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Earth System Science Partnership

EDITORIAL

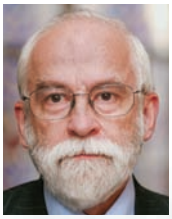
Since the last issue of the GWSP Newsletter (No.8 July 2009) was published, GWSP has made significant progress into its 3rd phase. The last 12 months were full of activities with the revival of the project and the launching of new initiatives. The 7th meeting of the Scientific Steering Committee (SSC) in Stellenbosch, South Africa identified four new research areas: the link between water and climate change mitigation, water and migration, water and health as well as the development of national water stress/susceptibility report cards. These are to be given particular emphasis in the months to come. The SSC meeting also approved the proposal submitted by the International Project Office (IPO) of GWSP to organise a comprehensive scientific conference in 2011 under the title, "Challenge for Science and Governance: the Global Water System", aiming to address GWSP issues and results.

New GWSP Research Area: Water and Migration

As far as policy relevant science is concerned GWSP can look back on significant successes and recognitions during the last couple of months. The IPO was invited to participate in the national preparatory committee of the 1st Water Research Horizon Conference held in July 2010 in Berlin. On 22 March 2010 in Nairobi, as a highlight of the World Water Day, "Clean Water for a Healthy World", a Science Panel session was co-hosted by GWSP on "Water quality challenges and responses". Furthermore, GWSP took the initiative and led the efforts to formulate and publish a communiqué of scientists (see this Newsletter). In June 2010, GWSP was invited by UNCCD to moderate a panel session on "Water and land assets in confronting climate change: what negotiators need to know?" at the Convention's Land Day 2 and to subsequently report on the most significant outcomes at a side event of the then ongoing UNFCCC Climate Change Talks in Bonn bridging the 15th and 16th COPs in Copenhagen and Cancun respectively. The ongoing year is strongly dedicated to the Global Catchment Initiative (GCI), one of the three integrative study areas of GWSP. In February 2010 the long awaited 2nd preparatory workshop was held in Bonn with a summary of the key outcomes presented in this Newsletter. The "GCI year" will be concluded with an international conference. The event "Global dimensions of change in river basins: threats, linkages and adaptation" will be held in Bonn between 6 and 8 December 2010. The summary of the GCI workshop and a background paper for the upcoming GCI conference is attached to this Newsletter.

Water crisis is often identified as a governance crisis rather than one of resource scarcity. In October 2010 an invitation based workshop on "Global Water Governance and the UN System" will be held in Bonn. In the coming year, GWSP will also support the international conference on "Water Governance Facing the Challenge of Global Change" to be held in June 2011 in Obergurgl, Austria with financial support from the European Science Foundation.

GWSP as a networking project is delighted to see the forceful start of the Global Environmental Change and Human Health (GECHH), another ESSP joint project. The forthcoming kick off symposium of GECHH in early November 2010 in Hamilton, Canada will certainly provide the platform where the close cooperation between the "Water and Health" initiative of GWSP and GECHH can be shaped.



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MEDIA AND SCIENCE-
'THE LEFT HAND SHOULD KNOW WHAT THE RIGHT HAND IS DOING'

I once read an article which required blood, sweat and tears for me to understand. It is possible that the target audience was scientists and experts, who would understand the technical jargon used, and I hope it was. Otherwise, if it was meant for the general public it was a total failure. Only a very interested reader would go to great lengths to understand the message that was being conveyed. How unfortunate for a reader who was genuinely interested but had no time and bought the magazine because of this one particular article! Well, I may be mistaken, and please pardon me if I am, but, assuming that the article was meant for the general public, a scientist somewhere overlooked the role of media in conveying messages and did it him/herself without breaking it down well enough for me, the reader.

What we, the media, do

Many people believe that media is out to entertain, to misquote people, defame them and spread propaganda. Experts often fear talking to journalists for fear of being misquoted. One thing they forget is that journalists are people, people interested in the good of the public as well. Without people to present their findings to and people interested in their results, scientists would have no need to research. Without people to report to, journalists would have no need for finding out information. They need one another, especially because their careers involve people.

Media is and should be a friend of the society. Our job is not just to destroy or tear down, if you may. Our main function is to inform. We inform and interpret. We are meant to teach and to educate. We glue the society together. We transmit values. We keep watch and inform you. We perform the gatekeeper function. We service the economic, political and social system. We offer a forum where people can meet, exchange ideas and express their views. We fight for democracy and justice. Contrary to popular belief, entertainment is not our main function. I would not disown it because it is part of what we do, but it is not our main function. If something is too boring yet important, we may combine information and entertainment just to get attention (infotainment) but that is as far as we go. We are agenda setters. We are the fourth estate.

The information, education and the agenda setting functions call for experts: lawyers, economists, doctors, scientists - the list is endless - to work with us. There is no point of delivering information if nothing will be learnt from it. To educate, we must make our information comprehensible. When lawyers are referring to that body of law relating to ships, shipping, navigation and transportation of persons or property by sea, for example, they will be referring to admiralty law. To communicate effectively, a lawyer speaking to or writing for the general public would either have to explain what admiralty law is, or simply describe it. A layman would not easily understand it at face value. Most of the times the lawyer may be too busy, and it is the journalist who takes the responsibility of finding out from the lawyer the meaning and communicating to the public in an understandable language.

Filming the floating market in Bangkok for a UN film on pollution in Bangkok

Break your message into manageable pieces

Closer home, experts dealing with the water issue may find their jargon very simple and understandable, but it is not so to a third party. If for instance an article seeks to answer the question 'what is an appropriate framework to address vulnerability, resilience and adaptive capacity of water systems in river basins from a global perspective and to integrate across scales to identify and rank factors that influence sustainability and their interaction?' (from the GWSP report 2008), a lot has to be put in to make the question understood, leave alone the answer. A water expert on the other hand would know exactly what it is about.

What I am saying, in a nutshell, is, scientists need the media and vice versa. There are so many things people do not know, maybe because they are hidden in scientific journals and magazines that are not accessed by the general public or they are written in technical jargon, thus los-

ing readership. The media are to blame too. With media getting commercialized by the day, editors are afraid of losing their audience and so they end up trashing scientific information as boring and unable to sell.

It takes two to tango. Let's do it together

Scientists should 'fight' for their place. We, the media are agenda setters. Once we report on something repeatedly it inevitably becomes public agenda. We can only report on what we know. If scientists specify what they would want the public to know it is our duty to frame the message to suit its purpose. Leaving issues like climate change and the water issue open for us will make us frame the story and highlight on something totally different, to suit us. For instance, we could easily change the water issue to an economical one, because after all finances will be required to manage the water issue. Furthermore, we have trained our audience to be interested in economical matters.

They say it takes two to tango. Both the media and scientists have a key role to play in ensuring that important information gets to the people. We need to know what scientists are doing and report about it. Scientists too, need to know why we report the way we do. If an issue is not handled with the seriousness it deserves or is mis-communicated, scientists should not shy away from speaking up. Dialogue is key. A call to participation in whatever field will be in vain if the person at the grassroots does not know what is going on, or gets the wrong information.

Science has new inventions everyday, and the society we live in is pretty dynamic. Whatever we are going to do we have got to do it now. We can no longer just talk about it. Remember, procrastination is the thief of time.

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MOVING FORWARD FROM THE 3RD EDITION OF THE UNITED NATIONS WORLD WATER DEVELOPMENT REPORT

The United Nations World Water Development Report 3 (WWDR 3) was released in Istanbul in March 2009 on the opening day of the 5th World Water Forum. While the report contains many messages, probably the most important one was that real decisions that affect the future of water resources and water resources management are not made by water managers but by decision-makers outside the 'water box'.

Ironically, the realisation that water managers need to inform decision makers in other sectors about water resources and their management highlights a problem with which those within the sector increasingly are facing: we have less and less information about the extent and quality of the resource and how it is being used. This information is necessary if we are to answer such questions as 'What is the value added to the economy of this particular use of water?' A framework of helpful indicators and the data to support their calculation would provide decision-makers with the information they need.

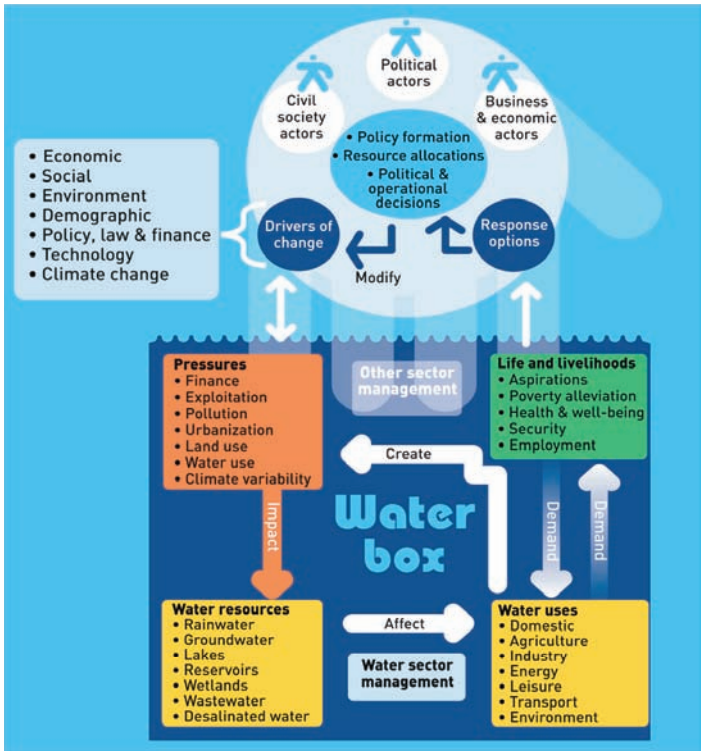
Having to make decisions without adequate information about the existing water resources and management is compounded by the unknown future and the impacts that are related to climate change, globalisation, demographic changes, changes in consumption patterns, technology developments and the evolution of social and cultural values. Decision-makers need tools to help them to manage when faced with these risks.

Developing a Framework of Water Indicators

Background

WWDR3 contains 58 indicators from WWDR2 of which 30 could be updated. Profile sheets describing these indicators are available on the World Water Assessment Programme (WWAP) Website (www.unesco.org/water/wwap/). While the indicators on the water resources situation in the United Nations World Water Development Report have provided policy makers at the national, regional and global levels with a critical overview of the situation, insight into the trends of key indicators is vital in a rapidly changing world. However, it remains a challenge to provide information on the evolution of key indicators.

While considerable attention has been given to the monitoring of key climate variables, notably temperature and rainfall, very little systematic attention or financial resources have been devoted to monitoring the water re-



Decision-making processes affecting water

source itself at a global level as opposed to in specific critical localities or regions. One consequence is that there is no regularly updated stream of data about the availability of water resources and their use that would enable trends to be determined and their consequences to be evaluated on a general as opposed to a local basis. This means that it is not possible to provide reliable information about the impact of broader socio-economic and climatic trends that impact upon water resources and their use. Consequently, national policy makers and agencies that support them cannot reliably monitor the performance of their countries or compare it with others.

While remote observation techniques have considerably improved the availability of data on variables such as land use and vegetation as well as basic precipitation and temperature data, this does not yet extend to information on the key water resource parameters such as river flows and underground storage.

