



CONFERENCE REPORT

**International Conference on
Integrated Water Resources Management**

Management of Water in a Changing World: Lessons Learnt and Innovative Perspectives

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Conference report

1. Introduction

On October 12 & 13, the international conference on Integrated Water Resources Management (IWRM) "Management of Water in a Changing World: Lessons Learnt and Innovative Perspectives" took place in Dresden, Germany. The conference was sponsored by the German Federal Ministry of Education and Research (BMBF), supported by the International Water Association (IWA) and the Global Water Systems Project (GWSP) and organised by the Helmholtz Centre for Environmental Research (UFZ). 365 participants from science and practice from 40 countries discussed lessons learnt and innovative perspectives of IWRM concepts and their implementation in more than 20 technical sessions, international key note speeches, a high level panel discussion and a two-day poster session.



Wilfried Kraus of the Federal Ministry of Education and Research (BMBF) during his inaugural address

(Photo: Klaus-Dieter Sonntag)

all participants) took part in an online survey and subsequently formulated a community statement on lessons learnt and innovative perspectives. Important information has also been drawn from the key note speakers presentations and from interviews conducted with eight key contributors such as Wilfried Kraus, the Deputy Director General of "Sustainability, Climate, Energy" from the German Federal Ministry of Education and Research (BMBF) and Bai-Mass Taal from AMCOW, the African Ministers' Council on Water. Finally, one important source was a statement prepared by the steering committee for the international conference in Bonn on "The Water, Energy and Food Security Nexus".

This report is highly subjective: The discussions and opinions are often subjective interpretations of facts, the relationship between science and practice which was discussed at the conference being an example. The leading and junior rapporteurs were also asked to make personal statements on the innovative lessons learnt and future perspectives rather than making sophisticated summaries of the conference contents. The extract of ideas made in this report is also based on a subjective view of different information sources and thus does not form an objective factual analysis.

This report aims to summarize the most important results from the conference based on six sources: Firstly, junior rapporteurs participated in the thematic sessions and made notes on the session results with respect to leading questions. Secondly, the leading rapporteurs of the thematic sessions each gave a five minute statement at the end of the conference, including a personal key message on the respective topic. Thirdly, more than 80 conference participants (approx. 25% of

We would like to present the conference results using the following structure, showing a consecutive level of generalization: On a first level, forming a low degree of generalization, we present topic-related insights based on the reports from both junior and leading rapporteurs (chapter 2). On a second level, we attempt to link the respective topics to one another, a task which is based on the observations made by the junior rapporteurs (chapter 3). On a third level, representing the highest degree of generality, we show some general challenges for IWRM such as energy supply and climate change which were emphasized in various sources (chapter 4). Concluding, we look at the often mentioned challenge of implementation and particularly at the science-policy interfaces which takes all previously mentioned levels into consideration (chapter 5).

2. Conference topics

Sustainable water resources management is based on integrated knowledge from different disciplines and sectors. Against this background, we present some core insights on seven identified scientific topics that were discussed during the conference (see Figure 1). These lessons learnt and future perspectives, mentioned below, are based on information given by the junior and leading rapporteurs.

Figure 1: IWRM Topics at the conference on "Management of Water in a Changing World: Lessons Learnt and Innovative Perspectives", 12–13 October 2011, Dresden, Germany.



2.1 Technologies and Implementation

Technologies and their implementation represented a core area of the discussions during the IWRM conference. In the sessions the talks ranged from i) adapted technologies for specific IWRM-problems such as water supply in climatically extreme conditions and ii) the process of implementation to iii) the challenges faced when maintaining technologies in the long term in developing and emerging nations.



The iPIT (Inspired Personal Innovative Toilet) of the project IWRM Mongolia was presented during the conference exhibition (Photo: Klaus-Dieter Sonntag)

On the topic of technological innovation, Univ.-Prof. Dr.-Ing. Jörg Londong stated that only a few new technologies were presented whereas more traditional technologies were demonstrated that had been applied in a new environmental context such as adapted water treatment and supply technologies. In this context, it was stressed that all water components, particularly the re-using of wastewater must be given due consideration. It was also emphasized that flexible rather than fixed technologies are needed in order to achieve sustainable solutions. On the topic of implementation in the short and particularly in the long term, it was repeatedly pointed out that technologies cannot stand on their own but must be embedded in an enabling environment associated with extensive stakeholder participation and adequate Capacity Development measures such as workshops, on-the-job trainings and education. International cooperation with long term perspectives has also been highly recommended for the maintenance of technical solutions.

