

Concept note for abstracts for the “GCI Conference 2010” on:

## **The Global Dimensions of Change in River Basins - Threats, Linkages and Adaptation**

**organized by Global Water System Project (GWSP)**

**6-8 December 2010; University Club, Bonn, Germany**

Up to now the focus of river basin research and management has justifiably been on the local to watershed scale. For example, municipal water managers have traditionally focused on the local scale while advocates of integrated water resources management usually put their attention to the river basin scale. But scientists are beginning to take a broader view of water. Although the existence of a global hydrologic cycle has been recognized for decades, science is now discovering and studying a vastly wider web of biological, biogeochemical, and even socio-economic connectivities that bind water globally. An important new insight is that water in its various forms operates as a “global water system” on scales much larger than a single lake, river basin, aquifer, or municipality.

This concept has important implications for river basins because it means that water scientists and managers must take into account not only what happens *within* a river basin but also its *connections to the rest of the global water system*. It justifies, but also calls for a new *global perspective on river basins*.

The aim of this conference is to advance understanding concerning the global aspects of river basins and their management by reviewing the state-of-the-art of research, and open a dialogue with professionals and policy makers about this subject. In particular, this conference will focus on understanding the connection between changes in a river basin and driving forces originating outside of the basin, e.g. the impact of climate change on river basin water availability, or the influence of international food trade on land use and resulting hydrologic changes within a basin, or the impact of international financial institutions on the development of water infrastructure within particular river basins.

Contributions (papers and posters) are invited that address these and other aspects of the global dimensions of change in large river basins. The conference themes are grouped into three thematic parts as described below. Each part begins with a plenary, which will be followed by two or three parallel sessions focusing on selected topics. For details on how and when to submit an abstract please consult the conference website: [www.gwsp.org](http://www.gwsp.org)

### **Part 1. Impact of global change on river basins**

#### ***Objectives***

Research and management of river basins have so far focused mostly on the driving forces of change that occur within a river basin. While this has been a sensible approach, it also excludes important aspects of changes in river basins because new studies show that many driving forces originate from outside the river basin. This part of the conference is devoted to identifying the impact of external drivers on the basin and its water resources, as explained below. Examples include the impacts of climate change on hydrology, the impact of national or international policies concerning energy- and other crops on river basin land use, as well as

the effect of external socio-economic factors (economic development, global trade, or demographic changes) on river basin characteristics.

### ***Session 1.1 Climate change impacts on river basins***

Types and magnitudes of potential changes in particular catchments due to climate change including changes in hydrology (e.g. frequency of droughts and floods, changes in seasonal flow patterns), water withdrawals, and water quality.

### ***Session 1.2 Impacts of large-scale land use patterns and demographic changes***

Topics in this session will include the impact of country- or continental-scale patterns, land use change (e.g. the impacts of national goals for energy and other crops on ecosystem goods and services provided by particular catchments), national and regional demographic changes (including urbanization and migration) and external socio-economic factors (economic development, global trade, or demographic changes) on river basin characteristics.

## **Part 2. Long-distance connectivities and linkages of river basins**

### ***Objectives***

Recent studies have shown that various long-distance, even intercontinental connectivities play an important role in water resource management of river basins. In this session three types of connectivities will be discussed:

- 1) Connectivities between river basins and the rest of the earth system through the interplay of land cover/use, atmosphere and hydrology. For example the role of moisture feedbacks between vegetation, soil and the atmosphere in the occurrence and persistence of both dry and wet spells over the Sahel zone in Africa.
- 2) Connectivities that occur within large river basins themselves. An example is the impact of deforestation and erosion and subsequent reforestation on the Loess Plateau of China (and river basin water uses) on the sediment and flow regimes of the Yellow River hundreds of kilometers downstream of the Plateau.
- 3) Socio-economic connectivities such as “virtual water trade” that bind changes in river basins with the rest of the global water system. Water embodied in traded food and other commodities leads to a large “virtual” transfer of water between river basins located on different continents.

### ***Session 2.1 Connectivities and linkages between river basins and the earth system***

This session covers feedbacks between the hydrologic system, the terrestrial environment and the climate system in large river basins, land use change in large river basins and their influence on regional climate and hydrological regimes including green water fluxes.

### ***Session 2.2 Connectivities and linkages within river basins***

Topics covered in this session include: Large-scale hydrologic and biogeochemical connections observed in specific catchments, the cause of their occurrence, and their influence

on resource management and allocations. The impact of upstream reservoir development on sedimentation, wetlands and delta development *far* downstream.

### ***Session 2.3 Virtual water flows between river basins***

International trade in food and other commodities imply a virtual transfer of water between river basins. This session will cover topics such as: The effects of virtual water transfer on water use, availability, quality and biodiversity in the donor and recipient river basins as well as methods to account for virtual water fluxes and their inclusion in water balances.

## **Part 3. The role of global governance in river basin management**

### ***Objectives***

Global institutions and governance schemes have both direct and indirect impacts on water resources and their management in river basins. In this session we examine the impact of these on river basin characteristics.

### ***Session 3.1 Impacts of national and international actors on river basin processes***

Global institutions increasingly influence the day to day management of water including the allocation and protection of water resources. This session addresses the impact of institutions (political, economic, financial) operating outside and above the river basin scale on water resources within a river basin and the influence of decisions being made by financial institutions on river basins, for example, their plans for water infrastructure development.

### ***Session 3.2 Influence of global and national governance on water resources in river basins***

Good governance is a prerequisite of sustainable use and protection of water resources at all scales. The global “water crisis” is often described as more a governance crisis than one of resource availability. This session addresses these issues, e.g. the effect of international and national governance regimes on river basin processes; the influence of Ramsar and other water-related international conventions and goals on the management or modification of river basin processes; the types of global or national governance schemes that promote, or are compatible with sustainable water management within river basins; capacity building programs that encourage good governance principles at the river basin level.