Approach

UN-Water created a Task Force on Indicators, Monitoring and Reporting which has produced a set of 15 key global indicators of the state of water resources to meet the needs of policy- and decision-makers at all levels. The World Water Assessment Programme established an Expert Group (EG) on Indicators, Monitoring and Data/Metadata Bases to support this work, specifically by promoting a dialogue between indicator users and data providers and interpreters about the feasibility of providing data for the key indicators on a sustainable, ongoing basis. The EG's overarching goal was to develop proposals that would bring to the area of water resource assessment the same degree of coherence and focus that has been achieved by the Joint Monitoring Program of WHO and UNICEF in the area of water supply and sanitation which, faced with similar deficiencies, successfully introduced new methodologies. Preliminary pilot work on new approaches is being carried out for WWAP by Charles Vörösmarty and his team at City University of New York. A proposal to carry on this work is now being circulated to potential donors.

The futures of the world water system: global and sub-global strategic scenarios

Background

It is widely recognized that many of the major processes that influence the water system operate outside the "water box" and escape the control of the managers that operate within the water sector. Each of the external water drivers is dynamic and continues to evolve in interaction with the others, as do the direct and indirect pressures they exert on water resources. Moreover, some of the drivers exhibit significant uncertainties about their current status and future evolution. Thus, it is very difficult to obtain a comprehensive picture of the future by examining each driver independently or by the extrapolation of current trends. Such an integrated picture is essential to identify coherent sets of policy and management actions aimed to move towards the sustainable development and use of the water resources. These drivers were described in WWDR3 based on information available in published literature.

Existing global water scenarios are outdated, incomplete or sectoral and do not fully incorporate all important external drivers. The evolution of the drivers and the logic behind their storylines need to be examined and possibly redefined in view of developments both inside and outside the water sector that have occurred over the past decade.

Approach

The World Water Assessment Program has launched a project that will produce a set of qualitative scenarios characterized by narratives and causal diagrams unfolding in time, combined, for those aspects amenable to mathematical formalization, with quantitative scenarios characterized by simulation models. The strategy of the project relies on a continuous iteration between the building of the qualitative scenarios and the simulation models,

engaging experts and stakeholders in the scenario-building exercise and encouraging communication and dialogue between these different actors.

To begin the process WWAP commissioned ten literature reviews on key forces which may have an impact on water resources and their uses. These are currently being reviewed by groups of experts participating in a Real time Delphi exercise. Results of this first phase of the project will be presented at World Water Week in Stockholm in September.

The process will continue with an in-depth discussion of the existing scenarios, followed by the development of qualitative "storylines" by a group of stakeholders and experts. These storylines will provide an understandable and transparent basis for understanding scenario assumptions, provide a more attractive method for communicating the substance of the scenarios to non-technical people than numerical data, and distil the combined views of the stakeholders and experts.

In parallel, modellers will produce quantitative scenarios which provide numerical data, and make possible a consistency check of the storylines. This part of the work will be based on models already existing, engaging their builders in providing simulations specifically geared to the questions of interest for the scenarios.

GWSP has been invited to contribute to the exercise, and contacts will be maintained throughout the project with other organizations who may be doing scenario work in parallel (e.g. IPCC5, Environmental Assessment and GEO5 through UNEP and the OECD Environmental Outlook update).

At the national and sub-national scales, the same general approach will apply, with the difference that the scenario construction process and the scenario findings can be more directly connected to concrete actors and decision-makers, gaining in realism and usability. At these levels the establishment of good communication systems between the groups preparing scenarios will be important to stimulate exchange of experiences, mutual learning and reciprocal capacity-building.

Conclusion

It is expected that work on development of a framework for indicators with supporting data collection and on scenario development will be sufficiently advanced to make a significant contribution to the next UN World Water Development Report, scheduled for 2012.

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UN-WATER DECADE PROGRAMME ON CAPACITY DEVELOPMENT (UNW-DPC): INTERVIEW WITH REZA ARDAKANIAN

Reza Ardakanian, founding director of the UN-Water Decade Programme on Capacity Development (UNW-DPC), is water resources engineer/manager. He did his Bachelor degree in civil engineering at Sharif University of Technology, Teheran,Iran and obtained his Master degree and PhD in water resources engineering and management respectively at McMaster University, Hamilton, Canada. Since 25 years he is involved in the field of urban water management and water resources on a government-, university-, institutional- and organization level. He has well grounded experiences with international bodies as he was on the Bureau of the International Hydrological Programme of UNESCO, on the Board of the International Hydropower Association (IHA) as well as the 1st Governing Board of UNESCO-IHE Institute for Water Education in Delft, the Netherlands. He was founding director of RCUWM, a UNESCO regional centre on urban water management (2002-07). In Iran, Mr Ardakanian was Deputy Minister for Urban Development of the Ministry of Interior (1987-89) and for Planning and Economic Affairs of the Ministry of Energy (1989-91), Vice-Minister of Energy (1998-2001) and Deputy Minister for Water Affairs of the Ministry of Energy (2001-2005). He is a faculty member of civil engineering department of Sharif University of Technology in Teheran, Iran and has released several publications in peer reviewed journals in the field of mathematical programming for IWRM.

Eva Flinkerbusch (Research Assistant GWSP): Mr Ardakanian, as the founding director of UNW-DPC, could you please outline what UN Water and UNW-DPC is about?

UN Water is an inter-agency mechanism established in 2003 by the United Nations High Level Committee on Programmes to increase coherence among 27 UN entities and a growing number of non-UN entities working on water related issues. The concept of UN Water is co-operation instead of replication and to increase coherence among different water related organisations, institutions and projects at academic, governmental and non-governmental levels. The ultimate goal of UN-Water is to provide better service to Member States in their efforts to achieve the Millenium Development Goals (MDGs) and improve their water resources management.

Without the further development of individual, organisational and institutional capacity of relevant stakeholders, the achievement of the MDGs will remain illusive. UN-Water has therefore decided that capacity development is one of the main cross-cutting issues in this respect and has established the UN-Water Decade Programme on Capacity Development (UNW-DPC) to support its members and partners on this specific issue.

UNW-DPC focus on MDGs related to water and sanitation

UNW-DPC started work in August 2007 with the focus on capacity development at the individual, organisational and institutional level. Based on the firm belief that the achievement of MDGs related to water and sanitation is conditional for stakeholders being able to mobilise essentially required capacities, UNW-DPC's mission is to enhance the coherence of the capacity development activities of the 27 agencies of UN Water and partners. UNW-DPC is hosted by the United Nations University in Bonn, with financial support from two German Federal Ministries. The Vice-Rectorate of the United Nations University in Europe (UNU-ViE) supports UNW-DPC and provides an efficient infrastructure.

Eva Flinkerbusch: How does UNW-DPC work in particular?

Firstly, UNW-DPC has an observatory function that supports UN Water with capacity development needs by mapping the existing capacity development activities as well as in analysing capacity development gaps.

Secondly, UNW-DPC cooperates with UN Water members and partners to classify and produce required new knowledge. This is arranged mainly by ongoing expert group meetings and workshops as well as by compiling publications on cutting edge water-related capacity development issues.

Thirdly, UNW-DPC subsequently invests in the management and dissemination of this newly produced knowledge through the design and implementation of knowledge management tools, such as the UNW-DPC Capacity Development Information System (CDIS). Furthermore, UN Water members and partners are supported in transferring required knowledge through effective delivery mechanisms involving e-learning, training of trainers and vocational training. An evaluation about the efficiency of the knowledge delivered and the mechanisms of delivery is carried out in order to meet future developments and needs.

Eva Flinkerbusch: On which findings and expertise is the work of UNW-DPC based?

The UN agencies, including the United Nations University, have experts and scientists who support the work of UNW-DPC. The Bonn based organizations and programmes foster the work of UNW-DPC. We also organise expert group meetings and workshops in order to discuss already existent knowledge and to create new knowledge. Additionally, we are associated with several academic institutions and think tanks, for example with the Center for Development Research (ZEF), which also hosts the Global Water System Project (GWSP). Those academic institutions do support the work of UNW-DPC through the production of new knowledge. Furthermore UNW-DPC has good access to an international network, including the European Water Association (EWA), the German Water Association (DWA), the Arab Water Council (AWC) and the International Hydropower Association (IHA).

Eva Flinkerbusch: What do you consider to be the main challenge for UNW-DPC?

Institutional capacity development is, in my opinion, the biggest challenge for the future since it is much more difficult to develop institutional capacity than individual

capacity. There are several levels to be considered, for example the whole respective existing systems, different languages, different habits and national interests, just to name a few. We have to supervise piloting of new systems and we are responsible for their consequences, which puts pressure to succeed on us. In order to meet the expectation of the respective institution or government we are focusing mainly on best practice-examples, which were made successfully elsewhere.

Eva Flinkerbusch: In your opinion, is research on the global water system relevant for UNW-DPC? Can you imagine a closer cooperation between GWSP and UNW-DPC?

Certainly research on the global water system is relevant for UNW-DPC as both of us have a global mandate. UNW-DPC tries to constantly develop contacts with active entities outside the UN-System to help fulfill the UN-Water mandates. Since UNW-DPC focuses on tools supported by the scientific community and the GWSP provides policy recommendations it can support UNW-DPC to achieve the water related MDGs. Furthermore, the office of GWSP is physically close to the UNW-DPC office, which facilitates excellent cooperation opportunities.

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RECENT GWSP RELATED EVENTS

GWSP 7th Scientific Steering Committee Meeting 2009

17 -19 October 2009, Stellenbosch, South Africa

The annual Scientific Steering Committee (SSC) meeting held in October 2009, addressed the continuation of GWSP's established research programs and outreach activities, and members decided upon new fields of activity to be taken up in the coming years.

This included:

- The revitalisation of the GWSP Digital Water Atlas as an open access internet resource
- Seeking new avenues of cooperation with the World Water Assessment Programme of UN Water
- Placing focus on Bonn as an excellent place for dialogue, initialising awareness raising activities, strategic meetings and conferences, as well as capacity building events - due to its 'central location', Bonn as a conference and meeting venue is likely to have the smallest 'CO2 Footprint' for any event with truly inter-continental participation.
- Starting two new regional hubs in Africa and Latin America
- Establishing four new fields of focus within GWSP:
  - Water and climate change mitigation link
  - Water and migration
  - Water and health (together with GECHH)
  - National water stress/susceptibility report cards

Presentations can be downloaded under: www.gwsp.org

Participants of the SSC Meeting 2009 in Stellenbosch, South Africa

GWSP Global Catchment Initiative (GCI) Workshop "Global Aspects of Water Research and Management in Large River Basins"

17-19 February 2010, Bonn, Germany

Following the GCI scoping meeting, which was held in February 2008 in Bonn, Germany, a workshop of the Global Catchment Initiative (GCI) was held on 17th -19th February 2010 in Bonn, Germany. The workshop focused on examining similarities and differences between various case study catchments and their respective global dimensions, in order to determine how global change plays out in different river basins. The invited participants from five continents were asked in advance to answer 10 research questions grouped under the three GWSP core themes. The set of questions were conceived and formulated within the GCI scoping meeting.