It was suggested at the conference that in the future, existing technologies must be adjusted and adapted to new purposes and local conditions, in parallel to the development of new technologies. Improved monitoring and evaluation of technical measures are also required, whereby a technical evaluation is just a first step in the evaluation process and must be complemented by surveys on acceptance in local communities. Finally, it was highlighted that more efficient and flexible technological solutions are needed for today's fast growing megacities and populations.

2.2 Water Resources in Changing Environments

The topic of Water Resources in Changing Environments was discussed in two sessions. Core issues addressed during the sessions related particularly to the effects of climate change, urbanization and human water uses such as agricultural intensification, irrigation and the storage of water in different spatial entities (from the basin to continental scale).

The following aspects were particularly emphasized: Firstly, the gathering of data is a key factor for successful IWRM, however data is still scarce in many regions and often particularly so in areas where IWRM is most urgently required. Secondly, it has been highlighted that there is a strong need for a better understanding of processes. Thirdly, essential methods were discussed, for example integrated computer modelling in order to depict the various effects of changing environments on water resources and scenario techniques for evaluating

different future pathways. It was pointed out that a range of methods must be used as water-related problems vary over different regions and scales.

The development of better models (e.g. with links between socio-economic and ecosystem models) and environmental change scenarios remains a core challenge for the future. Further, some participants questioned how the disparity between models designed for larger spatial scales and real world



water problems found on the small scale can be overcome. Thus the fundamental question – raised by the leading rapporteur of the topic, Dr.-Ing. Martina Flörke – still remains: Are models really capable of representing the reality of IWRM and if they are able to do so, how can this information be communicated and translated into practice?

Coping with drought and aridity is a major challenge for IWRM

(Photo: A. Künzelmann / UFZ)

2.3 Information and Decision Support Systems

The topic of Information and decision support was highly relevant at the IWRM conference. In two sessions, scientists and practitioners discussed different information management systems and decision support tools as well as their practical use in achieving IWRM. Special attention was paid to questions on the information required by such a system and on the structure of the developing process for such tools.

The following tools were presented and discussed: GIS databases, manuals and planning maps, the MONERIS model, the Water Evaluation and Planning System (WEAP), a semantic IWRM Wiki, a digital multimedia atlas in different languages and a technology tool-kit with information material and tools inside a physical box. Prof. Dr. Stefan Kaden, the leading rapporteur of this topic, also underlined that “there is no unique approach for decision support systems” and that the choice of system is highly dependant on the study area. It was further emphasized that decision support tools often do not need to be developed from scratch; existing tools can and should often be adapted to local conditions. Water managers frequently fail to use decision support tools and information management due to knowledge deficits and a lack of participation in the tool design process. Practical problems such as limited internet access for stakeholders are also common.

Looking to the future, the online questionnaire respondents rather agreed that decision support tools require further development in order to achieve IWRM. In this context, some individuals at the conference particularly highlighted the following challenges for the future: On the technical side, they demanded better models based on more reliable and improved data. Future models should have an improved processing of uncertainties in global change such as climate, socio-economic and land use change. More complex models should serve the increased demand for an integrated approach and integrate interacting processes in catchments, and should also be capable of processing contradicting management objectives. On the other hand, one participant suggested that decision support systems “need simplification for pre-planning phases where data availability is

scarce". It has also been noted that the development of more meaningful indicators for decision support is required. Generally it will require some effort in order to implement operational management rules in a generalised and user-friendly form.

2.4 Capacity Development

Capacity Development (CD) in IWRM and social learning theory was discussed in two sessions. Central questions that were addressed were related to the role and design of CD processes in IWRM, with a special focus on the experiences made by projects funded by the Federal Ministry of Education and Research (BMBF) in the funding priority IWRM.

