

Progress and Prospects on Water: For a Clean and Healthy World

with Special Focus on Sanitation

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WORLD
in Stockholm,
August 17–23, 2008 **WATER**
WEEK

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The 2008 World Water Week in Stockholm Synthesis Report

Over 2,300 leaders in science, government and civil society from more than 130 countries and 200 collaborating organisations gathered at the 2008 World Water Week in Stockholm to chart the path forward for a world where crises and opportunities are converging. Billions suffer ill health due to lack of access to safe sanitation or clean drinking water while growing, richer populations mount pressure on stressed water resources and global food, finance and energy sectors are in turmoil. Under the theme “Progress and Prospects on Water – For a Clean and Healthy World with Special Focus on Sanitation” experts assembled in over 90 sessions including workshops, seminars, side events and high level debates to share ideas and recommend solutions on topics ranging from sanitation, agriculture, biodiversity and climate adaptation to governance, technology and health.

In its role as organiser and host of the 2008 World Water Week, the Stockholm International Water Institute (SIWI) has prepared and published this Synthesis Report. The report analyses the issues, initiatives and recommendations put forward during the Week for the benefit of the participants and the broader water and development communities. The Overarching Conclusions in **Section 1** are compiled and written by SIWI to try to capture what we feel were the key issues and insights advanced during the week. **Section 2** includes analysis by specially appointed World Water Week Rapporteur Teams covering five predetermined thematic streams: Sanitation; Environmental Pollution and Ecosystems; Water and Climate Change; Transboundary Waters; and Water Resources Management. **Section 3** highlights the work of those honoured during the week with the Stockholm Water Prize, the Stockholm Junior Water Prize, the Stockholm Industry Water Award, the Swedish Baltic Sea Water Award, and the WASH Media Awards. As mentioned

earlier, over 200 organisations from all over the world and from a variety of sectors convened sessions during the week, and you can find a full list of these organisations on page 30.

The ambition of the World Water Week, as we see it, is to contribute towards meeting the challenges we face within the water and development field. We aim to build upon the outcomes of previous World Water Weeks as well as other water-related meetings and conferences that occur around the world. This synthesis report, by drawing firm conclusions from over 90 events, offers a chance to take stock of the progress made and the opportunities that lie ahead.

With the richness of important research and experiences presented during the week, a Synthesis Report such as this can of course not cover them all in detail. Presentations from each session and the complete synthesis report featuring summaries from each session are available electronically at www.worldwaterweek.org.

I would like to take this opportunity to thank all of you, convening organisations, participants, sponsors and partners for your role in again making the 2008 World Water Week in Stockholm a success and an important step to enhance the agenda of water and sustainable development for our common future. I would also like to welcome you back for the 2009 World Water Week in Stockholm under the theme “Accessing Water for the Common Good” with special focus on Transboundary Waters.

Anders Berntell
Executive Director
Stockholm International Water Institute



Photo: Dan Shirley - SYC

Overarching Conclusions

The Overarching Conclusions present some of the key issues and insights from the 2008 World Water Week from SIWT's perspective. In this section, the water-related issues of sanitation, climate change, virtual water and transboundary waters that were raised in various fora during the week are explored. The aim is to summarise the discussions around these key issues to ensure that the dialogue continues beyond the World Water Week.

Break the Sanitation Taboo

In light of the UN International Year of Sanitation, efforts to accelerate progress on sanitation coverage and hygiene practices were given special focus at the 2008 World Water Week in Stockholm. With a lingering, deplorable sanitation crisis, the efforts and mandates of the sanitation sector are necessary. But they are far from sufficient. At the current rate of progress, the Millennium Development Goal Target on improved sanitation will be missed by 700 million people. All actors, particularly politicians, need to speak up and start to plan for sanitation. They must back up talk with appropriate budgets for its realisation.

- Sanitation should be promoted as the cost-effective investment and human health intervention it is. The little money that is required to achieve the MDG sanitation target and, ultimately, universal sanitation coverage could not be more well spent. It is estimated that the economic return from improved sanitation is about USD 9 for every USD 1 invested. The low cost to high benefit ratio of sanitation programmes must be used as the selling point to attract decision makers to invest and provide needed budget lines at all levels. We also need to make sure that we not only talk about household sanitation, but also highlight “institutional” sanitation in schools, public spaces and work places.

- Plain talk is also needed on sanitation. HIV/AIDS struggled in the past with being a taboo subject, something sordid and personal that is unpleasant to address in the political debate. The sanitation taboo is even stronger and needs to be broken. The success of HIV/AIDS campaigns to break the taboo must be looked at as a model for sanitation and hygiene. At the national and international level this will require smart public relations and advocacy campaigns. At the local level, social marketing based on an understanding of community values, desires and product choice is needed to make sure we have demand driven approaches.
- Technical solutions, like smarter or cheaper latrines, are also necessary. However, if they are not wanted or culturally accepted they will not spread. The combination of cultural consent, local demand, behaviour change and appropriate logistical solutions is paramount.