The 25 participants concentration on 14 case studies were familiar with large river basins through their professional practice or research projects. Amongst other issues, the workshop addressed how global change is manifested within particular catchments, climate change, land cover/use, demography and consumption patterns. Secondly, the workshop focused on particular catchments, expected impact of those changes on society and ecosystems, the meteorological, hydrological and biochemical connections and feedback mechanisms from beyond the catchment that induce changes at the catchment level. Thirdly, on the determining factors and consequences of virtual water trade, institutional settings at different levels and their effect on water use, the comparison between water governance regimes in their ability to achieve a sustainable water management and the influence of international institutions on the resilience of river basins. Following pre-workshop responses by participants, as well as the presentations at the workshop, the discussions following those and working in specialized groups, some key issues came to the fore from the participants:

- **On Inter Basin Comparisons**: Can experiences and conclusions drawn for a particular large basin be transferred to another one, irrespective of social, political, governance, hydrological and economic differences?

- **On Policy and Legislation:** Why does it take so long for research results to be integrated in river basin management? How can "water security" be adequately taken into consideration when addressing interrelated and interdependent 'securities' such as food, energy etc.? How can science supported water policy transcend/link different scales of operation from international, national, provincial to local level? How can research contribute to transboundary water governance and management?

- **On Institutional Arrangements**: How can global players and events influence the water debate and river basin management/governance?

- **On Vulnerability**: How should the concept of vulnerability be incorporated into human-centered water resources management at basin scale and to which extent? How can capacity development be improved?

- **On Adaptation**: How can water be defined as a key factor in adaptation to climate change?

- **On National Adaptation Plans**: How to ensure that national frameworks on adaptation grow bottom-up rather than only top-down, being led by local initiatives rather than donor determined thrusts? How to amalgamate bottom-up and top-down approaches and concerns in management and governance of large basins?

- **On Links between Migration and Adaptation**: Is migration, that is induced by the lack of water security, an adaptation strategy or does it reflect the failure to adapt?

- **On Climate Change**: How could climate, social and action scenarios be addressed simultaneously?

- **On Virtual Water Trade (VWT)**: Is it a realistic option, especially to LDC´s which depend largely on dryland agriculture for their food production? Or is it merely a popular accounting system for scientists, but one which basin practitioners do not take account of? Or should it be considered already in basin management plans in order to set new water standards determined by global economic considerations? If VWT was to become a global driver of water utilization, who should control/regulate it?

- **Challenges Facing the GCI**: How can GCI insights and findings be useful and meaningful for development issues? And will the findings trickle down to people who make actual decisions?

The workshop participants noted that the scientific community as well as water managers and policy makers are

at the beginning of a difficult conceptual process – both in science and in practice – in terms of exploring links and mutual interactions between scales, sectors and concerns. The 2nd workshop of GCI was conceived as a preparatory step towards the international conference "The Global Dimensions of Change in River Basins - Threats, Linkages and Adaptation" to be held on 6-8 December 2010 in Bonn, Germany. The set of questions generated by the workshop are certainly waiting for answers to be given at the subsequent conference but also by follow up research and dedicated praxis of river basin management all over the world.

Following ten research questions were focused upon:

1. How is global change manifested in particular catchments (at the decadal to century time scales)?

2. How do changes in climate, land cover/use, demography, institutions and consumption patterns and other external factors affect the characterstics of particular catchments?

3. What are the expected impacts of these changes on society and ecosystems?

4. What meteorological, hydrological or biogeochemical connections from beyond the catchment are observed in specific catchments, why do they occur and which feedbacks do they induce?

5. What are the determining factors and the consequences of virtual water trade?

6. How do international power relations affect the use of water and other natural resources in catchments?

7. What is an appropriate framework to...

- address vulnerability, resilience and adaptive capacity on water systems in river basins from a global perpective?
- integrate vulnerability, resilience and adaptive capacity on water systems in river basins across scales to identify and rank factors and their interactions which influence sustainability?

Danube, one of the case study catchments at the workshop

8. How did and do water governance regimes compare between catchments in their ability to achieve a sustainable (environmental, social, economic) management of the water resources and to adapt to global change?

9. What is the influence of international institutions (e.g. binding UN conventions, global norms) and global actors (e.g. World Bank, GWP, multi-national water companies, NGOs, scientific community) on the resilience of river basins and how can such influence be improved?

10. Does sustainable water management (which accounts for uncertainties of global change) improve the balancing of water needs for ecosystems and human activities?

Following case studies were examined in detail during the workshop:

- Amu Darya
- Andean catchments
- Danube
- Elbe
- Huai
- Incomati
- Jordan
- Rhine
- Sao Fransisco
- Tisza
- Upper Danube
- Volga
- Volta
- Winnipeg lake basin

Further information is available under www.gwsp.org

World Water Day, 22 March 2010, Nairobi, Kenya
Scientific Communiqué on Water Quality Challenges and Responses

Statement of a Scientific Panel convened by UN-Water and GWSP

The United Nations General Assembly designated 22 March of each year as the World Day for Water as a means of focussing attention on the importance of freshwater and advocating for the sustainable management of freshwater resources. This initiative grew out of the 1992 United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro. States were invited to devote the day to implement the UN recommendations and set up concrete activities as deemed appropriate in the national context.

Each year, World Water Day highlights a specific aspect of freshwater. This years World Water Day "Clean Water for a Healthy World" focussed on water quality issues. On the occasion of the World Water Day 2010 a Scientific Panel on "Water quality challenges and responses" was convened by UN-Water and the Global Water System Project of the Earth System Science Partnership at UNEP Headquarters, Nairobi, Kenya. The panel discussion was moderated by Joseph Alcamo, Co-Chair of GWSP and Chief Scientist of UNEP. Almost 400 people, among them over 60 science journalists, mainly from developing countries attended the panel discussion. The following is a statement framed by this Panel. The purpose of the statement is to inform the UN community, policymakers, and researchers about key current and upcoming issues regarding water quality according to the viewpoints of the Signatories. It does not necessarily reflect the views of the UN.

1. Over the past decades, the water quality of surface waters and groundwaters has improved over many parts of the world, particularly in industrialized countries, but also in some parts of middle and lower income countries.

This has been one of the good news stories of environmental management, achieved by widely introducing wastewater treatment and other water quality management measures.

2. Yet there is important unfinished business.
Investing in wastewater treatment, assuring access to safe water, preventing water pollution and restoring aquatic ecosystems, are examples of important unfinished business that require the attention of policymakers and water experts.

3. Meanwhile, rivers and other parts of the freshwater system are faced with new threats to their water quality:

... In emerging and developing countries water quality is threatened by the increasing discharge of untreated or inadequately treated municipal wastewater as well as by diffuse sources of pollutants from agricultural, urban and other areas which degrade surface waters and groundwater. For example, the Millennium Ecosystem Assessment found that wastewater return flows might increase by a factor of 3.7 to 5.5 in Sub-Saharan Africa up to the middle of this century according to a range of scenarios.[1]

... Water quality degradation poses health risks and undermines ecosystem services provided by surface and subsurface waters. Increased discharge of untreated wastewater will contaminate surface waters and groundwater and this poses a health risk to those who come in direct contact with these waters. Wastewater loadings also deplete dissolved oxygen, increase turbidity, and have other negative effects on freshwater ecosystems thus jeopardising the services they provide. Impacts might include diminishing stocks of freshwater fish for food, declining aquatic biodiversity, deteriorating water quality for industrial and agricultural use, and higher treatment costs for municipal water supply. People in developing countries are, in general, more susceptible to the impacts of water quality degradation than those in industrialised countries because the lower income setting tends to put them at greater risk to disease, and their communities often do not have adequate funds for water treatment.

... In countries undergoing rapid economic development a new threat is caused by the increasing discharge of toxic organic chemicals, heavy metals, and other substances to surface waters. Some of these substances may accumulate in freshwater ecosystems or infiltrate to groundwater and thereby pose a long-term risk to human health and aquatic ecosystems.

... In industrialised countries, as well as in some developing ones, an increasing threat is the discharge to surface waters of unidentified and unmonitored residues from medicines and new chemical products. Since conventional wastewater treatment might not be able to remove these substances, they may find their way into freshwater systems. Some of these substances might act as endocrine disruptors and be otherwise harmful to people and the environment. These "emerging pollutants" represent new challenges to overcome. Another threat, especially pertinent to industrialised countries, are the heavy metals and other toxins emptied into rivers that become bound to the sediment of riverbeds; it is possible that at a later time these pollutants might be re-suspended in river water and have a negative impact on people and ecosystems.

4. The causes of water quality degradation are many:

- **Expanding the coverage of water supply without providing adequate facilities to collect and treat its returning wastewater flows could result in degraded water quality.** As efforts are stepped up to achieve the Millennium Development Goals for clean water and sanitation they may have the unintended side effect of delivering greater wastewater loadings to rivers and other water bodies. To avoid this problem, an integrated approach to water quantity and quality would be helpful, that is, the expansion of water supplies should always go hand in hand with the treatment and/or reuse of their wastewater return flows.

- **Water quality degradation in developing and rapidly industrialising countries is often associated with the growth of mining, manufacturing and industrial activities.** Wastewaters are often discharged without adequate treatment directly or indirectly to different types of water bodies (rivers, groundwater aquifers, wetlands, etc). These problems can be avoided by any number of available waste management techniques such as recycling or reusing waste streams within a manufacturing facility, or by on-site treatment of wastes.

- **An important factor contributing to water quality degradation worldwide is unsustainable land use and agriculture.** In agricultural regions, a main source of water contamination is seasonal runoff of pesticides and fertilizers from cropland and pastureland. Other possible sources of land-based water pollution are deforestation and intensive animal husbandry which often cause erosion and increased sediment loading to surface waters. Urban areas are also a major source of diffuse water pollutants. Better land management and planning could help minimise these problems.

5. Water quality has been transformed from a local issue to a global issue as a result of growing linkages with global processes and global drivers of change.

- **Climate change is expected to have an increasing impact on worldwide water quantity and quality.** Many of the drivers of change for water quality in a river basin now originate outside the basin. One example is global climate change which is expected to have an increasing influence on not only water quantity but also water quality. Where long-term precipitation diminishes, it is likely that stream flow may decrease and along with it the self-purifying capacity of rivers and lakes. Where the volume or intensity of precipitation increases, more pollutants and sediments could run off from land surfaces into rivers and streams. Higher air temperatures related to climate change are expected to increase water temperatures, thereby reducing the ability of freshwater systems to dissolve oxygen. Further, it will enhance the transfer of various pollutants (ammonia, mercury, polychlorinated biphenyls) from water and wastewater to the atmosphere[2], and stimulate other changes in aquatic ecosystems. The climate-related warming of rivers may be aggravated by "thermal pollution" caused by an upsurge of cooling water discharges from an ever increasing number of power plants and factories.