The following conclusions are highlighted as a result of the discussion: Firstly, the participants stressed that there is a need for targeted and coordinated CD on all levels (in particular academic, administrative and technical) and for all age groups. Secondly, cultural specificities must be respected when designing and implementing CD measures. Thirdly, the scientific evaluation of specific CD measures needs further development. CD measures for the settlement of disputes must also be boosted in order to support IWRM. Conference participants also stressed the importance of CD for researchers for the development and implementation of innovative IWRM solutions. Specialists with a well-founded interdisciplinary education are necessary as a lack of these skills may lead to an insufficient handling of complexity. This interdisciplinary IWRM education could already start at school level and was also strongly supported by those participating in the online questionnaire.

Dr. Steffen Niemann, the leading rapporteur on CD, emphasized that despite many good initiatives on CD, there is a need for better cooperation and coordination between different actors e.g. universities and associations, and that this represents an essential requirement for the future. More attention must thus be paid to new media and tools which are often underestimated, such as trade fairs.

2.5 Water Governance



Panel discussion on lessons learnt and innovative perspectives
(Photo: Klaus-Dieter Sonntag)

What can be learned from examples such as the EU Water Framework Directive? How do political and institutional changes effect the solving of water-related problems? And what causes conflict and cooperation over water resources? These and other questions were discussed during three governance related sessions.

The results are highlighted in the following points: First and foremost it was stressed that there is no one-size-fits-all approach, as there are for example major differences

between developed and developing nations. The EU Water Framework Directive is thus not easily globally applicable, especially in some Eastern and Southern Non-EU countries. Secondly, the concept of participation was particularly highlighted by the online survey participants, in addition to concepts and theories such as new institutional economics,

power relationships, liberal functionalism, polycentric governance approaches and political economy. The participation of all stakeholders, including the local population, in the design and implementation of IWRM measures and the decentralization of funds and functions etc. was demanded. The leading rapporteur on governance, PD Dr. Heike Walk suggested that the BMBF should establish more control mechanisms for good performance in participation and coordination in addition to sanctions with the aim of supporting IWRM solutions. Thirdly, a number of specific governance constraints for IWRM solutions were highlighted by some individual conference attendees: Even if legally binding rules exist, they are often hindered to implementation due to overlapping competencies between different administrative bodies, e.g. from financial, environmental and agricultural sectors. Further administrative constraints that were mentioned relate to institutional separations between ground and surface waters and between water quantity and water quality issues. The online questionnaire respondents also rather agreed that existing institutions are often overburdened with the complex task of efficiently coordinating different sectors of society in order to achieve IWRM.

The conference participants identified several challenges for the future in both scientific and practical issues. On the scientific side, a better understanding is required of the role of third parties in water cooperation and of EU experiences in developing and transition countries. Multi-level-governance, which also includes the transboundary dimension, remains an underdeveloped field of research in the water sector. Comparative analysis is an important methodological approach here. In practise, overlapping responsibilities and weak, inappropriate governance structures were highlighted in the online survey. The establishment of adapted institutions thus remains a major challenge for the future.

2.6 Groundwater Management

The topic of Groundwater Management was discussed in three sessions. A focal point of the discussions was the issue of sustainable groundwater management in areas where groundwater resources are overexploited by irrigated agriculture. A second major point in the discussions was the link between ground and surface waters and the combined management of both.

For the sustainable management of groundwater resources, the following points were highlighted: (1) Managed aquifer recharge is a tool for solving problems around shrinking and low-quality groundwater resources; (2) in order to manage karst aquifers, extensive hydrogeological basic research work is necessary in order to understand the system, in addition to a combination of active and passive management strategies; (3) in order to maintain

the quality and quantity of groundwater resources, precise criteria must be determined and vulnerability assessments conducted prior to the implementation of further measures in stressed ecosystems. On the topic of conjunctive use and management, coupled groundwater-surface water models were presented which simulate interactions between resources.



A handpump in a village in central Benin
(Photo: A. Usbeck)

For science, the development of adaptive groundwater management strategies which define groundwater allocations using a combination of groundwater level measurements, numerical groundwater models and water balance approaches remains a central challenge. Aspects of water quality and quantity must also be taken into consideration more often. Moreover, the implementation of different management approaches remains a challenge: The problem is that tools such as groundwater flow models lack the capability for implementing operational management rules in a generalised and user-friendly form. Political, institutional and economical restrictions also hinder the implementation of groundwater strategies. In this context, Héctor Garduño underlined that the “hidden resource” groundwater is often overlooked by political decision makers.

