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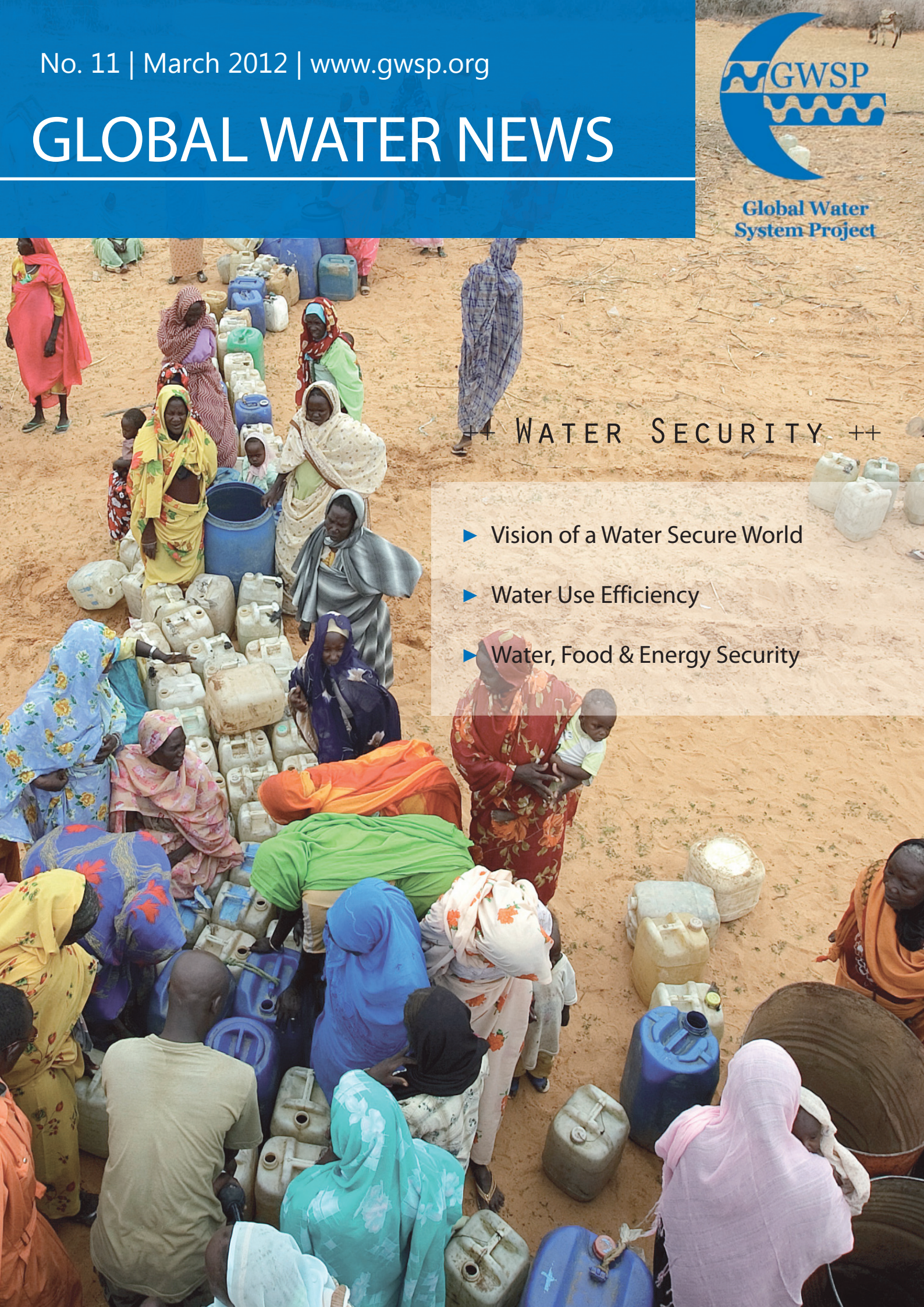
GLOBAL WATER NEWS

Global Water System Project



++ Water Security ++

- Vision of a Water Secure World
- Water Use Efficiency
- Water, Food & Energy Security

Imprint

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Editorial

by Janos Bogardi

Since the publication of our last newsletter in July 2011 the calendar of GWSP was full of important activities. For example, our presence at the Stockholm World Water Week in August 2011 was a big success. Besides interesting seminars and sessions co-organized with our partners the dissemination of our Rio+20 policy brief "Water Security for a Planet under Pressure" was launched there. Ever since this policy brief and the related GWSP publication "Water Security: Challenges for Science and Policy. Interconnected problems of a changing world call for sustainable solutions" have reached several thousand people.

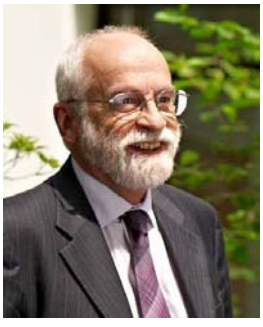
The present issue of Global Water News stands under the motto of "water security", thus echoing the growing recognition of the importance of water, its distribution in time and space, its quality, governance and management for global sustainability. The above cited GWSP policy brief and related publication on water security plus the forthcoming article on water security by leading GWSP scholars in the special issue of the ESSP Journal "Current Opinions in Environmental Sustainability" (issue March 2012) highlight the inherent tasks for science, the need for policy relevant research and science–policy dialogue, but also the need of a partnership of all stakeholders involved and the responsibility of politics to create an enabling environment, conducive to achieve environmental sustainability and among them water related goals. GWSP argues that for finding comprehensive, sustainable solutions for the planet, the world should be viewed through a "water lens".

The Global Water News takes pride that leading water resources experts accept our invitation and express their view and introduce their work for a sustainable water world. In this issue Ania Grobicki, Executive Secretary of the Global Water Partnership, is our guest author. Furthermore, Joachim von Braun, Director of the Center for Development Research (ZEF) of the University of Bonn, the host institution of GWSP-IPO, calls in an interview for decoupling water rights from land ownership to facilitate the emergence of innovative solutions. Further, the Water Observatory Botín Foundation introduces its recent Water-Food-Energy Project.

In March 2012 two paramount events follow each other: the 6th World Water Forum in Marseille and then the "Planet under Pressure: New Knowledge towards Solutions" Conference of the four GEC programmes and ESSP in London. GWSP will be present and active as host and organizer of important sessions in both events. In Marseille GWSP organizes a scientific panel discussion on scenario development with the emphasis on how to integrate interdisciplinary science and commit scientists to contribute to multistakeholder efforts towards a sustainable "water world". The joint GWSP UNESCO-IHE electronic book "River Basins and Change", based on selected contributions to the December 2010 GWSP-GCI Conference will be launched there, too. In London the water science community proves the importance of coordinated water research within the GEC research agenda. The session "Water: integrated assessment, governance and management in changing conditions at global, regional and transboundary levels" is organized by several GEC projects like GEWEX of WCRP, ESG Project of IHDP and GWSP of ESSP together with several scientific and international partners like UNESCO, OAS, IAH, SIWI. GWSP will also be present in both events with its own booth to display and disseminate its latest results and products.

Early May 2012 GWSP organizes together with the International Institute for Sustainable Development in Winnipeg a workshop to evaluate the results of the GCI Phase II questionnaire action and draw conclusions concerning water, energy and food security and their interactions in large river basins. The first half of 2012 will be concluded in June by the contributions of GWSP to the water security session (co-organized with UNESCO International Hydrological Programme) of the ICSU-led Forum on Science, Technology & Innovation for Sustainable Development in Rio de Janeiro, preceding the Rio+20 conference.