Water quality degradation in developing countries is often due to the growth of industrial activities

- **Water quality is coupled to national and international governance and development.** The water quality within a river basin or groundwater aquifer is affected by a host of policy and economic decisions taken outside the drainage area of a river or aquifer. For example, decisions taken nationally or internationally on the subsidies given to different crops and fertilizers influence the patterns of cropping within a river basin or aquifer drainage area. These cropping patterns, in turn, influence the volume of water withdrawals, the hydrological characteristics, and the water quality within the river basin. Other examples are the decisions made by national or international water companies and financial institutions regarding the development of industries or public water supply within a river basin. These decisions taken outside of a river basin could have a strong influence on the volume of wastewater loading, the level of wastewater treatment, and the state of water quality within the basin.

- **A strong connection exists between water quality in the world's coastal zone and the water quality of its rivers.** One important link is through the transport of nutrients. Rivers are the repository of nutrients from catchment areas as large as millions of square kilometers, and transport these nutrients hundreds or thousands of kilometers to the coastal zone. Hence, what we term "water quality", for example the concentration of nitrogen or phosphorus at a particular location in a river, is part of an important global process of nutrient transport. According to recent estimates, the amount of reactive nitrogen transported to the world's coastal zone by the world's freshwater system has doubled compared to "pre-disturbance" rates.[3] Some scientists believe that increased transport of nutrients has contributed to low-oxygen 'dead zones' in the Gulf of Mexico and elsewhere that endanger marine fisheries. This calls for an effective and integrated water resources management that tracks the fate of water pollutants from the upper watershed to the coastal zone.

- **The long range transport of air pollution is a new and growing threat to water quality in many countries.** As manufacturing and energy production grow, a common side effect is an increase in air pollutant emissions. Some of these pollutants (including sulfur dioxide and other acidifying substances, heavy metals, and persistent organic pollutants) can be transported by the wind hundreds or thousands of kilometers before being deposited at low intensity levels onto distant catchments where they eventually find their way into rivers, groundwater aquifers and other freshwater bodies. This process establishes a concrete linkage between the drivers of air pollution in one area and the water quality in distant watersheds.

- **Water quality is a manifestation of the global cycling of carbon, nitrogen, phosphorus and other key elements.** What we call "water quality" is a way of describing the physical and chemical characteristics of a water body. It is now better appreciated that the local characteristics of a chemical in water are an essential part of the global cycle of these chemicals. For example, the carbon compounds present in a river or other inland waterway are part of a dynamic global carbon cycle. Rivers act as collectors and sinks of carbon from the terrestrial environment, as a source of atmospheric carbon, and as a major transporter of the carbon they collect to the world's oceans.[4]

6. New approaches are needed to manage water quality that go beyond conventional ideas about pollution prevention and the treatment of wastewater and that take a "systems" view of the global water cycle. Many options are available to governments, companies and civil society:

- **Co-managing land use and water quality.** Land management is an effective instrument for controlling contamination originating from agricultural activity, deforestation, and other land-related sources.

- **Expanding the concept of Integrated Water Resources Management** to include surface and groundwater, land and water management, present and future time (to cover climate change effects), as well as factors external to the water system.

- **Harmonizing air and water pollution management over large areas.** Since the deposition of long range air pollutants can contribute to the pollution of surface and subsurface waters, it is advisable to consider air pollution management as a strategy for controlling water pollution.

- **Adapting to climate change by planning for warmer water temperatures.** There are many options available for water managers to adapt to expected impacts of climate change on water quality. In general it is advisable to "mainstream" climate change as one of many factors to be considered when designing water management facilities.

- **Implementing water reuse as a strategy for expanding sanitation and saving water.** There is a serious lack of water services in many developing countries, as well as in low income areas of the industrialised world. In these places water can be reused for sanitation, irrigation, and other purposes, thereby reducing the pressure on water supplies and sometimes decreasing the volume of wastewater flows.

- **Closing the huge gaps in monitoring water quality.** The coverage of water quality stations over a large segment of the developing world is inadequate for keeping track of the status and trends of water quality.[5] Because of these gaps in knowledge, policymakers are unable to make informed decisions about water quality management. Hence priority should be given to improving the monitoring of water quality at the local, national and global levels. It is also important to strengthen the dissemination of these data through UN GEMS-Water and other international and national institutions, and to build up the capacity of local people to collect and report data (e.g. through the use of mobile phones).

- **Expanding or modifying water governance at all levels from local to global.** Water quality is driven not only by actions at the local and watershed level, but also by regional factors such as long range transport of air pollutants (e.g. acid rain), national factors such as industrial and energy policies, and global factors such as the policies of global water companies and international financial institutions. This argues for "appropriate" water governance at all levels of government: local, watershed, national and global.

- **Training a new generation of water scientists and experts, as well as policymakers, with an integrated and systems perspective on water science and management.** If our aim is to take a new approach to handling water quality and quantity issues, then we have to train the new generation of researchers, engineers and managers to think in a new way about water. A broader "systems" and global viewpoint is needed for coping with today's water-related challenges.

- **Promoting water quality research centers in developing countries, especially in Africa.** Basic data and knowledge about water quality and other aspects of water systems are lacking in many developing countries, especially in Africa. One reason is that there are not enough institutions capable of doing the research and generating the knowledge needed by policymakers to support decisions making. Hence, it is important to establish and support centers of research on freshwater systems including their water quality aspects. These centers will also ensure that the new generation of water scientists and experts in developing countries have good work places in their home countries.

- **Engaging people.** Although this phrase was coined earlier, it is now more true than ever that "Water is everybody's business". People from all walks of life have an important role to play in keeping waters clean for a healthy world: municipal leaders, elected representatives, women, workers, farmers, managers, civil society, teachers, pupils and students, among others.

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ESSP Meeting,

16-17 April 2010 March 2010, Bonn, Germany

The annual meeting of the ESSP Scientific Committee took place in Bonn on the 16th and 17th of April 2010. At this meeting, all joint projects, including GWSP, reported their activities, were advised on their future plans and interracted with sponsor programmes. Charles Vörösmarty, Co-Chair of GWSP and Janos Bogradi, Executive Officer attended on behalf of GWSP.

GEO-DRI Workshop & DRI Annual Workshop

10-14 May 2010, Winnipeg, Canada

The Drought Research Initiative (DRI) is a research network that brings together researchers from universities and federal/provincial agencies to address the issue of drought in a well coordinated and integrated manner paying special attention to the North American drought 1999-2004. It is funded primarily through the Canadian Foundation for Climate and Atmospheric Sciences. Looking at the phenomenon from all different kinds of angles ranging from the atmospheric to the social aspect, DRI focuses on widening the knowledge and understanding of drought at a variety of spatial and temporal scales.

The Group on Earth Observations (GEO), a voluntary partnership of governments and international organizations which is coordinating efforts to build up a Global Earth Observation System of Systems (GEOSS), identified drought as a major activity within the Water Societal Benefit Area. The GEO-DRI workshop was held to identify ways in which DRI research could contribute to GEO and to improve the coordination of activities aiming at this convergence.

The workshop provided a platform for both scientists and watershed managers to aggregate the activities and findings of the Drought Research Initiative and to discuss where and how to link it to GEO and GEOSS. DRI researchers identified several options to contribute to GEOSS. These included the establishment and further promotion of drought monitors including an eventual global drought monitor, and drought prediction on several spatial and temporal scales. Based on the expertise gained through the North American Drought Monitor hosted by the US National Climatic Data Centre and Agriculture and Agri-Food Canada operated Drought Watch website, the setup of a Global Drought Monitor was discussed.

The GEO-DRI workshop was followed by the 5th and final DRI workshop bringing together all of the DRI investigators. Besides discussing recent progress in drought research, all DRI related projects and findings have been aggregated and the workshop was used to prepare the legacy of the Drought Research Initiative which includes a book with more than 20 contributions that is about to be finalised, as well as the DRI database which is being standardised and made available online. The first step in developing new future opportunities for drought research will involve building on the different efforts in drought monitoring and prediction that are being carried on by the individual investigators.

For more detailed information on both workshops please visit: www.drinetwork.ca

UNCCD Land Day 2

5 & 8 June 2010, Bonn, Germany

Land Day 2, which took place on Saturday, 5 June 2010, was a one-day event organised by the Secretariat of the UN Convention to Combat Desertification (UNCCD). The event sought to raise awareness among policy and decision makers on the importance of land issues in the ongoing climate change negotiations and to foster constructive dialogue concerning the post-2012 agreement on climate change.

Janos Bogardi moderated the third panel session 'Water and land are assets in confronting climate change: What do negotiators need to know?' He also took part in the ensuing side event of UNFCCC's Climate talks, embedded between COPs 15 and 16 of UNFCCC on Tuesday, 8 June 2010 in Bonn. Outcomes and findings of Land Day 2 were presented to the climate change negotiators that were meeting in Bonn. Bogardi underlined, among other issues, the importance of cooperation at various levels in order to avoid a fragmentation of the actions and to ensure a more integrative and holistic focus on climate change adaptation, land degradation and land use in particular among the Conventions (the UNCCD and UNFCCC), and the need for a paradigm shift in terms of how the role of water resources is perceived as the key agent of climate change adaptation.

More information is available under:
www.unccd.int/publicinfo/landday/2010/menu.php

WATER MIP: A combined community approach to estimate the global water balance

15-17 June 2010, Wageningen, The Netherlands

The Water Model Intercomparison Project (WaterMIP), which we presented initially in the December 2007 GWSP Newsletter (Global Water News No. 5/6), aims to compare a variety of models of the terrestrial hydrological cycle to estimate current and future global water resources. WaterMIP is a joint activity between the EU FP6 project Water and Global Change (WATCH) and the Global Water System Project (GWSP).

A series of joint WATCH – GWSP workshops have been initiated (see for example Global Water News No. 8) since the beginning of this joint effort by the modelling community. The latest one was held at the University of Wageningen, The Netherlands, 15-17 June, 2010. Again, 30 researchers were gathered from all over the world to discuss the status of the WaterMIP modelling efforts taken so far. The main outcomes from the latest modelling campaign were presented and plans for the next steps to be taken were drawn.

WaterMIP now includes both a number of Land Surface Models (LSMs) as well as Global Hydrological Models (GHMs). The global water balance was estimated at 0.5 degree spatial resolution for global land areas for a 15-year simulation period (1985-1999; see Haddeland et al. 2010) in a naturalised mode. Due to their very different origins, objectives, structures and parameterization of processes, the model results show large variations in estimated global mean annual runoff values, with a range of nearly 25,000 km^3 $year^{-1}$ (see Figure 1), which obviously will influence any impact study based on model simulation results. In this intercomparison study 6 LSMs and 5 GHMs have been included and analysed thoroughly.