2.7 Economic Instruments

Economic instruments for achieving financially sustainable water resources management were a highly relevant topic at the IWRM conference. Issues that were raised during the three sessions on the topic concerned the financing of IWRM measures, in particular the payment of water ecosystem services and the contribution of businesses to IWRM, but also the question of quantifying the economic value of ecosystem services.

It was clear that investments and financing must be sustainable, so the refinancing of investments is an essential consideration. This aspect was strongly supported both by the leading rapporteur Prof. Dr. Dr. Karl-Ulrich Rudolph and the participants of the online survey. Furthermore, even when businesses already contribute to water-related solutions, it has been noted that improvement is required when combining suitable water management and business strategy approaches. On the issue of payment of ecosystem services (PES), developing countries can also learn from experiences gained with institutional prerequisites in developed countries. Here, it has been shown that the durability of PES is rather given if a small group of stakeholders is involved in its design and leadership.

As for methodological approaches, combined hydro-economic modelling in river basins, multi-criteria analysis and cost-benefit-analysis remain vital tools for answering questions on financially sustainable solutions but these require further development. The development and implementation of adequate financing solutions remains a further challenge for the future. The annual worldwide investment in water infrastructure required for solving water-related problems currently stands at about 400 – 500 billion Euro. Although financial resources may often be available, the problem remains that the threshold for financing projects is quite high so that many smaller projects ultimately lose out on funding. A further challenge is to improve on the extent to which the actual refinancing potential of local populations is taken into account, as infrastructure refinancing must be guaranteed in order to support financially sustainable solutions. Finally, societal problems with IWRM financing have been underlined: In some regions of the world, the willingness to pay for water is less pronounced due to historically conventional behaviour. These mindsets must also be taken into consideration.

3. Links between the conference topics

The conference participants made it clear that no single IWRM topic alone can solve water-related problems such as bad water quality or water shortages. Technical innovations will not persist if institutional prerequisites, financial sustainability and the relevant capacities are not in place. Technical innovations will not be sustainable if they have negative effects on water resources such as groundwater, or on the general public – hidden impacts that are predictable with adequate decision support tools. This example illustrates what one

anonymous conference participant noted in response to the governance issue, that “we need to think (water governance) out of the box”.

The topics that were inter-linked at the conference have been identified below, generally based on the information given by the junior rapporteurs. Some overlaps between the different topics of the IWRM conference are apparent: The topics of Water Resources in Changing Environments (WRCE) and Information and Decision Support Systems (IM/DSS) both include aspects of modelling and decision support. Overlapping is also apparent in relation to groundwater and other topics such as WRCE, IM/DSS and technologies as technologies and decision support tools can be used in both ground and surface water management. The topic Technologies and Implementation also highly overlaps with implementation research and practices that were presented during the sessions on Capacity Development, Governance and Economic Instruments as all of these are part of the implementation process. Finally, the topics Governance and Economics may highly interlock depending on the understanding of the term ‘governance’.

Despite these overlaps, many links and the necessity for cooperation between the different topics were identified and are presented below. The focal point of the discussions was the respective topic as it is perceived by representatives of other disciplines. This information has been sporadically complemented by links made by representatives of the respective topic. The following shows that thinking outside the box is generally the rule, rather than the exception.

3.1 Technologies and Implementation

Many links between Technologies and Implementation and other IWRM conference topics have been identified. Firstly, predication & simulation software was seen as relevant for the modelling of salt dynamics, and a link to WRCE but also to economic modelling was thus established. Economic links have been made whilst highlighting the fact that all technologies must be embedded in a socioeconomic context, and that financing methods must be considered even in the R&D phase. This aspect seems to be commonly underestimated in current technological developments. Strong links to governance issues were also put forward by those participating in the technical sessions as well as in the online survey, both highlighting that governance ultimately sets the general scene for the implementation of innovative technologies. Also, a high degree of stakeholder participation in the designing process has been stressed in order to support sustainable solutions. Here, stakeholders from local but also from higher levels must be involved and their objectives identified. Finally, the relevance of Capacity Development has been underlined in order to guarantee long term solutions. The majority of those participating in the online survey strongly agreed with the assumption that the absence of capacities is one of the main reasons for the unsatisfactory implementation of IWRM-related measures.