This editorial would not be complete without finishing it with a personal note. In summer 2009 I took over the task of the Executive Officer of GWSP for three years. The GWSP-IPO was then to be rebuilt and GWSP was to be re-established as a major player in international water science and debate. My term as Executive Officer comes to a close by 30th June 2012. I am retiring after 43 years of work, serving water science at different levels and in different functions. While I wish to thank ESSP, the GEC programmes and the Scientific Steering Committee of GWSP for their trust and pleasant collaboration, I also want to thank the staff of GWSP-IPO for their dedicated work and acknowledge the support and facilitating role of ZEF as host of GWSP-IPO. I wish to recall in particular the unforgettable memory of Konrad Vielhauer (1957-2011), Science Officer of GWSP-IPO, whose warm personality and contributions till the last days of his life will always be fondly remembered. Retiring from the job is not a retirement from science and I will be pleased to assist GWSP and its IPO whenever it may be required.



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Global Water Partnership: Vision for a Water Secure World

by Ania Grobicki

There are high hopes that the Rio+20 conference in June 2012 can deliver international consensus on solutions for our increasingly resource-constrained world. At the recent Bonn Conference on the Water-Food-Energy Nexus (November 2011), debate ran high over the need for urgent action, and one delegate called for nothing less than "a social compact for global change" in Rio. Over coffee, however, a sober discussion focused on the practical issue of how researchers can influence water policy-making here and now, given the need for knowledge-intensive solutions in many different countries, and in many different contexts. Researchers articulate the world not only to themselves, but also to us who are not (or who are no longer) researchers. This naming and explanatory power can clarify concepts, identify inter-relationships, generate new ideas, spark innovative action and most importantly, provide the science and the evidence needed to ensure that new policies are soundly based.

I am personally passionate about this area, having been involved in helping to develop South Africa´s science and technology policy in the 1990s, the transformation policy of the Water Research Commission and aspects of the 1998 National Water Act. Subsequently I was involved in research-to-policy co-operation within the international health research arena. Now within the Global Water Partnership (GWP), I see the urgent need to keep encouraging linkages among actors in research and knowledge generation as in the Global Water Systems Project (GWSP), and policy formulation/decision-making, as well as with organizations taking action on the ground to address the critical water challenges in various countries and regions of the world. Starting from first principles, the Global Water Partnership is committed to the vision of a water secure world, where an acceptable quantity and quality of water is available for health, livelihoods and production, coupled with an acceptable level of water-related risks. The Partnership pursues this vision through its commitment to the mission of supporting the sustainable development and management of water resources at all levels. A widely acceptable definition of water security reads as follows: "the availability of an acceptable quantity and quality of water for health, livelihoods, ecosystems and production, coupled with an acceptable level of water-related risks to people, environments and economies." (Grey, D. and Sadoff C. 'Sink or Swim? Water security for growth and development'. Water Policy 9(2007): 545-557). The GWP Strategy rests on the foundation of a network of institutional Partners united by their desire to ensure that the world's water resources are managed sustainably, for people, economies and the environment. This multi-stakeholder, multi-sectoral network embodies a core GWP belief that only when a broad range of actors work together will water security improve. Over 15 years, Partner organizations, Country Water Partnerships (CWPs), and Regional Water Partnerships (RWPs) have helped to improve water resources management in a number of countries and regions. It can be argued that the Global Water Partnership is an organization that is both stable and flexible, as it is built upon a network of Partners coming together in the "golden triangle" of action, knowledge and policy/decision-making (see Figure 1A below).

Figure 1A: The conceptual structure of the Global Water Partnership as an innovative action network of institutional partners, influencing policy-makers by working from a sound evidence and knowledge base. The dynamic interlinkages of the three nodes constitute the GWP knowledge chain.

Knowledge: The regional knowledge platforms draw together a strong network of universities and other knowledge and research institutions, regional practitioners, technical professionals and researchers from many sectors of development. The GWP Technical Committee works with individual experts, institutional Knowledge Partners and regional knowledge platforms (within the Regional Water Partnerships) to build the knowledge base needed to inform action and policy -making in support of improved water management, and in turn drawing valuable lessons from experience and evidence on the ground (the two-way arrows).

Policy-making: GWP Partners include governments, decision-makers and policy-makers at all levels, such as Ministries, government departments and institutes, and local government as well as regional economic bodies, multilateral agencies and UN organizations. Policy decisions need to be influenced by knowledge and evidence provided by researchers, while existing policies inform ongoing research on governance issues. Furthermore, policy must be implemented, which can be done effectively through action partnerships, and policy must be informed by the monitored outcomes and impacts on the ground of earlier policies.

Action: Through GWP a range of autonomous partnerships act at various levels to build greater water security, through Regional and Country Water Partnerships, Local/ Area or Zonal Water Partnerships, Urban Water Partnerships, River Basin Partnerships and others. It is essential that actions are guided by a sound base of knowledge, and that monitoring of projects and actions feeds back into research that is taking place. Evidence from action can influence policy, decision-making and investment strategies at all levels, through research as well as more directly through the political process. Finally, action partnerships contribute to the implementation of policies that are established in support of greater water security.

Evolution of GWP: Following its inception as a network in 1996, GWP evolved by establishing an inter-governmental organization based in Sweden, the Global Water Partnership Organization (established in 2002), whose aim is to support the network of GWP Partners. GWPO comprises the Sponsoring Partners (national governments, multilateral agencies and UN bodies) as well as the GWP Steering Committee, the GWP Technical Committee and the global secretariat (see Figure 1B below).

Figure 1B: The evolution of GWP with the establishment of GWPO as an inter-governmental organization (IGO), in support of the GWP Network. Outcomes of GWP´s work involve behaviour change in boundary actors (especially in the key water-using sectors), policy shifts, institutional development and organizational change.

A group of Financing Partners (national governments) come together to provide core funding to GWPO, in support of GWP´s network and Strategy. GWP is not a programme nor a project but a Partnership, hence the GWP structure and strategy are not linear. The strategy delivers results through a number of feedback loops, which achieve a multiplier effect over time. This results in the development of national plans for integrated water resources management, the creation or reform of water laws, and the building of a trusted network with credibility for knowledge sharing and for action. Increased investment in water security is one clear indicator which results from successful outcomes. Other tangible results can be found through documenting the bigger picture of development and tracing the narratives of who has benefited, and how.

GWP has overcome many of the constraints of more traditional international development work, by focusing on country and regional Partner organizations and expertise, with capacity building and knowledge sharing to support a broad range of IWRM-related activities in countries and river basins. Country and regional researchers, experts and practitioners bring local knowledge to bear, ensuring the development of indigenous solutions and policy formulation with local buy-in and sustainability. This decentralized networking and Partnership approach is highly effective and a major aim is for national governments to have technical assistance and policy support locally available on-demand. Because of this locally-focused credibility, GWP is able to engage substantively with senior international policy makers, major NGOs, UN bodies and financial institutions across the board.

In conclusion, there have reason to be cautiously optimistic that Rio+20 will indeed deliver some much-needed progress in the international arena. The necessary science base for sustainable development is frequently mentioned, and Clause 53 in the zero draft indeed calls for "the scientific basis for decision-making to be strengthened across the UN system and to recognize that the interface between science and policymaking should be enhanced". The clauses on water include a re-affirmation of countries to commit to the "development and implementation of integrated water resources management and water efficiency plans" (Clause 69). Furthermore, Clause 89 calls for "partnerships to address the interrelationship among water, energy, food and climate change". Through its articulation of the systems approach, the Global Water Systems Project will surely have an important role in helping to deliver this vision. I believe too that the Global Water Partnership can play its part in such a historic shift to a more sustainable and equitable future. I hope that there will be many opportunities for us to work in partnership.

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No Water Security without Water Use Efficiency: Interview with Joachim von Braun by Eva Flinkerbusch

Joachim von Braun, director of the Center for Development Research (ZEF) of the university of Bonn, Germany, is an economist, with a Doctoral degree in agricultural economics from University of Göttingen, Germany. He joined ZEF as Professor and Director of the Department for Economic and Technological Change in December 2009. He was also Director at ZEF during its foundation phase 1997-2002. Before returning to ZEF, von Braun was Director General of the International Food Policy Research Institute (IFPRI) based in Washington, DC, USA, from 2002 to 2009. His research addresses international development economics topics, including markets and trade, natural resources, poverty, health and nutrition, science and technology.