Some intrinsic differences in the model simulation results can be explained and attributed to model characteristics. Distinct simulation differences between LSMs and GHMs are found to be caused by the snow scheme. The physically based energy balance approach used by land surface models in general results in lower snow water equivalent values than does the conceptual degree day approach used by global hydrological models. For evapotranspiration and runoff processes no major differences between simulation results of land surface models and global hydrological models were found. However, some model simulation differences can be explained by the chosen parameterisation used in the models, although the processes included, and parameterizations used, are not distinct to LSMs or GHMs. From this study it becomes clear that water resources assessments and their stresses across the global domain may not be investigated by one model solely, but has to be

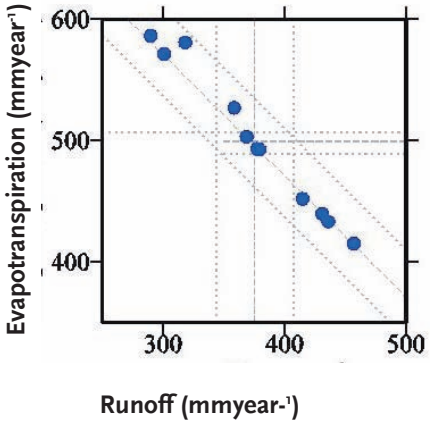

Figure 1: *Global mean model predicted runoff and evapotranspiration values (mm year $^{-1}$) for the 11 participating models; each represented by a blue marker. The diagonal, vertical and horizontal lines show long term multi-model mean annual values and the interannual range of multi-model mean precipitation (837 - 910 mm year $^{-1}$), runoff (344 - 408 mm year $^{-1}$) and evapotranspiration (489-507 mm year $^{-1}$), respectively.*

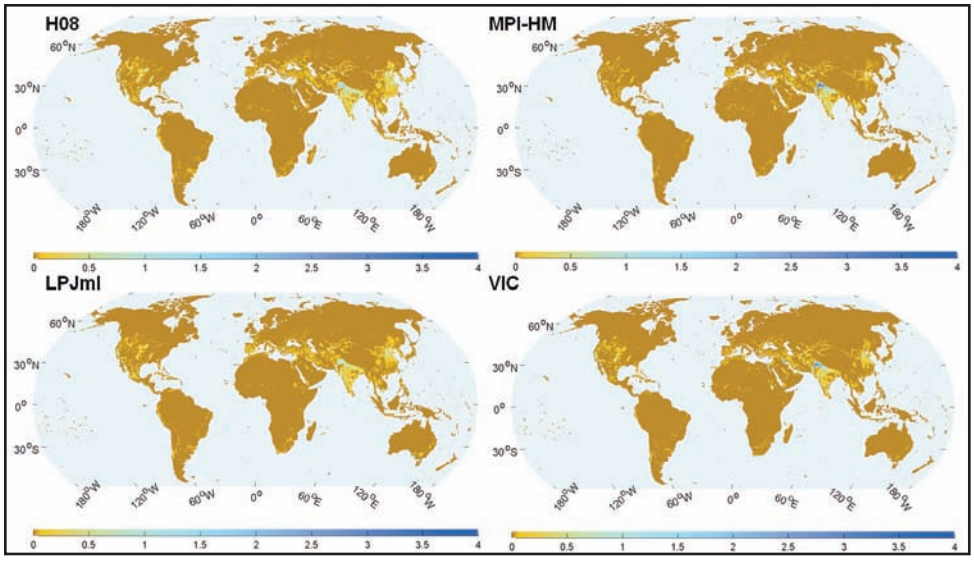

Figure 2: *Four different modelling results for average annual potential irrigation water use (mm day $^{-1}$) for calculated for the time period 1985-1999.*

based on a multi-model ensemble approach.

Water management may have a significant impact on river flow regimes and may lead to endemic over use of water resources. Therefore, as a subsequent step, different representations of pressures on water resources were investigated. In particular the effects of human interventions, e.g. dams and irrigation, were considered. It might not be surprising that hot spots of potential water use for irrigation can be found in India, the Mediterranean area, Middle East, China, and North America (see Figure 2). This result is consistent between the models, even though absolute numbers are slightly different. Seasonally the results vary more, which is caused by different modelling approaches. This will be analysed in more detail in the following steps of WaterMIP and will give us first estimates about the impact of irrigation on evapotranspiration and hence future vulnerability of water resources.

During the workshop at Wageningen University, close coordination between WaterMIP and the GWSP global Green-Blue Water Initiative (GBI, see Global Water News No. 8) were explicitly discussed. In addition, linkages and cross cutting themes between WaterMIP and GWSP (see e.g. Dirmeyer et al. 2006) were identified and a dialogue between these two communities was initiated.

For more information and progress on WaterMIP see our website at: www.eu-watch.org/watermip.

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Scenarios Workshop

29-30 June 2010, Dresden, Germany

The roundtable discussion was organized by the workgroup 'Scenarios' supported by the Senate Commission of the German Research Foundation (DFG) on Water Research (KoWa). The background of the workshop was to foster interdisciplinary collaboration in water research through applied methods like scenarios, which are already used in various disciplines within the natural sciences, engineering or social sciences. However, there exists a wide range of different approaches to scenario development and there is still no consolidated theory about scenario planning. This situation motivated the DFG-Senate Commission on Water Research to organize this roundtable discussion on an international level. The aim of the discussion was to merge the knowledge on scenario use and development by different disciplines in engineering, natural and social sciences in order to develop common understanding for interdisciplinary scenarios and to foster international collaboration in deriving consistent and policy relevant scenarios to capture possible trajectories of an uncertain future.

Scenarios Workshop: fostering interdisciplinary collaboration in water research through scenario development

German National Water Research Perspective Conference

13-14 July 2010, Berlin, Germany

Claudia Pahl-Wostl, member of the Executive Committee of GWSP and Janos Bogardi, Executive Officer of the GWSP-IPO attended the 1st Conference on Water Research Horizon held on 13-14 July 2010 in Berlin. While Janos Bogardi was member of the Scientific Committee of the conference and contributed to the background "White Paper" of the conference, Claudia Pahl-Wostl gave a presentation on research challenges in global water governance. The event was a key element in preparing the future water research programme of the Federal Ministry of Education and Research of Germany (BMBF), the donor of GWSP-IPO. The conference was attended by more than 200 scientists.

Conference called for the need to bundle and strengthen research on water related issues

UNU-EHS Summer Academy: "Social Vulnerability – Protecting Environmental Migrants: Creating a New Policy and Institutional Frameworks"

25-31 July 2010, Hohenkammer, Germany

The fifth annual Summer Academy organized by the Munich Re Foundation (MRF) and the United Nations University Institute for Environment and Human Security (UNU-EHS), was held at Hohenkammer Castle near Munich, Germany from 25-31 July 2010. The topic for 2010 builds on the previous four academies, which focused on water hot spots (2006), mega-cities (2007) social vulnerabilities and resilience-building, the interplay of environmental migration and social vulnerability (2008) and tipping points in humanitarian crises in the context of climate change (2009).

Climate change due to greenhouse gas emissions is now, at some level, irreversible. Based on records of the last couple of decades, researchers predict that as average temperatures increase, natural disasters will grow in intensity and frequency. The poor in developing countries are the most vulnerable to these disasters, which include prolonged drought, water scarcity, food insecurity, spread of disease, and loss of livelihood, mainly due to their vulnerability and limited capacity to adapt. Disasters, such as storm surges, floods and hurricanes may also cause the destruction of homes and infrastructure, leading to additional humanitarian crises. Some level of displacement and/or migration among those in affected communities is likely: research suggests that some people are already engaging in migration as a coping strategy for climate shocks. These issues present key challenges for governments, particularly for both source and target countries in case migrants cross borders to protect their lives or improve their livelihoods. Many victims of climate change who are forced to move may encounter discrimination or other abuse, or could be viewed as criminals if they become undocumented workers in another country.

While the needs of climate-related victims and the level of protection required in any disaster is context specific, few national or international standards have been adopted to protect current or future climate related migrants. Among decision-makers in the climate change debate, there has been little evaluation of the most appropriate migration management or governance strategies that could serve as models to help countries better prepare for and/or adapt to predicted climate impacts. Where countries already face humanitarian and human rights constraints, the use of governance approaches that incorporate best practice and international standards can help to assure that adaptation programs appropriately and more successfully meet the

needs of affected victims.

The week-long program focussed on country and regional level challenges related to human migration and displacement, with a view to identifying the gaps in policy, law and institutions needed to protect vulnerable groups. Amongst others, the learning objective is professional networking amongst young and senior professionals at the academy to explore together synergies for further collaboration. Janos Bogardi, Executive Officer of GWSP attended as senior expert and chaired the working group "Framing the issue for policy makers. As decided upon at the GWSP SSC Meeting in Stellenbosch in October 2009, Water and Migration is one of the new fields of focus of GWSP, addressing the vulnerability, water availability and potential migration decision nexus. Hence the academy is an important implementation of GWSP's new initiative in a collaborative context.

Holm Voigt, research assistant at the GWSP-IPO was selected as one of the 20 scholar participants of the Summer Academy. Holm currently is preparing his PhD within the new GWSP focus on Water and Migration. His proposed research project is aiming at evaluating the role of water within the context of environmentally induced migration. Being at the beginning of his research he got in contact with young scientist who are dealing with the theme of environmental migration, discuss and reshape ideas for his research within a diverse and interdisciplinary environment. Since the focus of the Summer Academy was on policy and institutional frameworks, water governance as an option for sustaining livelihoods was one of the points to discuss as well as how to understand migration on a global scale.

The Academy will publish its findings, including selected student papers and a synthesis report. The Academy will circulate the findings and report globally to its network of academic scholars, government and international agencies and other relevant institutions with a view to furthering international dialogue on human security in climate adaptation strategies.

For student papers and the synthesis report please visit:
www.ehs.unu.edu/article/read/summer-academy

Water and Migration: A PhD Project

At the Scientific Steering Committee (SSC) meeting in Stellenbosch 2009, the launch of the subproject "Water and Migration" has been approved by the SSC members of the GWSP. This activity aims to provide a water perspective within the debate of environmental migration. Although the discussion about environmental migration is already going on for decades, most of the questions have not been answered yet. Water as a prerequisite for human existence can also have devastating effects on human livelihoods if it occurs in excess or privation. These effects might lead to temporary or permanent human migration within or across national borders. To determine the role of water within international migration will constitute the major focus of GWSP activities.

The recently launched activities are attached to the International Project Office (IPO) of GWSP. IPO Staff member Holm Voigt is preparing his PhD research within this framework under the supervision of Janos Bogardi. The project has two mutually supporting dimensions: in correspondence with the global perspective of GWSP the above mentioned research question is to be answered globally. To address this task, various known "water indicators" will be analysed and tested to determine whether they could provide information on the likelihood and extent of migration and possibly on the trajectories of migration. Learning from the huge expertise in global hydrological modeling and the application of water indicators, Holm will also work with the group of Charles Vörösmarty, Co-Chair of GWSP, at the City University of New York (CUNY).

Since the decision to migrate is taken individually, one cannot neglect the local scale. Therefore, the second dimension of the project is a local case study. This will focus on the question of how water influences livelihoods. Water in this context will be examined under several aspects: physical availability, quality, accessibility, etc. Furthermore, a household survey is planned to get to know people's perceptions on what threatens their livelihoods and where there is a threshold before people start to move. The area identified is Sub-Saharan Africa. The hosting institution of GWSP, the Center of Development Research (ZEF) of the University of Bonn has ample experience, excellent contacts and long-term institutional presence in the area to build upon.