International Conference on Integrated Water Resources Management
(Photo: Klaus-Dieter Sonntag)

3.2 Water Resources in Changing Environments

The topic of Water Resources in Changing Environments has been predominantly linked to modelling (including economic modelling). The model results are often the basis for technical solutions, and information management and decision support tools for both ground and surface waters. Furthermore, a strong link to Capacity Development has been established as the need for the training of trainers has been stressed in order to support adequate information management.

3.3 Information and Decision Support Systems

Information and decision support tools rely on (improved) data as well as information and modelling techniques provided by ground and surface water specialists (see WRCE, GW, Economics). When a broader perspective of the term 'economics' is used, decision support tools become necessary when choosing optimal management strategies. The importance of participatory modelling and management paradigms was stressed in relation to governance, to be of use for the analysis of complex social-economical systems and to guarantee decision acceptance. Participants in the sessions on decision support tools also lamented the effects of inadequate legislation and ineffective administration. Scientists also deemed adequate user knowledge to be an essential aspect, as insufficient knowledge also leads to the misuse of DS-systems.

3.4 Capacity Development



Capacity building in
Uzbekistan
(Photo: I. Abdullayev)

Capacity Development was mentioned in almost every session at the IWRM conference but the perspectives on CD were quite different, depending on the topic of the session. Asked about the necessity of CD, participants in the technological sessions emphasized the importance of CD in the long-term maintenance of technologies. Those attending the sessions on WRCE and IM/DSS stressed that CD is necessary for the adequate management of information and the subsequent efficient use of project results in the short

and long term. Economists maintained that CD is necessary for local governments in order to be able to provide the necessary political framework for businesses. Moreover, it was noted in technological sessions that CD measures can be undertaken by different people, and it was also emphasized that scientists are an important group in the organization and implementation of CD measures. Further, different target groups for CD measures were discussed: Individual users (technological session), beneficiaries (economic session), trainers (WRCE), local governments (economic session) and institutions (Governance) were named in particular. Workshops and on-the-job-training courses were suggested among others as tools during the technological session.

3.5 Water Governance

Governance issues were also very prominent in various sessions. The conference participants discussed both general governance issues and specific governance-related aspects. The point was made that governance sets the general scene for implementation (during the technological session), that it must be improved through institutional Capacity Development (CD session) and that there is a strong connection between politics and economics (Economic session). The relevance of participation was particularly highlighted (technological session, IM/DSS, Groundwater Management and Economic Instruments). In technological sessions, a high degree of e.g. local and regional stakeholder participation in the designing process was seen as crucial in supporting sustainable solutions. The relevance of participatory modelling (IM/DSS) and participation in the design of measures (economics), e.g. for the acceptance of decisions, were also stressed. Absent legislation and ineffective administration (IM/DSS) in addition to differences in the legal frameworks of different countries (groundwater) were also lamented. Groundwater experts clarified that they do not support “top-down provisions” whereas economists search for the necessary political framework for business involvement.



3.6 Groundwater Management

The resource groundwater was interlinked to all other sessions. A special focus during the groundwater sessions was placed on modelling and technological innovations. There is also an important link to information and decision support systems. Groundwater modelling, the simulation of river-groundwater interactions and the striving for adaptive groundwater management strategies are important links to the topic of IM/DSS. Groundwater specialists also highlighted economic issues such as the financial risks of certain methods and governance issues such as legal frameworks. In his key note speech and report on groundwater governance, Héctor Garduño underlined the importance of participation for sustainable groundwater management, referring to the enabling rather than organisation of society. He simultaneously warned that “participation is not the magic bullet”, as it must be based on sound hydrogeology, complemented by adequate regulation and economic incentives. Groundwater experts also highlighted the importance of Capacity Development, e.g. in the form of training for trainers in order to address the ‘SUR’ challenge which stands for sustainability, upscalability and replicability. Generally a multidisciplinary approach is desired for solving ground water-related problems. Finally, participants in the online survey stressed the necessity of linking further research on ground and surface waters.