The problem of water scarcity is going to escalate worldwide in the foreseeable future due to population growth, urbanization, and the growing water demands of agriculture, industry and households. This situation is calling for much faster institutional and technological innovations to achieve improved management of the resource water and the optimization of its use.

Mr. von Braun, what are the reasons for the little progress on integrated water resources management (IWRM) 20 years after Rio? Does the concept of IWRM need "re-evaluation and operationalization"?

I see substantial progress during the past 20 years in water management and in making water a more valued resource. We are most likely going to reach the drinking water-related MDG which has some relation to IWRM. But I do agree that we need re-evaluation and see IWRM in a broader context of the nexus among water, food, energy, and health.

Balancing human needs, economic efficiency and ecosystem protection is a big challenge. How could water use efficiency be improved to master this balance appropriately?

Efficiency is key to reduce the competitions among multiple water uses and related tradeoffs . But human needs in relation to water also have a human rights dimension, that is access to minimum essential supplies of safe water and basic sanitation, so it is not only an efficiency issue. The utilization of water for different purposes requires that multiple-use-systems are managed well. That is where efficiency has to come in. And we have to think more in terms of efficiency along whole water-value-chains in hydrological systems.

Is water pricing an option to improve water use efficiency? What could be an adequate mechanism to protect the poor?

Scarcity of a resource needs to be signaled to all users. So water pricing is a necessity, but implementation is a complex institutional challenge. The poor need to be protected by having access to safe drinking water, and farmers in irrigation schemes need access to some irrigation water. To address these concerns can be handled by a system of market segmentation, that means before pricing at marginal costs kicks in, basics needs are to be ensured.

Agriculture is the biggest water user with relatively low economic return. How to cope? Is food security endangered?

Irrigated agriculture, where it is practiced, is the backbone for national food security in many countries. Additionally, climate change also puts pressure on freshwater resources and therefore on food security. The world is in a precarious food security situation for decades to come. It is well known that agriculture uses about 70% of the water withdrawn from nature. Water use efficiency especially in agriculture has to increase. Technical and institutional innovations are needed for that and both of these innovations depend on sound research. Otherwise we will not cope with the water shortages in main parts of the world. Actually there are few places of real water shortage. Often shortage is rather a result of wasting water because institutions are ill designed or access to technology is impaired.

You advocate that water rights should be decoupled from land ownership. How to proceed? What are the main research needs in this field?

First of all, separating water rights from land rights is necessary because the two resources - land and water - operate in completely different market situations. To put it simply: The use of water, underground, aboveground or rainwater requires institutional adaptation to the very nature of water being liquid. Land is fixed and local. To have fair and efficient water systems and land markets requires ownership and use- rights separation. Only then both markets can function efficiently and interact well. Countries like South Africa and Australia have already implemented such policies. Other countries should follow that track. Separating water from land permits creative and community based institutional arrangements of the allocation of the precious liquid. Institutions should focus on the actual conditions of the respective freshwater

resources. There is great need for more research into these critical water and land nexus issues, and that should systematically explore relevant patterns and facilitate adaptation of innovations to local circumstances.

What type of engagement in water science do you envisage for ZEF? In which way is ZEF planning to put further emphasis on water research in the future?

Water was and is a central priority at ZEF. We may move further into research that emphasizes trans-sectoral nexus aspects of water, that is, water and food, water and energy, water and health linkages. In each of these linkages, improvement on the side of water can be critical for peoples' well being and economic benefits. We see frontiers of water related research in interdisciplinary work on the connections between so called "large" and "small" water especially for improving water quality, sustainability of water use in multi-use hydrological systems, the connection of water and public health and a continued strong emphasis on water in the context of land use systems. Adaptation to climate change has to have a main emphasis on water. That is why ZEFs research on climate change

We thank Joachim von Braun for this interview.

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Water Observatory Botín Foundation: Water, Food and Energy (WFE) in Spain and Latinamerica

by Bárbara Willaarts & Elena López-Gunn

The Water Observatory of the Botín Foundation (WO-BF) is the first interdisciplinary think-tank dedicated to water issues in Spain. Its beginnings date back to 1998, with the launch of a series of projects and activities devoted to the analysis, discussion and debate of water issues, from a global, European, national and river basin perspective. The goal is to offer innovative concepts and ideas that generate effective debates and trigger changes in the minds and actions of decision makers. Through the establishment of strategic partnerships, the WO-BF searches for synergies and joint efforts with other institutions, to further develop ideas by collaborative research, generating a combined effect with universities, private corporations, nongovernmental organisations and government institutions.

The work of WO-BF starts from the premise that 'the world is not running out of water', based on the experience and research evidence gathered in a semi-arid country like Spain. It has sought to find new angles, data and dialogues that show the untapped opportunities to meet its citizens' needs, feed its economy and improve the natural environment. These assertions are based on the results gathered over the years, which are regularly open for debate and discussion with the leading global experts on water and associated key sectors, like energy, agriculture or environment.

Key areas where substantial work is being undertaken include different dimensions of integrated water resource management, like national and sector's water accounting, analysis of institutional reforms, the role of food trade for improving water security and potential trade-offs, and the increasing strategic global importance of groundwater. In addition, the Water Observatory is working on the transparency of water institutions by developing a Water Transparency Index for river basin organisations in a project led by Transparency International-Spain. In 2011 the WO-FB expanded its focus to encapsulate issues related to Water, Food and Energy, while increasing its area of analysis and collaboration to a wider geographical scope: Latinamerica. This has lead to the start up of the project Water, Food and Energy in Latinamerica and Spain (the WFE project 2011-2013), an ambitious endeavor that seeks to make a comprehensive diagnosis of the water, energy and food nexus in Spain and six Latinamerican countries (Argentina, Brazil, Chile, Mexico, Peru and Costa Rica), and placing this nexus within major socio-economic trends taking place at

regional and global level. A preview of the results achieved by the WFE project will be presented at a side event at the 6th World Water Forum in Marseille on 14 March 2012.

Spain, despite being a small country, represents a great experimental lab because of its rich territorial diversity and the dramatic and rapid changes it has experienced as emergent economy of the EU. This provides an interesting parallel for a rigorous and comprehensive inquiry in some of the most dynamic emerging countries in Latinamerica. While Spain took four decades to become an industrialized country, the transformations in leading Latinamerican countries are occurring in much shorter lapses. The challenges for the water sector in Latinamerica are astounding, since some of them are crucial food exporters and key global players, with large mega-cities, growing at rates of 5-6 % annually, and which are beginning to experience environmental problems of a significant scale.

One important goal of the WFE project is re-thinking what the concepts of water and food security mean for Spain and in Latinamerican countries; how these concepts have evolved as a result of globalization; and identify some of the potential trade-offs linked to food production and consumption for exporting and importing countries (e.g between Latinamerica and Europe). Most of the attention up-to-date has been placed on the production side, i.e. how trade and greater production's efficiency can improve a nations' water and food security. However, attention also needs to be paid to the other side of the coin, the consumption side, as nutritional improvements, food waste reduction and the internalization of environmental externalities linked to changing consumption patterns are key features to have a deeper understanding of water and food security issues.

Our preliminary results in Spain seem to indicate conflictive evidence regarding water and food security. In relation to food security, today 13 % of the Spanish population is obese, compared to e.g. 20 % in the USA and 5 % in countries like China or Japan. Such trends results from the substantial shift in the dietary habits of Spanish consumers, who are slowly moving away from the 'gold standard' Mediterranean diet, a diet officially recognized by the WHO for its health benefits and its nutritional balance. Today Spanish consumers eat 30 % more animal proteins and 60 % more processed food (sugar, bakery, alcohol, fast food) compared to the recommended Mediterranean standard. Meanwhile , the intake of cereals, legumes, fruits and vegetables has dropped to almost half.