Addressing social and natural questions and targeting policy relevant questions is at the core of GWSP's mission. First contacts to the migration community have been made during the UNU-EHS/MRF Summer Academy on social vulnerability. Further progress will be reported on www.gwsp.org

GWSP participation in other events

In the pursuance of its capacity building mandate, the International Project Office (IPO) of GWSP takes part and is invited to address workshops and conferences in Germany

Lectures held by Janos Bogardi

Environmentally Driven Migration and Water Scarcity
Institute for Technology and Resources Management in the Tropics and Subtropics (ITT), Cologne University of Applied Sciences, 1 October 2009

Vulnerability: the Root of Risk, PhD Block Course on Modelling
Centre of Development Research (ZEF) & UNU- Institute for Environment and Human Security (UNU-EHS), Bonn, 21 October 2009

Weltbevölkerung und Gesundheit / Sustainability of Present Water Use Patterns: Future in a Changing World
Rheinisch-Westfälische Technische Hochschule Aachen (RWTH), 5 November 2009

Weltbevölkerung und Gesundtheit / Sustainability of Present Water Use Patterns: Future in a Changing World
Rheinisch-Westfälische Technische Hochschule Aachen (RWTH), 4 May 2010

E-learning Module on IWRM and Vulnerability
UNESCO- International Hydrological Programme (UNESCO-IHP), World Meteorological Organization (WMO-HWRP), Internationale WasserforschungsAllianz Sachsen (IWAS), 11 June 2010

Presentations held by Janos Bogardi

Floods and Climatic Change Trends in Germany
European and Mediterranian Workshop: Climate Change Impact on Water Related and Marine Risks, Murcia, Spain, 26-27 October 2009

Wasserbewirtschaftung im Spannungsfeld der Gesellschaft- „Mit dem Wissen wächst der Zweifel"
Karlsruhe Institute of Technology (KIT), 20 January 2010

Future Trends and Research Needs in Water Management- "What is missing in the Researchscape?"
University of Osnabrueck, 3-4 Februrary 2010

Spannungsfeld Wasserwirtschaft: Neue Aufgaben für (Wasser-)Bauingenieure
Franzius-Institut für Wasserbau und Küsteningenieurwesen, University of Hannover, 11 March 2010

UN World Water Day 2010
(Orientation presentation for local and international journalists),
Nairobi, 20 March 2010

World Water Day 2010: All about water – quality.
(Moderator of the panel discussion of the monthly ZEF/UNU-EHS/GWSP/UNW-DPC Water Lecture)
Centre for Development Research (ZEF), Bonn, 17 March 2010

Flüsse trennen und verbinden: Ökologie, Ökonomie und Wasserressourcen. Hintergründe der Donauinititive der Europäischen Union.
German Hungarian Society, Hungarian Embassy, Berlin, 28 May 2010

Concept of IWRM and relations to GWSP
Integrated Water Resources Management (IWRM)
Workshop, Dresden, 17 Juni 2010

Global Water resources:
Societal Needs and Research Priorities.
IPSWAT Meeting, Leipzig, 7-9 July 2010

Presentations held by Claudia Pahl-Wostl

Global Water System Project. An initiative from the global change progrmmes to address the global water challenge.
National GLOWA Conference Potsdam, 12-14 October 2009

Events at which Janos Bogardi participated

1st Water Research Horizon Conference
Helmholtz Centre for Environmental Research - UFZ, Berlin, December 2009/March 2010

ICLEI- Local Governments for Sustainability Resilient Cities Congress 2010
(Member of the Scientific Committee),
Bonn, 28-31 May 2010

UNCCD Land Day 2. Water and land assets in confronting climate change: What do negotiators need to know? Bonn
(Moderation of the 3rd Panel), Bonn, 5 June 2010

Water Scenarios Roundtable Discussion
Deutsche Forschungsgemeinschaft (DFG)
Bonn, 29-30 June 2010

NEW INITIATIVES

TWIN2GO: Coordinating twinning partnerships towards more adaptive governance in river basins

The failure of governance systems has been identified as being one of the most important reasons for increased vulnerability to water related threats. Successful governance in river basin management depends on adaptive institutions able to cope with complexity and uncertainty. Despite the overall importance of water governance - the global "water crisis" is often described as more a governance crisis than one of resource availability - our understanding of multi-level water governance systems is quite limited. Twin2Go's mission is therefore to gain insights into adaptive water governance in the context of climate change. Twin2Go follows a diagnostic approach supporting context-sensitive analysis without being case specific and thus not transferable and avoiding simplistic panaceas, which have proven to be weak in their explanatory power and not very useful or even detrimental for policy advice.

Twin2Go is a Coordination Action within the scope of the Seventh EU Framework Programme and runs from May 2009 to June 2011. It reviews, consolidates, and synthesises research on adaptive and Integrated Water Resources Management (IWRM) in basins around the world. The aim is to draw insights relevant to policy and research on issues around adaptive water governance in the context of climate change, and to make them transferable to other basins. Twin2Go further promotes sharing of research results with practitioners and high level decision-makers through effective dialogue.

Twin2Go's objectives are:

- to review, compare, synthesise and consolidate the outcomes of several EU-funded projects that undertook research on specific Integrated Water Resources Management (IWRM) issues in basins around the world
- to draw context-sensitive but transferable approaches for improving adaptive water resources management with regard to adaptive water governance
- to formulate policy-relevant best practices and tools for implementing adaptive water governance and for improving the uptake of research results
- to disseminate outcomes effectively to relevant stakeholders at the policy level.

As a first step, Twin2Go reviewed the methodological approaches from several EU research projects dealing with IWRM. Based on these approaches, Twin2Go developed a questionnaire to collect case study data from basins around the world. The questionnaire comprises 86 indicators, which address properties of water governance regimes, their contexts as well as the actual performance of

Participants of Twin2Go's Case Study Review Workshop in May 2010, Berlin, Germany

water governance. Twin2Go hosted six Case Study Review Workshops to collect data about water governance. Experts provided data for numerous case studies in Europe, Latin America, Africa and Asia.

In a next step, Twin2Go is going to prepare and perform analyses of the data collected. Comparative analyses will serve to identify, which water governance properties work well and how the context influences performance. Up to now, hardly any comparative analyses of a similar scope exist. Together with experts from different target regions, Twin2Go is going to formulate best-practices and recommendations for adaptive water governance in the context of climate change. In the first half of 2011, Twin2Go is going to host four Policy Workshops as side events of water conferences and meetings in order to disseminate the consolidated results to decision-makers at multiple levels. For this Twin2Go will closely collaborate with GWSP to ensure a sound transfer of its results to the policy-maker community.

For more information on Twin2Go, please visit :
www.twin2go.uos.de

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REGIONAL NEWS

Climatic Change: Implications for Ecosystem and Environmental Services in Amazonia

In general, biodiversity plays an important role in ecosystem functions that provide support, provisions, regulations and cultural services essential to human well-being. For example, people rely on biodiversity for food, medicine, raw materials, and ecosystem services such as water supply, nutrient cycling, waste treatment and pollination. Forest ecosystems also provide a wide array of goods and services. Human responses to a warmer climate are likely to increase the demand of fresh water to meet urban and agricultural needs. Likely results will be decreased flow in rivers and streams, causing a loss of ecosystem services.

The Amazon forest is sufficiently large to have a significant impact on the regional and even global climate system, and provides a host of ecosystem services that are threatened by deforestation. As deforestation approaches this critical threshold, we can expect the marginal value of the forest ecosystem to rise rapidly, approaching the infinite if we believe that the loss of the Amazon ecosystem is unacceptable. Compounding the uncertainty of how much forest loss the system can tolerate before it can no longer generate adequate rainfall to sustain itself, climate change is likely to have substantial impacts on such thresholds.

Studies of hydrological cycle in the Amazon suggest that it recycles as much as 50% of its rainfall, and that if as little as 30% of the Amazon is cleared, it will be unable to generate enough rainfall to sustain itself, leading to a positive feedback loop of more forest loss and less rainfall. Rainfall in other words is essential for sustaining the Amazonian ecosystems and all the ecosystem services they generate, and the value of the Amazon as a water-regulating eco-utility becomes indistinguishable from the value of all ecosystem services generated by the Amazon. The Amazon forest releases water vapour to the atmosphere daily, transferring heat, moderating weather conditions and supplying Brazil and the La Plata Basin further south with rainfall on which US $1 trillion of agribusiness, hydropower and industry depend. Reduced rainfall in the Plata Basin would impact agriculture, industry and hydro-electricity. These sectors are responsible for 70% of the GNP of five Latin American nations. Rainfall in the Plata Basin is derived from moisture from the Amazon basin together with local evaporation in the Plata basin, cold fronts from the south and air masses from the South Atlantic. The major economic region of Latin America depends to an as yet unknown extent on rainfall from the Amazon.

These ecological services provided by the Amazon Basin may be threatened by global warming through a middle-century, climate-driven die-back and substitution of forests by savannah-like vegetation. Of course, we must consider the uncertainties associated with such climate change projections. Changes in rainfall and atmospheric moisture transport resulting from declines in Amazonian forest cover will need to be considered in addition to changes resulting from global climate change.

The main environmental services provided by the Amazon forest can be summarised as:

- Stability of the hydrological cycle and climate in the region
- Stability of soil and agriculture
- Carbon storage, storing and sequestering carbon
- Moisture recycling and transport to other regions
- Keeping large biodiversity
- Opportunities for ecological services and sustainable use of resources

Further research is needed to investigate the role of the forest in the economic well-being of the continent and to integrate this information into policies and practical activities to conserve the Amazon and provide benefits to its inhabitants. The introduction of payments for environmental services offers an opportunity for traditional and indigenous populations to be compensated for contributing to carbon sequestration in meeting the challenge of ameliorating global warming (Hall 2008).

Besides the environmental impacts of expanding agribusiness and poor forestry practices, unsustainable development in the Amazon has also led to significant poverty and social inequality (Viana 2009). Forests have historically been seen as valueless and forestry as backwards - neither of them worthy of inclusion in 'development' strategies or in the usual set of policy instruments encouraging relevant investment, such as tax incentives and credit. Yet the significant problems deforestation causes now suggest that forests need to be regarded as valuable assets to individuals, families, businesses and governments. In short, public, non-profit and private sector policies have to be guided by a simple message: "forests are worth more standing than cut". This paradigm shift has to be translated into broad cross-sectorial policies in areas such as finance, education, health, energy and sustainable land use systems.

Tropical forests are 'eco-utilities' providing critical ecosystem services that underpin food, energy, water and climate security at local to global scales. Currently, these services are unrecognised and unrewarded in international policy and financial frameworks, causing forests to be worth more dead than alive. Much attention is currently focused on REDD (Reducing Emissions from Deforestation and forest Degradation) and afforestation and reforestation as mitigation options (Trivedi et al. 2009). Some valuations of standing forests in the Amazon have produced very positive results. On the one hand are the results of public policies aiming to increase the value of forest products - such as honey and managed timber-supporting private sector investment and social-environmental entrepreneurship.

Trivedi et al. (2009) described the tropical forest eco-utility in the form of (a) Carbon capture and sequestration – mitigating climate change, (b) Water pumping – moderating surface temperatures, (c) Rainfall recycling – supporting energy and food security. The Amazonian eco-utility can be assessed in the form of standing forests, frontier forests and deforested and degraded land. Standing forests support human populations that are not currently clearing large areas of forest. In contrast, frontier forests are under direct and immediate threat from human activities, as in the 'arc of deforestation'. In such areas, the eco-utility services are being replaced by other ecosystem services such as agricultural production and forestry operations. Finally, there are large areas that were once forest but have been converted to agriculture and are now degraded of their natural capital. Conservation and sustainable development activities should aim to support the standing forests, stabilize the frontier, and restore the degraded forests.