Participants of the IWRM 2011
(Photo: Klaus-Dieter Sonntag)

3.7 Economic Instruments

Economic instruments were also well interlinked with the other conference topics. It was stressed that technologies must be embedded in the current and future socio-economic context and that the issue of financing must be considered early in the research & development phase. In the sessions on Water Resources in Changing Environments and Informa-

tion and decision support systems the importance of integrating economic variables into ecosystem modelling and decision support tools was underlined. Groundwater specialists pointed out the financial risks of certain technologies. Governance specialists discussed the structuring of payment for watershed ecosystem services and drew the general conclusion that there is a high degree of connection between politics and economics. Economic experts also stressed the importance of Capacity Development for beneficiaries when implementing measures and also for local governments by providing the necessary political framework for businesses. Finally, the leading rapporteur of the topic economics, Prof. Dr. Dr. Karl-Ulrich Rudolph, stated that “economics is not the exclusive property of economists” and thus requested an intensive exchange between economists and other disciplines.

4. Future challenges for the management of water

Beside the above mentioned issues, the conference participants discussed core challenges for the future – or “icebergs” using the Conference Chair Prof. Dietrich Borchardt’s metaphor. Some of these core challenges for sustainable water resources management will be highlighted below. As indicated by the IWRM conference steering committee, they demonstrate the relevance of closer cooperation between all water relevant sectors and levels.

4.1 Land use

Land management issues are particularly challenging with regard to a sustainable water resources management. The Steering Committee placed particular emphasis on the “strong linkages but also substantial trade-offs between water security” and food security and that “IWRM should be seen as pathfinder process for the implementation of an Integrated Resource Management.”

The following links between sustainable water and land management were mentioned. In the session on Water Resources in Changing Environments questions were raised about the effects of environmental changes such as land use change, agricultural intensification and irrigation on water resources and models were presented that integrate hydrological and land use aspects, amongst others. In DSS-sessions, the challenge of uncertainty under land use change was particularly highlighted. Participants in these sessions also stressed that multicriterial optimisation algorithms are necessary for contradicting objectives such as profit-oriented agriculture versus aquifer sustainability. The high relevance of land use dynamics with regard to groundwater was particularly stressed. A core issue was the sustainable extraction of groundwater for agriculture, under the consideration that the largest abstractions of groundwater are made for irrigated agricultural purposes. Further, the Conference Steering Committee stated the technological perspective on the links between water and land management: “IWRM based infrastructures typically serve multi-purpose schemes (e.g. water storage schemes for producing energy or food and mitigation of extreme events such as floods and droughts).” Finally, it has been emphasized that the polluter-pays principle must be applied to land management issues as this is not currently the case.

4.2 Climate Change

Climate change is a core challenge for Integrated Water Resources Management. Participants in the sessions on Water resources in Changing Environments were particularly interested in how environmental changes such as climate change effect water resources in different

spatial entities from the basin to the continental scale. In sessions on decision support systems, the relevance of uncertainty under climate change was stressed. Participants in the sessions on governance also discussed how governance features can contribute to adequate adaptation to climate change.

4.3 Energy

Energy supply is another critical challenge for sustainable water resources management. On this topic, the Conference Steering Committee's position was that there are "strong linkages but also substantial trade-offs between water security" and energy security. Questions raised in this context referred particularly to the effects of dams and power plants on water resources. The negative effects on water resources were highlighted in addition to the positive aspects of "IWRM based infrastructures that typically serve multi-purpose schemes", e.g. "water storage schemes for producing energy or food and mitigation of extreme events such as floods and droughts". A higher efficiency of energy producing technologies was also desired. In general, the participants in the online questionnaire strongly agreed that cooperation between experts from the water and energy sectors needs to be intensified.

4.4 Urbanization

Urbanization is one of the most significant future challenges mentioned at the IWRM conference. One conference attendee pointed out that by 2050, more than 80% of the world's population (more than 6 billion people) will live in cities. Participants asked how it will be possible to facilitate water supply and wastewater disposal in fast growing cities and especially in mega cities. The effects of urbanization on water resources were also discussed, particularly during the sessions on Water Resources in Changing Environments.