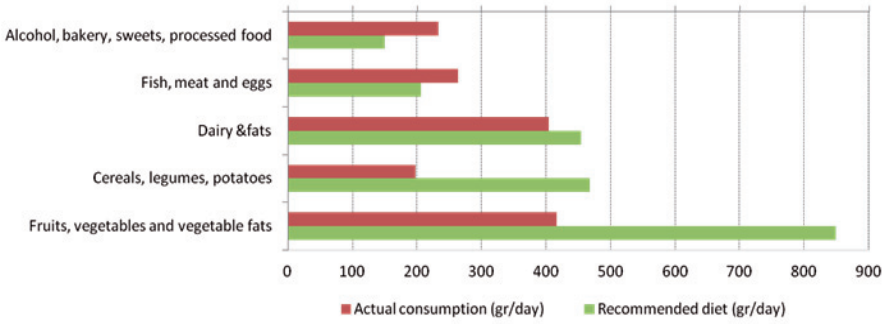

Figure 1: Composition (gr/person/day) of the recommended Mediterranean diet and the current average diet for an adult Spanish consumer

These dietary shifts have potential implications for national water management, and have been made possible in a semi-arid country like Spain to an extent because of its reliance on animal feed imports from third countries like Brazil and Argentina, which have contributed to the development of a growing and profitable livestock sector. Trade has allowed Spain to "expand" its access to external water resources, increasing its water security. However the extent to which globalization and trade is contributing to improve food security in Spain needs to be analysed further. Likewise, in Europe the protein enrichment of our diets may entail important environmental trade-offs in the distant production centers of Latinamerica.

The approach of this project is that globalization of water and food can be important for improving living conditions in many countries through increased trade. However, it could also entail important trade-offs that need to be further analyzed. The nexus between water and food is complex, and despite the need to increase production's efficiency to bridge the food and water gap, there is not one-size-fits-all solution. In fact most decisions regarding food and water take place "out of the water box", that is, outside the normal water organizations and institutions sphere of influence, driven by social changes, economic growth, globalization and technology development.

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Multimodel Estimate of the Global Terrestrial Water Balance

Summary of a paper by Eva Flinkerbusch

The global water balance has been the subject of modeling studies for decades, both from a climate perspective where the main interest is the influence of the water balance on surface heat fluxes and from a hydrological perspective focusing on water availability and use. However, there are still many uncertainties in the understanding of the current water cycle, and to date the results of land surface models (LSMs) and global hydrology models (GHMs) have not been compared in a consistent way. To distinguish properly between LSMs and GHMs it is important to know that LSMs can solve the surface energy balance, GHMs do not. The European Union WATCH (WATer and global CHange) project and the Global Water System Project (GWSP) have recently combined their model intercomparison efforts in a joint project called the Water Model Intercomparison Project (WaterMIP), in which both LSMs and GHMs participate. WaterMIP includes both LSMs and GHMs, and many of the participating models include the possibility of taking into account anthropogenic impacts such as water withdrawals and dams. Hence, WaterMIP provides an opportunity to compare results of LSMs and GHMs, focusing on differences between the two model strategies, while additionally investigating the effects of anthropogenic impacts on the global terrestrial water balance. The aim is to improve the understanding of current and future water availability and water stress at the global scale, with an emphasis on the available water resources of major river systems at the subannual time scale. The models participating in WaterMIP cover a wide range of characteristics, ranging from physically based models run at subhourly time steps to more conceptual models run at daily time steps. An objective of WaterMIP is to bring together researchers from the climate and water resources communities, because there have been few comparisons of water balance results between these communities. The main hypothesis tested in this paper is whether there is a consistent difference in simulations of the global terrestrial water cycle between LSMs and GHMs.

Simulation setup: In this first stage of WaterMIP, the components of the contemporary global terrestrial water balance under naturalized conditions are assessed, i.e. human impacts such as storage in man-made reservoirs and agricultural water withdrawal are not included in the model runs. The spatial resolution of the forcing data and the model simulations is 0.5° in latitude and longitude, covering the land area defined by the Climate Research Unit (CRU) of the University of East Anglia global land mask. The land mask does not include Antarctica. The temporal resolution of the forcing data and model runs are model dependent, and vary from sub-daily to daily.

Model description: Six land surface models and five global hydrological models participate in WaterMIP. The models use their default soil and vegetation information and no attempt was made to standardize these parameters. A key difference between the models is whether they solve both the water and the energy balances at the land surface or only the water balance. The models differ in their choice of evapotranspiration (ET) and runoff schemes and vary substantially in complexity. Other model differences concern the complexity of the representation of runoff processes, groundwater, snow, and frozen soil. All models were run at 0.5° spatial resolution for the global land areas for a 15-yr period (1985–1999; after a 5-year spin-up period) using a newly developed global meteorological dataset. Simulated global terrestrial evapotranspiration, excluding Greenland and Antarctica, ranges from 415 to 586 mm yr^{-1} (from 60 000 to 85 000 km^3 yr^{-1}), and simulated runoff ranges from 290 to 457 mm yr^{-1} (from 42 000 to 66 000 km^3 yr^{-1}).

Results: Both the mean and median runoff fractions for the land surface models are lower than those of the global hydrological models, although the range is wider. Significant simulation differences between land surface and global hydrological models are found to be caused by the snow scheme employed. The physically based energy balance approach used by land surface models generally results in lower snow water equivalent values than the conceptual degree day approach used by global hydrological models. Some differences in simulated runoff and evapotranspiration are explained by other model parameterizations, e.g. evapotranspiration scheme, although the processes included and parameterizations used are not distinct to either land surface models or global hydrological models. The results show that differences between models are a major source of uncertainty. Climate change impact studies thus need to use not only multiple climate models but also some other measure of uncertainty (e.g., multiple impact models).

For detailed information read the original paper:

Haddeland, I., D.B. Clark, W. Franssen, F. Ludwig, F. Voß, N.W. Arnell, N. Bertrand, M. Best, S. Folwell, D. Gerten, S. Gomes, S.M. Gosling, S. Hagemann, N. Hanasaki, R. Harding, J. Heinke, P. Kabat, S. Koirala, T. Oki, J. Polcher, T. Stacke, P. Viterbo, G.P. Weedon, P. Yeh, 2011: Multimodel Estimate of the Global Terrestrial Water Balance: Setup and First Results. Journal of Hydrometeorology, 12:869-884.

World Water Week: Valuing Water – Spreading the Word

21-27 August 2011, Stockholm, Sweden (by Sina Marx)

The GWSP contribution to last year`s major water event in Stockholm was characterized by the intention to raise awareness of the most pressing issues in working for a sustainable water world: water governance, the water-energy-food-nexus and the communication between science, policy and practice.