Productive Sanitation

- The conventional linking of water and sanitation, i.e. WSS, needs to be revisited. Some sanitation systems are water borne, whereas other systems are dry. Dry sanitation has important potential benefits beyond the sector itself. The nutritional contents of faeces and urine can provide an important source for soil improvement and enhance land and water productivity. Recycling of phosphorous and nitrogen through “productive sanitation” could replace or reduce the need for commercial fertilisers and reduce the pressure on the finite mineral resources. At the same time, it augments food security and could also be a source of energy. However, water is always a vital component for hygiene, especially hand washing. The link to water is also obvious in terms of pollution of recipient water bodies.

- The potential for different kinds of sanitation solutions should be further explored and visualised. Research on social acceptance of practical arrangements is fundamental. We also need to know more on potential health risks of sanitation options under climate change conditions.
- A vital part of the sanitation solution is the involvement of the private sector. A number of sessions during the week drew attention to the ways in which business is and can be involved in developing and implementing sanitation solutions that benefit society as a whole, as well as the bottom line. Benefits to business from improved sanitation include increased operational efficiency, creation of new markets and a healthy and productive workforce.

Climate Change Mitigation, Adjustment and Adaptation

A greater variability in the availability of water, between years and seasons is one of the results from a higher frequency of extreme weather events and increased temperature. Drivers of climate change include emission of greenhouse gases, which in turn are the result of human activities in agriculture, transport and industry. Mitigating climate change requires these emissions are reduced. Adaptation largely entails managing the impacts climate change has on water-related issues. Strategies are needed to address more extreme floods and droughts at a large-scale.

- Research on how to ensure food production in areas facing increasing temperature and water stress is crucial for many countries, especially those in the tropics. Significant reductions in the potential yields have been reported as a likely effect of climate change in Sub-Saharan Africa and Southern Africa. But reduction in the potential is not the same as real reductions. The gap between actual and potential yields is significant but it varies significantly even within local communities with similar physical pre-conditions. Farmers and communities must learn from good examples to produce more efficiently through the use of improved seeds, nutrient strategies and better rainwater management.
- More knowledge is needed about the potential of green water development and use, e.g. harvesting and storing rainfall locally and how to best combine that with land and soil management. The beauty of this solution is that the communities can do most of the arrangements through their own efforts. But some support is required, for example, loan schemes, preferably combined with “strategic” subsidies for innovation and illustration of good practice, i.e. a tailored extension service.
- Apart from production per se, transport, storage and processing must improve to meet rising food demand in urban areas. Consumption patterns are increasingly important in food and nutrition policies. Many of the required and promising changes will take time, both due to the complexity in the physical production and supply systems but also in terms of the inertia in trends in consumer preferences.

It must be recognised that some of the changes indicated above refer to medium and long term climate adaptation strategies. Societies also must adjust in the short term. The likely regional variation in impacts from climate change will also require a revisiting of trade and the comparative advantages and disadvantages of production between different parts of the world.

Changing Context for Virtual Water Trade

Virtual water refers to the amounts of water that have been used to produce a good, for example, food items like wheat or meat. The water consumed is not visible in commodities, but huge volumes are embedded in a virtual form.

- For countries, where food self sufficiency is not possible due to water shortage and other constraints, the option is either to import food, i.e. virtual water, or to import water in a real sense. A number of water starved countries have already, to a greater or smaller degree, chosen the option to import water intensive goods produced elsewhere. Export and import of water intensive commodities can also be rational if the exporting country can produce goods more efficiently than the importing countries can. Naturally, export and import of food and other commodities are developed for many reasons.
- Climate change, including global warming, will modify the geography of production potential. In combination with economic and demographic trends, food security issues will increasingly have to be dealt with at an international scale. One basic dilemma is, of course, that to be able to import countries must also export to obtain the foreign currency required to pay for imports.
- Countries and social groups with an economic strength can make use of the opportunities for “virtual” water trade. For countries with a weak economy and with little water and other resources, options are limited and strategies must differ. Switching to a strong urban industrial and service-oriented export economy is not realistic for poor and water starved countries in the short run.
- One option that is worth exploring is the promotion of value-added activities in the agricultural sector and making use of opportunities in the expanding urban market. Farmers need to better control and benefit from the processing of agricultural commodities and not only try to sell them in a raw form. Combined with a strategy to reduce the risk of spoilage, for example to better conserve the quality and quantity of commodities, both farmers and buyers may benefit. The demand for agricultural commodities is widening and includes an increasing demand for raw material for energy, fiber, etc.
- In a world of rapid demographic and economic change, it is essential that civilisation’s life support systems – land, water and biological resources – are productively utilised and maintained. Effective and scientifically sound policies are needed to prevent over-exploitation and degradation of water and natural resources.