Aerial photograph of Santiago, Chile. The ever-expanding city of Santiago is one of the megacities of tomorrow (Photo: A. Künzelmann / UFZ)

4.5 Demographic change

Demographic change in developing, emerging and industrialised countries is another important challenge that was addressed during the conference. In developing and emerging countries, continued population growth increases the demand for water and food. Prof. Dr. Dietrich Borchardt noted that "water is running out for food production" which raises the question of how water-efficient food production can be achieved (see also the challenge of land use change). In industrialized countries, it was emphasized that technologies must be adjusted in order to a) reduce water demand, particularly in rural areas, and b) remove pharmaceutical residues.

5. Implementation of IWRM solutions and science-policy interfaces



Interested audience at the IWRM 2011
(Photo: Klaus-Dieter Sonntag)

During the IWRM conference, research results on the main IWRM topics were presented, links between these topics were established and core challenges for the future were formulated. Nonetheless, the implementation of scientific results into practice remains a core requirement for the future. The IWRM Conference Steering Committee stated that “while considerable progress has been made to include IWRM in national policies, strategies and laws, the actual imple-

mentation of IWRM is lagging behind”. The IWRM conference chair, Prof. Dietrich Borchartd asked in his key note speech: “Do we really have so much time for planning? Or do we have to speed up with action?” The Steering Committee answered this question clearly stating that the realisation of IWRM solutions must be accelerated as the dynamics of change “are fast and already lead to irreversible damage to water resources in many regions of the world”. The participants of the online survey also tended to agree that the implementation of measures is slow in comparison with the dynamics of driving forces and pressures resulting from land-use change, demographic change and resource use. Aspects of water supply and sanitation in developing and emerging countries and water quality aspects in industrialised countries are core issues that must be addressed.

In order to strengthen the implementation of IWRM solutions, the Steering Committee stressed that IWRM research approaches must be “transdisciplinary with a substantiated science policy interface”. In other words, successful IWRM “works with an intense dialogue between governmental institutions, science, NGOs and society in order to achieve more sustainable solutions”, but must especially bridge the gap between science and political decision makers in order to support the transfer of results to applied IWRM. This desire was expressed in plenary discussions, in the special sessions and by the participants of the online survey.

PD Dr. Heike Walk referred to transdisciplinary projects in particular when she suggested that the BMBF should further support the strategic exchange between scientists and people outside the scientific community such as authorities and NGOs by supporting networks and workshops. Several methods of integrating science into practical work have been proposed in order to foster the exchange between politicians and scientists. Adapted decision support tools are, amongst others, vital tools for bringing IWRM strategies to governmental decision makers. These systems facilitate the transfer of scientific results to decision makers and can thus inform and influence political decisions. According to Dr.-Ing. Martina Flörke, scientists must consequently make it clear that they cannot provide predictions and they must continuously communicate the uncertainties of developed models. In the online survey it was further agreed that there is a strong need to clarify the conditions under which deci-

sion support tools are used in decision-making processes. Implementation research and governance analysis in particular also remain essential to the implementation of IWRM solutions.

The interaction between scientists and politicians remains a challenge due to the different logic prevalent amongst the two societal groups. Whilst politicians have governmental targets and restrictions to consider, scientists must still work for scientific credibility that is

not given for good management consulting. Scientists also tend to think in the long-term whereas politicians need direct impacts with immediate economic benefits within short periods. A further challenge is that scientists and politicians need to find a common language for communicating scientific results and transferring knowledge. Referring to this interaction between science and policy, Peter Reichert appealed to scientists in his key note speech, asking them to “stimulate integrative thinking (...) even if sectoral management prevails”.

Finally, at the conference it was underlined that IWRM is a philosophy rather than a template to be followed step by step. The IWRM approach is not too complex but too general and abstract to be easily implemented. The best approach, according to the participants seems to be to focus on local conditions, and to support long-term reforms which encompass the different topics, interactions and challenges addressed in this conference and beyond.



Chair of the IWRM Conference
Prof. Dr. Dietrich Borchardt
(Photo: Klaus-Dieter Sonntag)