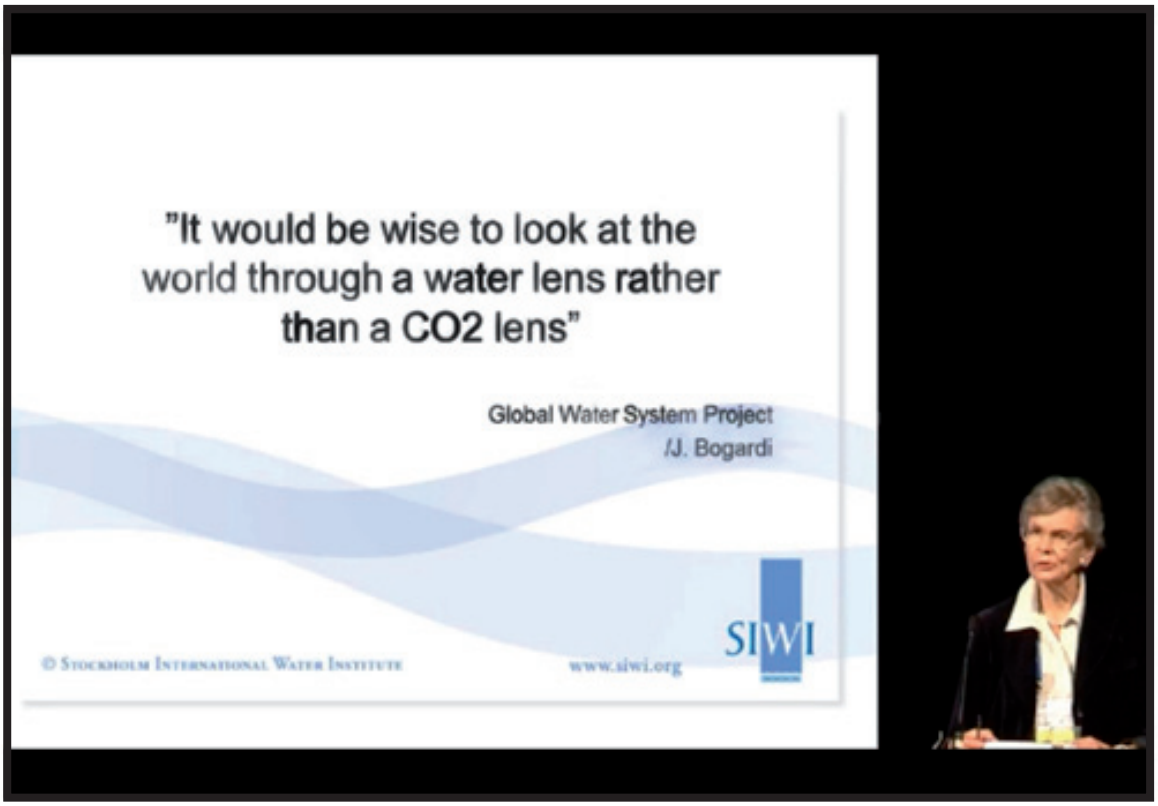
Under the title "Governing Water Wisely: Adaptive Approaches to Water Resources Management" the Twin-2Go Project (an endorsed project of GWSP) together with GWSP and other partners shared its latest insights and best practices in water governance. The seminar ended with a very lively discussion between researchers, practitioners and policy makers, which enabled a fruitful exchange of ideas. GWSP`s work towards communication between different sectors was continued with a keynote speech by Janos Bogardi in a preparatory session towards the 6th World Water Forum, "Which Water Quality for Which Uses? A Regulators' and Practitioners' Perspective", organized by UNEP, WMO and l`Academie de l`Eau.

Two joint side events with the Botín Foundation`s Water Observatory dealt with the relation between water and food security, which is likely to be one of the most imperative global issues in the immediate future. Tradeoffs that have to be made between the components of the water-energy-food-nexus have to be based on a value-driven discussion, which is often still neglected in water science and policy. The cooperation with the Botín Foundation provided valuable synergies for future work on these very timely issues – after all, the topic for the next World Water Week in 2012 will be "Water and Food Security".

Together with the Botín Foundation GWSP also showed presence with a joint booth to get in touch with scientists and practitioners from both industry and policy. Especially important was the start of the distribution of the Rio+20 Policy Brief on Water Security, of which the first batch was just printed for the event in Stockholm.

Both GWSP`s publications and events were meant as a call to acknowledge the role of water as the interlinking agent in GEC research and the necessity to put water more prominently on the global political agenda. GWSP`s success in communicating this message became apparent in Prof. Falkenmark`s overarching summary on the last day of the event, which closed with a quotation from GWSP Executive Officer Janos Bogardi (see picture below).

The following members of GWSP community were active in Stockholm: Janos Bogardi (GWSP-IPO Executive Officer), Claudia Pahl-Wostl (GWSP Co-Chair), Holger Hoff (PIK/SEI) and Sina Marx (GWSP-IPO).



Summary of the Workshops by Malin Falkenmark citing Janos Bogardi, GWSP Executive Officer

GWSP 9th Scientific Steering Committee Meeting 2011

18-19 October 2011, Xi'an, China (by Eva Flinkerbusch)

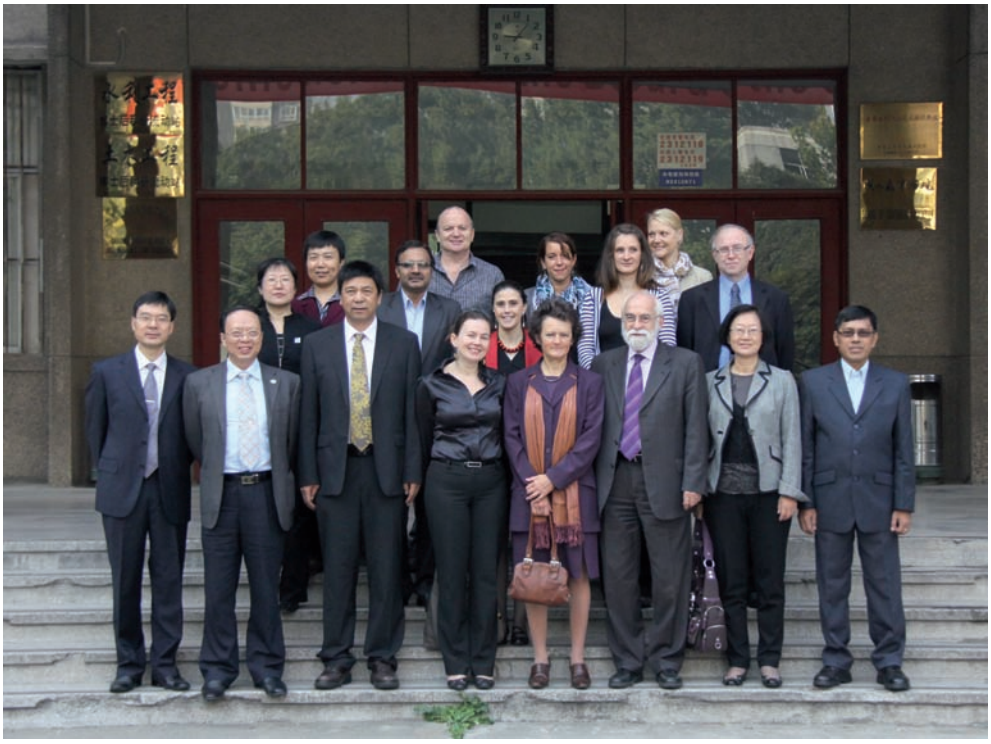
The annual Scientific Steering Committee (SSC) meeting of GWSP was held in October 2011 in Xi'an, China, prior to the GWSP co-sponsored international conference entitled "International Symposium on Impacts of Climate Change on Water Resources in Arid and Semi-arid Regions" (21-23 October 2011) with an embedded GWSP workshop (see page 12). This event was conceived and organized by the Asian node of GWSP.

Addressed were the following lines of activities: As GWSP is now approaching the end of its 10-year-long first phase GWSP is focusing on its "harvest period" with highly relevant scientific publications, events, conferences, policy documents and awareness-raising brought forward by the three Integrated Study Areas (ISAs) of GWSP, the Global Scale Initiative (GSI), the Global Catchment Initiative (GCI) and the Global Water Needs Initiative (GWNI) as well as by its expertise in Global Water Governance (GWG). It is also a period of intensive strategic planning. The future of "water science" in general, and that of the GWSP in particular, have to be analyzed both in the context of policy and science challenges and the increased attention paid to the global dimensions of water. The need for more inter- and transdisciplinary, cross-cutting and policy-relevant research is evident both through high profile multiple stakeholder conferences such as the Stockholm World Water Week (August 2011) or the Bonn Conference on "The Water, Energy and Food Security Nexus: Solutions for the Green Economy" (November 2011; constituting a preparatory conference for the United Nations Conference on Sustainable Development, Rio+20), and in the various science, policy and priority documents. The need for new knowledge and innovative approaches will be further emphasized by forthcoming events in 2012.