The more profitable sustainably harvested forest products become, the less attractive deforestation is, and the greater the economic stimulus to conserve forests. On the other hand, environmental services such as carbon sequestration and storage have big potential and are a key part of the equation too. The more valuable environmental services are the more resources will be available for investment in improving local people's quality of life and ability to generate income.

References

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Regional Actions of the Chinese National Committee and the Asia Scientific Network Office for GWSP

Since the beginning of 2010, both the Chinese National Committee (GWSP-CNC) and GWSP's Asia Scientific Network Office (GWSP-ASNO) have taken several regional and national actions related to GWSP's focus areas.

1. Climate Change Impact, Water Resource Vulnerability & Adaptation in North China

The impact of climate change and anthropogenic influences on water resources is a challenging issue with global concern. It is also the key tenet within water security evaluation and adaptation management in the sustainable development of China. The eastern monsoon area of China, which includes the major river basins of China such as Yangtze River, Yellow River, Huai River, Hai River, Pearl River and Songhua River, is home to ninety five percent of the population of China. Xia Jun, Chief of the Asia Scientific Network Office of GWSP (ASNO-GWSP) and team leader of the Institute of Geographical Sciences & Natural Resources Research (IGSNRR) at the Chinese Academy of Sciences (CAS), initiated a national basic research program for China in 2009 (also referred to as the national "973 Key Project"), entitled "The Impact of Climate Change on Terrestrial Water Cycle, Regional Water Resources Security and the Adaptation Strategy for the Eastern Monsoon Area of China". This project is supported with 4 Million USD by the Ministry of Science & Technology (MOST) of China. In collaboration with the Bureau of Hydrology, Ministry of Water Resources and the National Climate Change Center of China, the project will focus on the major river basins in the eastern monsoon region of China to investigate the impact of climate change on water resources and on relevant adaptation strategies. The major research topics are centered upon three key issues: (1) The spatial-temporal variability and uncertainty of water cycle components under climate change; (2) Interaction and feedback mechanisms between land surface hydrology and regional climate; (3) Vulnerability and sustainability of water resources under climate change. Through the analysis of the observed terrestrial hydrological cycle components in the past 50 years, through quantifying the uncertainty in precipitation from multi-model predictions under future climate change and through analysing the two-way coupling and interaction between land surface hydrology and regional climate this study is to reveal the driving factors of the hydrological process change under climate change, as well as to recognise and highlight the impact of climate change on the spatial-temporal dynamics of the hydrologic cycle and system feedbacks. Corresponding to the latest report of the IPCC,

Participants of the project meeting in Beijing, November 21, 2009

this study will analyze and evaluate the climate change impact on the spatial-temporal pattern of water resources of China's monsoon area, the frequency and intensity of extremes of drought and flooding, the economic and social impacts and risks in water resource vulnerable areas in the next twenty to fifty years, and finally establish adaptation strategies in order to effectively deal with the impact of climate change on the water resources security for China.

2. Case study on Global Catchment Initiative (GCI) in Huai River Basin, China

The impact of dams and sluices on flow regimes, water quality and the eco-system within a river system is one of the key issues in China related to the Global Catchment Initiative (GCI) of GWSP in China. Huai River Basin (HRB) is such a case with strongly regulated river due to the large number of water projects for flood control and water supply. The traditional regulation of water projects focused mainly on social functions (flood control, electricity generation, water supply, irrigation and aquaculture) but only marginally considered the environmental effects. Water pollution can easily result in major risks for the water quality. Thus, the new challenge will focus on how the integration of water quality and quantity management and operation in the HRB. Under the support of the Nature Science Foundation of China (NSFC), a research team led by Xia Jun completed a case study related to the Global Catchment Initiative. Three urgent issues for Huai River Basin (HRB) were identified, i.e. (1) Understanding water-material circulations and ecosystem mechanisms of the river system, which are due to impacts of water projects and waste load; (2) Providing comprehensive assessment on the impact of dams and sluices on changes of river flow regimes, water quality and the ecosystem; (3) Developing effective approaches of improving water quality and restoring the river ecosystem by fully utilizing state-of-the-art environmental monitoring and integrated water resources management. Present research shows that: (1) Water quality management is the priority of river basin management. Major pollution sources can be identified which reflect the present complexity of water problems in HRB. A clear vision on water security at the basin level; (2) Based on the new concepts of GWSP and the Global Catchment Initiative, the integrated water quality and quantity management can be developed and successfully applied to river system operation considering both flood control and water pollution control in HRB. This is the only way to deal with the present contradiction between flood control and pollution control.

3. Regional Workshop in Beijing, Nov. 21-22, 2009 and upcoming Regional Workshop in China

Urgent challenges to water resources management for the next decade and beyond include Water and Food, Water and Nature, Water and Energy, Water and Health (including Sanitation), Water and Trans-boundary Cooperation and Climate Change and Adaptation, all of which are related to water security at a regional and global scale. Pressing research issues for scientists include water cycle processes, environmental changes (climate change and human activity), and to quantify water security linked with social-economic and environmental sustainability, as well as to provide high vision with science support not only for the existing but also beyond 2020's water management of the world. Under the support of CAS, IAC Water Program and ASNO-GWSP, a regional workshop, entitled "Climate Change & Water Sustainability", was held from 21-22 November 2009 in Beijing. Six international experts from the Netherlands, USA, South Africa, Malaysia, Poland plus 42 Chinese experts attended the workshop. Fruitful presentations were given and enabled high-level discussions among the experts. The workshop concentrated upon following issues: (1) A review of the challenges faced in providing sustainable water resources for the world, at both the global and regional scales; (2) Understanding the causes of and the science behind water problems, including the impacts of climate change and human activities; (3) The identification of adaptation and mitigation measures as well as capacity to adapt to environmental changes; (4) The identification of innovating and promising new opportunities to solve the water crisis and ensure sustainable water resources to the world.

The 2010 Regional Workshop is planned to take place between 17-19 September in Beijing, China, under the title "Water Vulnerability & Adaptive Governance under the Climate Change and Development", co-sponsored by the Inter-Academy Panel (IAP) Water Program and GWSP-ASNO. Major focus will be put on water issues, particularly in the Asia-Pacific region, science and technology for future water, impact of climate change, water resource vulnerability, water demand and supply management, improving water governance and adaptation management.

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FORTHCOMING EVENTS

GWSP Global Catchment Initiative (GCI) Conference 2010

6-8 December 2010, Bonn, Germany

An important new insight in the river basin research is that water in its various forms operates as a "global water system" on scales much larger than on the local to river basin scale. This concept has significant implications for river basins. 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. This induces a new global perspective on river basins.

Under the title "The Global Dimensions of Change in River Basins - Threats, Linkages and Adaptation", the conference aims 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 issue. In particular the 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, international food trade on land use and resulting hydrological changes within a river basin or the impact of international financial institutions on the development of water infrastructure.

Background papers prepared for the GCI Conference are attached to this issue of the Newsletter.

Detailed information and online registration is available under: www.gwsp.org/66.html

GWSP Scientific Steering Committee Meeting 2010

8-10 December 2010, Bonn, Germany

GWSP's annual Scientific Steering Committee (SSC) Meeting will be taking place from 8-10 December in Bonn, back to back with the GWSP GCI Conference "The Global Dimensions of Change in River Basins - Threats, Linkages and Adaptation". The SSC meeting will be attended by SSC members and other invited participants.

GEWEX-GWSP Consultation/ 2nd Pan-GEWEX Science Meeting

23-27 August 2010, Seattle, United States

The 2nd Pan-GEWEX Science Meeting will be taking place at the University of Washington in Seattle, 23-27 August 2010. The conference will bring together the project and working group members of the three GEWEX (Global Energy and Water Cycle Experiment) Panels. The central focus will be on developing a two-year plan for GEWEX panels, their projects and working groups which facilitates the achievement of their short-term goals, as well as accomplishment of the post 2013 Imperatives. Within the framework of the Science Meeting GEWEX and GWSP officers will meet in order to explore future avenues of cooperation.

More information is available under:
www.gewex.org/2010pangewex/home.html

Storm Surges Congress 2010

13-17 September 2010, Hamburg, Germany

Land-Ocean Interactions in the Coastal Zone (LOICZ) together with GKSS Research Centre in Geesthacht will be hosting the Storm Surges Congress 2010 on 'Risk and Management of current and future Storm Surges' from 13-17 September 2010, at the University of Hamburg, Germany. The conference will be attended by Holm Voigt on behalf of GWSP-IPO.

More information is available under:
www.loicz.org/storm2010
Type of conference: Open

IHDP Science Committee Meeting

23-25 September 2010, Bonn, Germany

From 23-25 September 2010 IHDP's Science Committee meeting will be taking place in Bonn. The meeting is open to IHDP Scientific committee members.

More information is available under:
www.ihdp.unu.edu

Global Water Governance Workshop

13-15 October 2010, Bonn, Germany

Water related problems have been considered as local problems for a long time. Today there are strong arguments to take the global dimension into account. In the upcoming workshop on Global Water Governance and the UN system, the participants will discuss the major challenges for global water governance and if current forums and processes of global water governance provide the necessary institutional framework to meet present and future challenges. The workshop aims to make an assessment of the current state of the art in global water governance studies and to identify major knowledge and policy gaps.

More information is available online under:
www.gwsp.org

IWRM Conference 2010

24-25 November 2010, Karlsruhe, Germany

The Integrated Water Resources Management (IWRM) Conference 2010, organized by Fraunhofer IOSB and Karlsruher Messe-und Kongress-GmbH (KMK), will be taking place from 24 - 25 November 2010 in the Karlsruhe Convention Center/ Stadthalle, Germany. Janos Bogradi is invited as keynote speaker.

More information is available under:
www.iwrm-karlsruhe.com

GECHH Symposia

31 October - 2 November 2010, Hamilton, Canada

The Global Environmental Change and Human Health (GECHH) Joint Project is launching a Symposia Series aiming at catalysing dialogue across different disciplines and countries, optimising current and future research efforts on global environmental change and human health, and at mainstreaming key research outcomes into policies and interventions. The annual GECHH symposia are planned as in-depth reviews of specific systems being impacted by global environmental change which in turn have major impacts on global human health and wellbeing. The first three symposia will address the most challenging crises at the interface of global environmental change and human health – water, food and biodiversity – by focusing on water quality, food security and the roles of ecosystem services. The first symposium "*Global Environmental Change and Human Health: Protecting Water Quality*" (by invitation only) is organized in partnership with the United Nations University Institute for Water, Environment and Health (UNU-INWEH) in Hamilton, Canada, from 31 October to 2 November 2010. The GECHH 2010 symposium aims at bringing together the most innovative thinkers from across the globe to present and discuss state-of-the-science knowledge on the nexus of human health and water quality by addressing major global environmental change components, adaptation strategies and research gaps. A Special Issue of the journal "Current Opinion in Environmental Sustainability" (Elsevier) and the UNU-INWEH publication "The Water-Health Nexus: the Key to Global Environmental Change" are among the expected products stemming from the Symposium.