Benefit and Risk Sharing in Transboundary River Systems

Policies, political constituencies and socio-economic systems are only partially organised in harmony with boundaries and dynamics of physical and biological resource systems. The global and national mismatch between population distribution, resource endowment and production systems is a case in point. Water abundant countries rarely orient their economies towards water intensive activities while water starved countries often maintain a large low-value and water-intensive industry, like smallholder agriculture.

- Water and the benefits derived from its use need to be better and more fairly shared between different parts of the world and also between countries located within the confines of a transboundary water system.
- Many of the big transnational water systems are microcosms of the global situation. They contain water rich and water short areas; cities and rural sectors and different political and socio-economic systems. Riparian countries need to collaborate to improve conditions in the basin and minimise the risk of devastating conflict.
- Better understanding and guidance is required for how this complex process can be balanced and governed. A basic idea of the IWRM concept is to balance and broker between interests and activities that seem to be or are incompatible. The “M”, for Management, basically refers to technical and optimisation issues, i.e. the tools and methods for water allocation and use. But it does not say anything about how to best distribute the benefits from the goods and services produced from water use.
- In addition and as a support to water resources management, a strong and effective governance structure, founded in the

political systems is required to ensure two major tasks (i) budget allocations, regulation, data and information sharing and retrieval, (ii) how to best distribute the goods and services that are produced, usually referred to as benefit sharing.

- A strategy for balancing between interests and to generate positive synergies is required for guiding authorities and agencies about how to make use of both green and blue water, where and for what purpose the resources can be used. Coupled with this strategy, it is necessary to include a strategy for financial management, risk and benefit sharing.

Two Types of Knowledge

Bridging knowledge with policy can provide solutions to the myriad of water-related challenges. The implementation of policy and transfer of knowledge to where it can be applied is a difficult and crucial step. In the sanitation sector, for example, massive international campaigns require long periods of time to implement. The tendency, however, is to reinvent the wheel.

Knowledge gaps result from lack of understanding and/or from a new situation, which implies a need for further research. Typically, climate change will expose societies to situations and processes that, by definition, are not being researched or are poorly understood. Poor trans-generational, trans-sectoral and trans-cultural transfers of knowledge aggravate these gaps. Additional and “new” research must therefore be integrated with a strategy for knowledge conservation, upgrading, translation and transfer. We need to know more about how to conserve and transfer yesterday’s wisdom with new techniques to supplement existing knowledge. It is important to identify successful cases to improve capacity and make sure that the wisdom that has contributed to progress is not dying.



Photo: Thomas Henrikson



Special Focus Theme Report – Sanitation

Lead Rapporteurs: Ms. Barbara Evans, and Prof. Ausaf Rahman

Junior Rapporteurs: Mr. Nelson Ekane, Ms. Lovisa Selander and Mr. Enest Nkengayi Ategwa

Context and Regional Dimensions

The Sanitation Challenge. The Last Taboo. The World's Greatest Development Scandal. These were all phrases to be heard at this year's World Water Week, which for the first time put special focus on sanitation. 2008 is the International Year of Sanitation, a year in which the international community recognised that the burden borne by people who live without sanitation dwarfs the efforts being made to address the gap (see Box 1).

A Complex Geographical Challenge

Figure 1 shows that the majority of those who lack access reside in Asia, and Figure 2 indicates that the bulk of the disease burden associated with lack of access to sanitation and hygiene falls on Africa.

Notwithstanding the huge challenges of Africa, other regions also present particular problems (see for example Box 2).

A Highly Effective Intervention

Investments in sanitation have been shown to have major impacts on reducing diarrhoeal disease and cutting deaths, especially to children under age 5 (see Box 3). Hygiene promotion is reported to be the single most cost-effective intervention in reducing health burdens, while sanitation lies within the top ten according to DCPDC data presented by various presenters including S. Cairncross and R. Franceys. Despite this, however, achieving these health gains is challenging. Experts increasingly believe that a complex combination of core behaviour changes and infrastructure use is required to achieve long term health gains. What is more, the drivers at individual and community level rarely relate to health and are more commonly associated with issues of privacy, security and pride. Thus, effective sanitation interventions are about more than the delivery of toilets.

Box 1: Poor sanitation is a big development issue which is relatively under funded

A number of excellent presentations were made during the week which highlighted the startling statistics around sanitation. The small selection below serve as an illustration.