The following two years 2012 and 2013 make up the so called main "harvesting" period of GWSP. Presence and participation of the GWSP at the 6th World Water Forum in Marseille and then at the GEC conference "Planet under Pressure" in 2012, are among the highlights, together with the publication of the follow-up electronic book "River Basins and Change" of the 2010 GCI conference and a workshop in Winnipeg in Spring 2012 to evaluate the results of the ongoing 2nd phase of the GCI initiative. In 2013, a comprehensive GWSP science conference is planned. Last but not least GWSP continues the revitalization of the online GWSP Digital Water Atlas with open source software to be installed on a virtual machine and start the transfer to the future host, the German Federal Institute of Hydrology (BfG).

During its session the SSC has reviewed the developments of the global environmental change research field both in terms of institutional challenges and emerging research needs and mandated the International Project Office to draft a strategic plan for the forthcoming GWSP "harvest period 2012-2014" and to outline how the global scale water research could evolve beyond the present life cycle of GWSP. This GWSP "strategy paper", a kind of rolling document was finished after having received feedback from the SSC by the end of the year 2011 and will be used as a guide for the coming transitional period of global environmental change research.

A detailed summary of the meeting by Richard Lawford and presentations held are to be found at:
www.gwsp.org/100.html



Participants of the SSC Meeting 2011 in Xi'an, China

Detection of Non-stationary Hydrological Processes and Adaptive Water Resources Management under the Changing Climate

GWSP Workshop, 21 October 2011, Xi'an, China (by Felino Lansigan, Sharad Kumar Jain, Jun Xia)

As decided at the 8th GWSP SSC meeting held in Bonn, Germany, 2010, a workshop on "Detection of Non-stationary and Adaptive Water Resources Management in a Changing Climate" was organized at the University of Technology, Xi'an, China. Altogether 20 experts from Europe (Germany, Italy, Switzerland), North America (Canada), and Asia (China, India and Philippines) attended the workshop.

Felino Lansigan reports about the workshop at the conference closing session

Session One "Impacts of Climate Change on Water Resources in Arid and Semi-arid Regions I", chaired by Felino Lansigan, focused on flood management and adaptation to climate change.
Session Two "Impacts of Climate Change on Water Resources in Arid and Semi-arid Regions II", chaired by Richard Lawford, focused on the assessment of regional water resources and impact of climate change. Session Three "Impacts of Climate Change on Water Resources in Arid and Semi-arid Regions III", chaired by Sharad Kumar Jain, focused on trend analysis, drought characteristic and uncertainty.

After a discussion the following main points emerged:
• Need for differentiation between detection and attribution;
• Availability of reliable and representative data should be ensured that climate change studies could be taken up;
• Change in hydrologic regime is not necessarily due to climate change, other factors are also important. A case study from Germany clearly demonstrates this;
• Methodologies for analysis of climate change trends, uncertainties, sources of uncertainties, non-stationarity, etc. needs to be refined and standardized so that the results can be compared across the studies;
• Copula modeling approach has been found to be very useful in study of extreme events, e.g. drought analysis in China. Its applicability needs to be explored;
• More research on quantifying uncertainty is needed;
• Studies pertaining to detection of non-stationarity and non-linearity, as demonstrated through a case study from Canada, need to be taken up at regional and local levels;
• Climate change adaptation strategies are required to be developed and implemented;
• Studies on extreme events at global, regional, local scales are needed;
• Methodologies for downscaling, detecting non-stationary, frequency analysis accounting for non-stationary is needed; time dependent probability distribution functions to estimate return period.

Highlights of the panel discussion have been summarized in the following:
• Climate of the Earth has always been changing and will continue to do so. Governments accept it but it is one of the challenges that they are facing. They are facing many other pressing concerns, e.g., population increase, financial issues, etc. Climate change and sustainable water management has to be mainstreamed in political agenda and governance through knowledge - and science-based approaches.
• Analysis of scenarios involving time span of 50-100 years is not of much interest to decision makers whose immediate concern is to address the issues arising now. They want scientific advice on what to do over the next 5-10 years and scientists should be able to provide these answers.
• How to present uncertainties in planning, engineering design, and operations to the designers and managers so that they are convinced about it and incorporate it in planning and design, etc.?
• People have to be made aware that risks are associated with climate science and humans can apply limited controls to provide safety against extreme events. Thus the society has to learn how to manage the extreme events and live with them.
• More research is needed on how uncertainty can be made a part in planning and analysis (e.g. land use plan), engineering design (e.g., drainage design) and operations.

Determining Sustainable Environmental Flow Requirements (EFR) and resulting Challenges for Water Management and Governance

Workshop of the Global Water Needs Initiative (GWNI), 14-16 November 2011, Bonn, Germany (by Claudia Pahl-Wostl)

Population increase, economic development and globalization, as well as great uncertainty about the impacts of climate change, and their effects on land and water use are placing considerable pressure on freshwater resources and the ecosystems that they sustain. In many countries and basins the state of aquatic ecosystems and their functions and services has been deteriorating, with detrimental influence on human well-being (Millenium Ecosystem Assessment, 2005; Dudgeon et al., 2006; UNEP 2011). This has raised increasing global concern about the need for sustainable water and land management in an era of rapid change and persistent water and food insecurity (Molden, 2007; Boelee 2011). Effects of the above drivers on water resources include changes in river population growth and an increasing per-capita consumption coupled with changes in water availability (further exacerbated by climate change), may result in reduced flows, shifts in flow regimes, also entailing more frequent extreme events, water demands surpassing renewable supply, and reduced access to water of sufficient quality. Under such constraints human water demands are generally served at higher priority than ecosystem water needs. However, with freshwater biodiversity and ecosystems disappearing much more rapidly than the terrestrial ones, we are losing essential services such as fish production, water purification, carbon sequestration, nutrient cycling and resilience against shocks. Drivers behind this loss of freshwater ecosystems include water abstraction, dams, pollution, land use and climate change.

The development of the environmental flow concept is a response to these challenges. Environmental flows can be defined as the "quantity, timing and quality of water flows required to sustain freshwater and estuarine ecosystems and the human livelihoods and well-being that depend on these ecosystems" (Brisbane Declaration 2007). The definition entails a normative claim, namely that environmental flows should be maintained and balanced with other human water uses to guarantee the long-term sustainability of water resources management and equitable sharing of benefits from water and ecosystems. The EFR concept can provide the base to establish aquatic ecosystems as one legitimate user of water, or in several national contexts as the resource base itself, in a larger International Water Resource Management context (IWRM, e.g. Naiman et al. 2002).

Human water demands generally have a higher priority than ecosystems

Implementing the environmental flows concept in policy implies rules to be established that link water flow patterns to a certain state of aquatic ecosystems and the services humans derive from them. Early approaches to define minimal average flow requirements adopted in many developed countries and were gradually recognised as being considered too simplistic to support ecosystem processes and needs for water flows (Tharme, 2003). Since then the importance of daily, seasonal, and interannual variations in water flows has been recognized and scientifically established (e.g. Poff et al., 1997; Bunn and Arthington, 2002) and different more elaborate EF methodologies have been developed and applied in the study of individual river basins around the world.

What is missing is a globally applicable methodology for determining and implementing EFRs that are sustainable in environmental, economic and social terms. Such a methodology should allow for a globally consistent approach across different climates, ecoregions and aqua-

tic ecosystem types, different societies and water needs, levels and types of anthropogenic modification and water use (e.g. reservoir and dam constructions, abstractions, return flows, changes in water quality), and management goals. It would facilitate the integration of EFRs in IWRM plans for river basins and in global water assessments. It would also allow analyzing potential and limitations of transferability of lessons learned from developing and implementing EFR policies in various regions of the world.