For further information please see:
www.gechh.unu.edu/meetings.html or contact the GECHH Project Officer, Dr L. Spini (spinil@inweh.unu).

ANNOUNCEMENTS

IHDP Executive Director

Anantha Duraiappah is the new Executive Director of the International Human Dimensions Programme on Global Environmental Change (IHDP) in Bonn, Germany. He is an experienced environmental-development economist, whose work largely focuses on the equity of access and use of ecosystem services. In his previous post as Chief of the Ecosystem Services and Economics Unit of the United Nations Environmental Programme (UNEP) he helped to initiate the Intergovernmental Science Policy Platform for Biodiversity and Ecosystem Services (IPBES) and since then has played a pivotal role in its recent approval. He additionally serves on the scientific committee of DIVERSITAS, one of the Earth System Science Partnership (ESSP) members. He has authored two books on environment and international aid and development, as well as articles in several internationally recognized journals. Duraiappah continues to successfully incorporate his expertise in science-policy interaction, economics, development and ecosystem services into his work at IHDP.

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GECHH Project Officer

Lucilla Spini took up the position of Project Officer for the Global Environmental Change and Human Health Joint Project (GECHH) in January 2010 when the GECHH International Project Office was established at the UNU Institute for Water, Environment and Health (UNU-INWEH). Spini is a biological anthropologist with expertise in human biology and primate behaviour as well as biodiversity conservation and international environmental policy. Before joining UNU-INWEH, she worked as an Associate Expert at the United Nations Educational, Scientific and Cultural Organization (UNESCO) and as a Programme Officer at both the Food and Agriculture Organization of the United Nations (FAO of the UN) and the UNEP World Conservation Monitoring Centre (UNEP-WCMC). She holds a B.A. (Hons.) in anthropology from New York University (USA), and an M.Sc. in human biology and D.Phil. in biological anthropology, both awarded from the University of Oxford (UK).

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ESSP Science Officer

Ada Ignaciuk was appointed new ESSP Science Officer in Paris. She has integrative research experience and is specialized in the quantitative analysis of economy-environment interactions. She obtained a PhD degree from Wageningen University in 2006; her thesis focused on the economics of multifunctional biomass systems. After her PhD she worked at Kiel Institute of the World Economy, Germany and at the Netherlands Environmental Assessment Agency (PBL), the Netherlands on various projects, mostly in the field of the economics of climate change.

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Scientific Steering Committee Member

Sharad Kumar Jain is new member of the GWSP Scientific Steering Committee (SSC). He is currently researching and teaching at the Department of Water Resources Development and Management at the Indian Institute of Technology in Roorkee. Prior to this, he was a scientist at the National Institute of Hydrology in India. His research interests include, amongst others, Surface Water Hydrology and Water Resources Planning and Management. He is the author of numerous scientific articles published in peer-reviewed, internationally recognized journals. He has co-authored three books: Water Resources Systems Planning and Management (Elsevier), Hydrology and Water Resources of India (Springer), and Risk and Reliability Analysis: a Handbook for Civil and Environmental Engineers (ASCE). Jain is a Member of the International Board of Advisors of the Journal of Hydrologic Engineering (ASCE); Member of Editorial Board, Hydrological Processes Journal, Wiley-Blackwell Publishers; Special Issue Editor of Hydrology Research (Formerly Nordic Hydrology) Journal, IWA Publishers, London; and the Editor of the Journal of Indian Water Resources Society. Furthermore, he has been involved in more than ten consultancy projects dealing with real-life water problems. He is also associated with the work of the Bureau of Indian Standards in the water sector.

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NEW IPO MEMBERS

Research Assistants

Eva Flinkerbusch joined the GWSP IPO in June 2010. She is a geographer specialized in nature conservation and natural resource management in developing countries. Prior to her work at GWSP she worked for the German Development Service (DED) in Uganda. There she was responsible for a project aiming at establishing an integrated water resources management concept for a small town. She developed and implemented a new concept to improve the efficiency of water use and to ensure the access to safe drinking water. In GWSP IPO she assists in all scientific tasks and takes care of administrative and event organisational processes.
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Holm Voigt joined the GWSP IPO in November 2009. He is geographer by training, specialized in hydrology and risk assessment for natural hazards. As a student Holm has been working in the Hydrology Research Group at the University of Bonn. His diploma thesis in Geography discussed the salinisation of soils in Northern Iran. In GWSP IPO he is responsible for the further development and maintenance of the GWSP Digital Water Atlas and active in networking with associated water programmes and projects. He is preparing a PhD dealing with the role of water within the process of human migration.
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Finance Officer

Roswitha Wyrwich is a Political Scientist specialised in Transatlantic Relations, Conflict Management and State-Building. In GWSP Roswitha is responsible for Finances and Administration.
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Student Assistants

Lea Böttger is studying Asian Studies at the University of Bonn.
Within the scope of her studies she focused on the region of Eastern Asia especially Mongolia and China.
In GWSP IPO she is maintaining the projects website and assists with various organizational tasks including conference management. She will be leaving GWSP in September in order to do her master`s degree.
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Sina Marx is studying Cultural Anthropology, Political Sciences and Malay Studies at the University of Cologne. While spending a lionshare of her time working and studying in Indonesia, she has gained water-related experience during her field work within the framework of the ZEF project 'Re-thinking water storage for climate change adaptation in sub-Saharan Africa'. In GWSP IPO she is responsible for the maintenance of the website, general administrative tasks and conference management.
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Eva Riedke is doing a Masters Degree entitled 'Culture and Environment in Africa' at the University of Cologne. Within her studies she will be working on constructing a historical climate chronology for two regions in South Africa. Prior to her work at GWSP IPO, Eva worked for the Development and Peace Foundation (SEF) in Bonn, gaining a grounded understanding of development problems driven by increasing scarcity of natural resources, including water. In GWSP IPO she is responsible for the editing and layout of GWSP publications a well as general administrative tasks and conference management.
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HONOURS

Grand Prix des Lumières de l`Eau de Cannes

Joseph Alcamo, Chief Scientist of the United Nations Environment Programme as well as Co-Chair of GWSP's Scientific Steering Committee, was honoured with the International Cannes Water Prize "Grand Prix des Lumières de l'Eau de Cannes" on 2 July, 2010 for his contributions to the development of global water research.

Remarks by Joseph Alcamo upon receiving *Le Grand Prix des Lumières de l`Eau de Cannes*

"I am very honoured to be acknowledged in such a magnanimous way. And it has been a privilege to be able to contribute in a modest way to the new global view of freshwater needs, resources and ecosystems.

The way I see it, the 1990s marked the decade in which we began to fully grasp the scale of global water scarcity. There were many studies, many symposia, and many public discussions about the worldwide lack of sufficient water supply for people and ecosystems, and I was fortunate to be part of these discussions.

During the decade of the 2000s the world community began to make progress in solving the global water supply problem. During this decade the percentage of people in the world with access to at least a minimally-reliable supply of water reached 87%, although of course much more needs to be done.

As the 1990s was the decade of awareness of global water problems

... and the 2000s the decade of tackling global water supply,

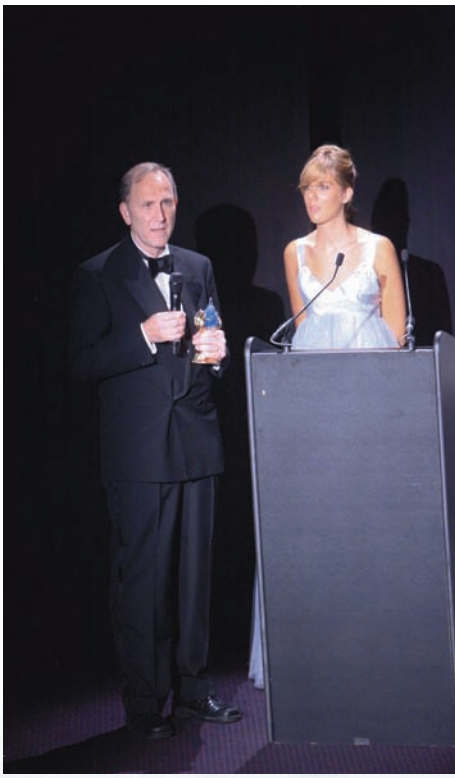
... I believe the 2010s should be the decade of protecting water quality.

The reason is that while water supply in developing countries has been increasing, water quality of their surface has been deteriorating. This is because larger and larger volumes of municipal and industrial wastewater are being discharged untreated into these waters. A water supply problem is rapidly being swapped for a water quality problem as inland waters become unsafe for bathing, unsafe for drinking without extensive treatment, and uninhabitable for fish. – The value of the world fishery should not be underestimated – 2.6 billion people rely on fish from marine and inland fisheries for at least 20% of their daily animal protein intake.

And the water quality problematique is not confined to developing countries. Although the richer countries have made great strides in cleaning up the most obvious water pollution, they continue to discharge many pollutants into their waterways including unsafe residuals from medicines, as well as excess pesticides and fertilizers from their croplands.

The water quality problematique also has global and regional dimensions. – Global climate change will aggravate water pollution in many regions, and long range transport of air pollution will in some cases contribute to water pollution in distant watersheds. Also, decisions taken by financial and political institutions in national and international power centers will continue to influence changes in the water quality of river basins far from these centers.

But my aim is not to raise yet another environmental alarm. Rather, this is a call for action. In the 2010s we should begin to tackle the world water quality problematique as we have made progress during the 2000s in expanding water supply in developing countries.



The degradation of water quality is not an unsolvable problem – The technology and management know-how is there; what is needed is the political will and support to use them. The 2010s can and should be the decade of global action to protect and restore the water quality in our rivers and lakes and coastal zones for the benefit of society and nature."

HONOURS

International Journal of Climatology Editor's Prize

Jose Antonio Marengo Orsini, senior scientist at the Brazilian National Institute for Space Research (INPE) and member of GWSP's Scientific Steering Committee was awarded the International Journal of Climatology Editor's Prize for 2009.

Award ceremony in London, Julia Slingo (President of the Royal Meteorological Society) & Marengo

The prize was awarded for Marengo's contributions as an author and reviewer. As one of the leading climatologists in South America and through his papers published in the journal and elsewhere, Marengo has contributed to major advances in understanding and communicating regional to hemispheric scale processes that determine climatic variability and change over South America. The prize was awarded 19 May 2010 at the Royal Meteorological Society Meeting in London, UK.

Légion d'honneur

Ceremony in June 2010, Julia Marton-Lefèvre (Director General of IUCN) and Anne Larigauderie (Executive Director of DIVERSITAS)

Anne Larigauderie, Executive Director of DIVERSITAS, was received into the Légion d'honneur as a Chevalier for eminent merit. With the Legion of Honour, the highest general military and civil order of merit, Larigauderie was honoured by the French government for her work in international science. The ceremony took place at the International Council for Science (ICSU) on 25th June 2010. The award was conferred by Julia Marton-Lefèvre, Director General of the International Union for Conservation of Nature (IUCN), on behalf of the Ministry of Higher Education and Research of France.

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CONTENTS

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