 2015 at COP21 in Paris.

10. Contact details

Mr Blaise – Léandre Tondo
Hydraulics expert
CICOS
Tel.: +243812958225
blaisetondo@yahoo.fr

Mr Bertrand Meinier
Technical Advisor GIZ
Transboundary Water Management in the Congo Basin Project (GETRACO)
bertrand.meinier@giz.de

11. Senegal River Basin Development Authority (OMVS)

11. Short description of the project/ activities

A. STORAGE DAM PROJECTS

Large dams on the Senegal River aim at satisfying the needs for water of the population, such as uses related to navigation, industry and the mining sector.

- **Manantali** multipurpose dam (hydroelectricity and flow regulation): Storage 11.5 billion m³
- **Diama** benefits improved filling conditions downstream.
- **Félou** and **Gouina**
- **Koukoutamba**: The structure uses high rainfall of the catchment area (1750 mm/year)
- **Gourbassi, Boureya** and **Balasa**

B. OTHER TOOLS AND PROJECTS

➤ Resource management tools: these tools are used to manage conventional, uncertain and rare situations.

These tools include:

- Dashboard of needs / resources, which provides a quantitative assessment of the resource,
 - Models, including rain runoff model and forecasting model.
- Vulnerability study within the Integrated Water Resources Management Project. The overall objective of these studies is to improve the resilience of the river basin to impacts caused by variability and climate change.
- Alert Plan: It has been established and can prevent flooding due to rainfall or dam failures.

12. Which climate change impacts are you already experiencing or expecting, such as floods, droughts, impacts on water quality etc.?

Effects of climate change, with recurrent droughts, have resulted in losses of agricultural production, high livestock mortality and an impoverishment of the population from the middle valley and the delta. To adapt, OMVS has built dams.

As much as the basin suffers flooding, sometimes it also suffers of heavy floods such as in 1998 and 2003.

13. Which concrete results did you achieve in 2014-2015 with regards to climate change adaptation?

In 2014-2015, OMVS continued to establish other storage dams, including Gouina which is under construction. OMVS has adopted a meteorological and hydrological forecasting model. This model allowed forecasting rainfall and runoff.

Actions are also carried out for the development of Koukoutamba, Boureya and Balassa dams in Guinea. OMVS also developed terms of reference for vulnerability assessment of the basin to climate change. This study will provide basin vulnerability maps to climate change.

14. Which major challenges did you face in this work? How did you overcome them?

Major challenges in the implementation of adaptation programs are twofold: first funding planned actions, and second availability of essential data for forecasting and response.

15. Which lessons learned would you like to share with other basins?

The need for cooperation and the urgent need to develop structures such as storage dams and dikes.

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

All actions are carried out by three sources: the first source is the regular budget funded by equal contributions from the four Member States; the second consists of loans for development projects. The main donors are multilateral (World Bank, African Development Bank, European Investment Bank, Arab Fund) and bilateral (French Agency for Development, KFW, Exim Bank of China, Kuwaiti Fund); donations from bilateral and multilateral partners

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

Information management, processing and sharing tools activities are conducted at the level of the 4 states and coordinated by OMVS.

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

Activities carried out in the context of adaptation provide for the development of other sectors such as irrigated agriculture and hydropower. Storage dams allow to turbine for electricity production, to regulate flows, to provide a necessary volume for irrigation.

Manantali storage dam produces 800GWh / year. This capacity is shared between Mali, Mauritania and Senegal. Félou Dam produces 335 GWh / year. Gouina has a capacity of 140 MW. And this energy transits through a network of over 1500 km of line of the Diama Dam.

19. Future planned activities

Future activities are developing hydroelectric storage dams and monitoring of the resource

20. Contact details

Dr Amadou Lamine Ndiaye Director of Environment and Sustainable Development of OMVS

BP: 3152 Dakar, Senegal

Tel.: +221 338 598 101 (office), +221 775 370 000 (private)

Fax: 221 338 640 163

elaminendiaye@gmail.com, amadnd@yahoo.fr