Experience with assessing EFRs at river basin scale for different eco-hydrological and socio-economic conditions to support operational water resource planning and management has shown that two major bottlenecks for their successful implementation are the inadequate involvement of stakeholders and the lack of appropriate governance structures for effective implementation (Dyson et al., 2008; Le Quesne et al. 2010; see also Poff et al. 2003) on the need to involve stakeholders from the outset). What is a desirable state of surface waters and associated aquatic ecosystems and their services, in the context of all other benefits derived from the available water resources, at local, regional, national or global level, is a societal decision. Hence, any assessment of sustainable EFRs at any scale must include an analysis on who decides/should decide, based on which kind of trade-off analysis and evidence and must be participatory. Furthermore, given the complexity of the relationships between water withdrawals, impoundments, land uses, river flows and their variability, biodiversity, and functions and related services of aquatic ecosystems, any kind of governance system and resources management that encompasses EFRs designed to implement sustainable environmental flows has to be adaptive (learn from experience, respond to unexpected developments) without sacrificing the achievement of targets. Hardly any systematic research is available on the relationships outlined above, except maybe some individual case studies.

Our approach aims at providing major progress in developing an integrative conceptual framework for determining sustainable EFRs and deriving therefrom a universally applicable classification system for sustainable EFRs based on eco-hydrological, as well as socio-economic, governance and management characteristics. This would allow assessing potential and limitations of transferability of insights from one case study to another. The classification system can serve as the base for a meta-analysis of existing empirical evidence and support an improved representation of EFRs in global assessment models. It should be tested in a suite of connected case studies.

In particular the following questions have been addressed in the workshop:

- Which approach and which criteria allow for determining sustainable EFRs?
- Which scale and spatial resolution is appropriate for determining EFRs?
- What are potential classification criteria and dimensions of classification respectively the integrative conceptual framework?
- What are the goals and potential outputs of the classification respectively the integrative conceptual framework?
- How can the different scales of decision-making be addressed that shape multi-level governance structures and public policy processes?
- What are the key factors that influence decision-making?
- What are the points that have to be considered within decision-making?
- How can change be supported and triggered and how can the performance of change be measured?

This workshop, a part of the Global Water Need Initiative led by Claudia Pahl-Wostl, was organized by the GWSP IPO. The workshop initiated the preparation of a review paper on the state of the art and the search for funding to advance the development of a globally applicable conceptual framework for determining sustainable EFRs.

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Water Resources Award of the Rüdiger Kurt Bode - Foundation goes to Claudia Pahl-Wostl, Co-Chair of GWSP SSC

This well endowed sponsorship award of 100.000 Euro goes to Claudia Pahl-Wostl as an outstanding scientist within the research field global water resources management. The jury chose Claudia Pahl-Wostl among numerous nominations.

The pressing issue of water shortage will influence global development within the next decades. The main reasons for that are population growth, climate change and not sustainable water resources management. One third of the worlds' population already lives in water stress areas. With this award the Bode-Foundation honors outstanding scientists focussing their interdisciplinary and practice-oriented studies on the development of strategies and concepts for a sustainable use of the global water resources at the interface between science and society.

The Bode-Foundation was established in 2009 by Rüdiger Kurt Bode, a pharmacist and enterpreneur from Hamburg, Germany, to advance interdisciplinary research in the field of life- and natural science.

GWSP involvement: 6th World Water Forum, 12-17 March 2012, Marseille, France

Since 1997 every third year the World Water Forum mobilizes creativity, innovation, competence and know-how concerning water. The previous five World Water Fora have placed water on the international political agenda and contributed to a global awareness of water issues.

This year GWSP will convene a 2-hour long panel session (session Conditions of Success CS 3.3.7) on "How to characterize the Future for a Sustainable 'Water World'?". Global change and development needs precautionary policies and solid planning for the future. Due to our inability to forecast the future scenarios have been increasingly used to characterize the future. Sectoral scenario development however yields incomparable results. The lack of coordination may undermine the usefulness and credibility of scenario based planning. At this juncture, and from the perspective of the "water world" the mushrooming scenario scene is to be revisited. Multistakeholder dialogue and consensus, common scenarios, the best available knowledge, data and insights are needed to put "scenarioing" on solid footing. The concrete target of this session is to initiate an active community of scenario developers to conceive and to develop comprehensive scenarios for the "water world" synchronized with other scenarios initiatives. Additionally GWSP is represented in the Exhibition hall with a information booth.

E-Book Launch „River Basins and Change", a joint endeavour of GWSP and UNESCO-IHE

GWSP together with UNESCO-IHE present a new publication, an E-Book entitled "River Basins and Change" containing the major contributions to the international conference on "The Global Dimensions of Change in River Basins – Threats, Linkages and Adaptation", organized within the Global Catchment Initiative (GCI) of the Global Water System Project (GWSP) in Bonn, Germany, December 2010. Addressing especially graduate students and young professionals in the field of freshwater research, the book is meant as an introduction to the issues, debates and contributions of the conference. Selected contributions, both keynote presentations at the plenary sessions, but also submitted papers were edited by Janos Bogardi, Executive Officer of GWSP, University of Bonn, Jan Leentvaar (UNESCO-IHE), Delft and Hans-Peter Nachtnebel, University of Life Sciences (BOKU), Vienna with the assistance of Sina Marx and Eva Riedke of the GWSP International Project Office. The book is prepared as a joint endeavor of GWSP and UNESCO-IHE. Contributions are grouped into three "thematic blocks" focusing on:

- Global change and river basins

This includes analyses of the drivers and impacts of global change, involving climate change but also that of population dynamics, socio-economic development, land use change and related processes.

- Accounting for water and river basins

Under this part methods of water balance at basin, national and global scales are highlighted. They account for the links between water management and global trade and economics but also water quality. Water availability, its

changing spatial and temporal distribution and role in water security is a core subject with particular emphasis on the links between water and food security.

- Governance and river basins

This part deals with issues of how societal structures and values influence evaluation, development, selection and implementation of options regarding allocation, use and protection of water and related resources at basin, national and international scales. Further the summary of the "Science meets Praxis" panel discussion of the GCI Conference adds insights into the intriguing aspects of how to transfer and benefit from scientific results in real world water resources governance and management in large river basins. The book is completed with a glossary and short explanatory boxes on several key issues of the contemporary water science and international water debate.

The book is devised as a free publication in digital form to achieve maximum outreach and accessibility, especially considering recipients from developing countries.

The book can be downloaded free of charge:
www.gwsp.org

GWSP Involvement: „Planet under Pressure (PuP): New Knowledege towards Solutions", 26-29 March 2012, London, England

The international „Planet Under Pressure" conference will focus the scientific community's and the wider world's attention on climate, ecological degradation, human well-being, planetary thresholds, food security, energy, governance across scales and poverty alleviation. The conference will discuss solutions at all scales to move societies on to a sustainable pathway. It will provide scientific leadership towards the 2012 UN Conference on Sustainable Development - Rio+20.

GWSP is involved in a 90 minutes session within Day 2 Programme (Options and Opportunities) called „Water: Integrated assessment, governance and management in changing conditions at global, regional and transboundary levels" co-chaired by Janos Bogardi. The two keynote speakers are GWSP SSC Co-Chairs Claudia Pahl-Wostl and Charles Vörösmarty. This event is co-orginized by: Research Institute for Humanity and Nature, Japan; Stockholm International Water Institute SIWI, Sweden; UNESCO International Hydrological Programme (UNESCO-IHP), France; Chinese Academy of Science, China; Global Energy and Water Cycle Experiment (GEWEX-WCRP), USA; Earth System Governance Project (ESG-IHDP,) Sweden; UNESCO Internationally Shared Aquifer Resources Management (UNESCO-ISARM), France; International Association of Hydrogeologists (IAH), UK and the Integrated Water Resources Management Division at the Organization of American States (OAS), USA.

Water, its availability, quality, consumption, management and governance form the core of this session. It explores the interface of physical and governance science as far as water, its occurence and sustainabale use and its long-term security is concerned. An integrated spatial perspective approach is proposed that ranges from global through national/regional basin scales along with a disciplinary perspective that covers social and natural science as well as water resources management and engineering.

GWSP Blog posted at PuP website on water security by Eva Flinkerbusch

20 years after Rio little progress was made on Integrated Water Resources Management (IWRM). In fact, worries about 'water security' resound throughout the world these days. Whereas IWRM promoted water management to maximize economic growth, sustainable agricultural development, democratic participation in governance and health improvement without compromising the sustainability of ecosystems and the environment, the term water security implies "the availability of an acceptable quantity and quality of water for health, livelihoods, ecosystems and production, coupled with an acceptable level of water-related risks to people, environments and economies." In a nutshell: The plot thickens. We simply cannot continue to use water as wastefully as we have so far.

The problem of water scarcity is going to escalate worldwide in the foreseeable future. Climate change is alrea-

dy changing precipitation patterns, with increased risk of droughts and floods. Global warming is causing glaciers to melt, which has enormous implications for many major river systems. Even though global warming and a potentially accelerated hydrologic cycle dominate the water-related climate change debate, many other - arguably more direct - anthropogenic factors redefine the state of rivers and drainage basins that supply freshwater to society. Especially widespread land use changes and pollution as well as population growth, urbanization, industrialization and last but not least poor water management affect large numbers of people and many ecosystems. According to a nature article entitled 'Global threats to human water security and river biodiversity' threats to human water security and aquatic biodiversity are highly coherent. This linked human water security-biodiversity water challenge must be also addressed in our quest for sustainable development.

All this has increased the awareness of uncertainties, the complexity of the systems to be managed, the need for changes in policy and management paradigms, as well as governance systems. Governments must lead the way in setting frameworks for improved water management while stakeholders on all levels have to be involved in finding and implementing solutions. Scientists have to provide and communicate the knowledge, information and options for action in a comprehensive way.

In order to provide knowledge leading to sustainable development, poverty eradication, and environmental protection in the face of global change, a list of the highest priorities for Earth system research, the so-called five grand challenges have been identified by the International Council for Science (ICSU) visioning process. These priorities for Earth system research provide an overarching research framework for scientists. But, once more, science cannot solve the water crisis without societal engagement and political will. Scientists and policy makers have a joint responsibility to work together in the development of more sustainable solutions to existing and emerging water problems. Action has to be taken now.

The original Blog is to be found under: http://www.planetunderpressure2012.net/blog.asp

Global Catchment Initiative (GCI) Workshop, 3-4 May 2012, Winnipeg, Canada

In its 2011 report, the World Economic Forum identified the Water-Energy-Food (W-E-F) security nexus as one of the greatest threats to the global economy and sustainable development over the next few decades. The W-E-F nexus refers to the tightly interwoven cluster of risk that links global water, energy and food systems. The Rio+20 conference in June 2012 will be developing plans for a green economy that will address the management of water, energy and food along with other issues such as climate change, health and biodiversity. A great effort is needed to identify and implement changes that will be needed to move from our conventional approaches of water management, energy use and food production to a new paradigm built around sustainable development. In order to address the W-E-F nexus the Water Innovation Centre of the International Institute for Sustainable Development (IISD) is collaborating with the Global Water System Project (GWSP) to host a conference on Water-Energy-Food Security on 2-4 May 2012. The conference will feature international experts and opinion leaders, policy makers and scientists who will discuss the nature of water management problems affecting food and energy security and review possible pathways to adapting water management practices to foster a sustainable approach to the development of energy and food resources. The conference is a three part event. The first workshop, led by IISD's Water Innovation Center will introduce the water-food-energy security nexus, its relationship with river basin management, and illustrate integrated solutions based on bioeconomy principles. The second workshop will be led by GWSP on 3-4 May 2012. GWSP has identified the W-E-F nexus as a critical science-policy interface issue in nearly every river basin in the world. It has undertaken a survey of 18 major river basins across the globe to explore all dimensions of this issue. The basins that will be reported cover 6 continents and include Amudarya, Danube, Elbe, Incomati, Jordan, Lake

Winnipeg, Mekong, Mississippi, Murray Darling, Nile, Okavango, Orange, Volta, Yellow, Rio del Plata and Huai River Basins. The survey addressed a wide range of issues starting with the perspectives on the goals of water management and whether it was oriented to supporting energy and agriculture or it was directed at other goals. During this needs analysis workshop, findings from this survey will be reported along with insights from scientific experts and basin managers on key management issues. The workshop will result in a synthesis that will provide a basis for assessing the options proposed for managing water to promote energy and food security. The conference will conclude with a seminar on the policy implications of river basin management for water, energy and food security.

iidd Institut international du développement durable / International Institute for Sustainable Development

GWSP IPO Transitions

Obituary Konrad Vielhauer, GWSP Scientific Officer *24 April 1957 † 8 December 2011

KONRAD VIELHAUER was born and raised in Addis Abeba, Ethiopia, where he graduated from high school in 1976. After returning to Germany he studied agronomy at the University of Göttingen, Germany, which he successfully finished in 1985. In 1992 he obtained his doctorate degree from the University of Göttingen, Germany, too. Being a tropical agronomist by training he subsequently was involved in soil physical questions of fallow management systems in southern Nigeria, where he worked for the International Institute of Tropical Agriculture (IITA). Afterwards he moved with his family to the Eastern Amazon region in Brazil. Within a collaboration of the two German universities of Göttingen and Bonn with the Brazilian Agricultural Research Corporation (Embrapa) he continued and intensified his work on fallow management systems under high rainfall conditions. Prior to his work at GWSP IPO he worked as a research center manager and as scientific coordinator of the GLOWA-Volta project for the Center of Development Research (ZEF) of the University of Bonn in Burkina Faso since 1999. This was in collaboration with the Burkinabe Institute of Agricultural and Environmental Research (INERA) and later with the newly founded Volta Basin Authority (VBA). From March 2009 onwards Konrad Vielhauer coordinated GWSP's activities in support of the executive director. His substantial experience in coordinating scientific projects and in organizing international conferences as well as his pleasant personality was very much appreciated by his colleagues and the whole GWSP community. He was always happy to share his knowledge and experience with colleagues and students. Konrad Vielhauer passed away at December 8th 2011 in Bonn, Germany. He suffered from cancer, which finally caused his untimely death. He is survived by his wife Stefanie and his five children. Konrad will be remembered with fondness for his warm personality and devotion to science and his family. He was a true gentleman and will be greatly missed.

GWSP IPO Staff Transitions

- EVA FLINKERBUSCH, GWSP part-time research assistant since June 2010, has been appointed to the position of a research associate on a full-time basis in October 2011.
- ANDREA MEYN, GWSP associate science officer from May 2011 to January 2012 recently left the GWSP IPO for a new job at the German National Academic Foundation. We wish her all the best for her future career!
- SINA MARX, GWSP part-time student assistant since November 2009, became research associate in February 2011 on a full-time basis as she finished her studies of anthropology, politics and malay studies with honors.

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Organizational Framework

The Global Water System Project (GWSP)

- GWSP is a Joint Project of the Earth System Science Partnership (ESSP) consisting of four Global Environmental Change Programmes: the International Geosphere- Biosphere Programme (IGBP), the International Human Dimensions Programme on Global Environmental Change (IHDP), the World Climate Research Programme (WCRP) and DIVERSITAS, the international programme of biodiversity science.

- The mission of GWSP is to understand the ways in which humans use the resources and influence the dynamics of the global water system and to advise decision-makers on how environmental and social consequences can be mitigated.

Our Mission

Earth System Science Partnership

DIVERSITAS an international programme of biodiversity science

GLOBAL CHANGE IGBP

IHDP International Human Dimensions Programme on Global Environmental Change

WCRP World Climate Research Programme