- Diarrhoea kills more children under five than malaria and HIV/Aids together; 5,000 children die from diarrhoea every day. Source: World Health Organization.
- Up to 25 times more aid is allocated towards HIV/Aids than to sanitation. Source: Organisation of Economic Cooperation and Development.
- Approximately 2.5 billion people lack access to 'improved' sanitation as defined by the United Nations. An estimated 3.5-5 billion people lack access to sustainable sanitation that can reliably deliver the needed health and environmental benefits in the long term. Source: D. Mara, Leeds University.
- Approximately one quarter of Africans are still obliged to practice open defecation.
- Sanitation is the most cost-effective health intervention. Source: London School of Hygiene and Tropical Medicine, World Health Organization, World Bank.
- The money needed to achieve the sanitation targets in the Millennium Declaration is on par with the annual turnover of the bottled water industry. Source: United Nations Children's Fund.

Slow Progress

While progress has been made over the last 15 years, it is slow. In Sub Saharan Africa progress is barely keeping pace with population growth. While the absolute number of people without access globally has fallen by about 73 million, this number is small compared with the 2.6 billion who must still be provided for (Table 1). The number of urban dwellers without access is rising (by 24 percent over 15 years). Increasing urban growth and growing informality in urban areas are significant challenges.

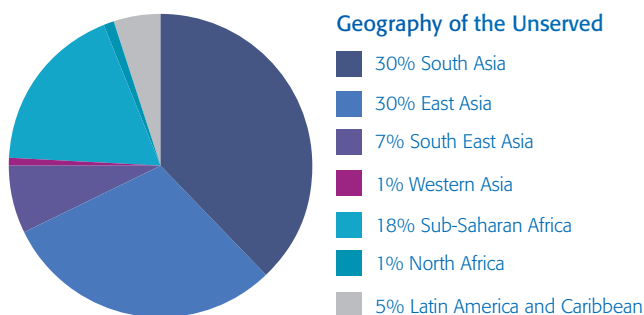


Figure 1: Geography of the Unserved. Source: JMP data presented by the Water and Sanitation Program.

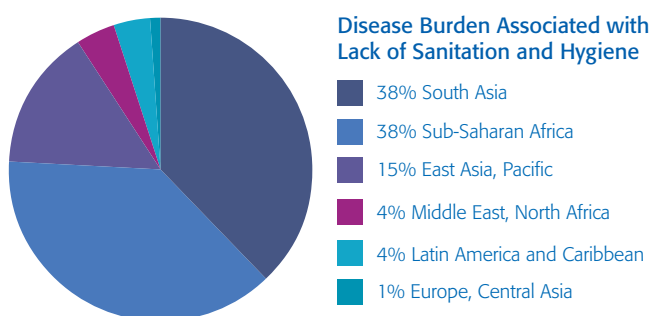


Figure 2: Disease Burden Associated with Lack of Sanitation and Hygiene. Source: Disease Control Priorities in Developing Countries (DCPDC) data presented by the Water and Sanitation Program.

Box 2: Sanitation Challenges and Developments in Europe

One less known sanitation challenge is that faced by the countries of Europe, particularly Eastern Europe. In many cases coverage is low and falling due to poor maintenance and a backlog of rehabilitation needs. More than 20 million Europeans lack access to improved sanitation. Excellent progress in modelling pollution risks and financial needs have resulted in some sophisticated decision-making arrangements (for example in assessing pollution abatement options for the Baltic Sea), but more work is needed to deliver basic sanitation and hygiene to the most needy. Source: Presentations by Women in Water in Europe and Swedish EPA.

Box 3: Impact of Sanitation Interventions on Diarrhoea Incidence

A review of available literature confirmed the following estimates of impact on incidence of diarrhoea:

Intervention	Percentage
Water Supply	
Public source	17%
Additional benefit with house connection	63%
Excreta disposal	36%
Hygiene promotion	48%

The review also revealed that:

- Hygienic disposal of children's faeces is much less prevalent than access to improved sanitation and is a neglected area.
- Health benefits from access to water are highest when a private connection is available. Benefits fall when the supply is public but remain fairly constant until the time taken for a round-trip to collect water rises to 30 minutes or more, at which time the benefits again fall dramatically.

Source: DCPDC data presented by various presenters including S. Cairncross and R. Franceys.

	Urban		Rural		Total	
	NO access	Millions	NO access	Millions	NO access	Millions
1990	21%	477	74%	2227	51%	2693
2004	20%	626	61%	1988	41%	2620
Change in absolute no.		149		-239		-73
Change in percent	-1%	24%	-13%	-12%	-10%	-3%

Table 1: Global numbers without access to improved sanitation. Source: JMP data presented by WSP.

Progress Made

Against this complex backdrop the presentations at the World Water Week highlighted several areas where significant progress has been made.

Sustainability and Behaviour Change

Much has been learned about the need to embed behaviour change with technologies to ensure that sanitation interventions are effective. This is particularly true for communities taking early steps towards achieving good sanitation. The shift from open defecation to fixed place defecation and the improvement

in design and use of traditional latrines are challenges which require long term attention and support.

Top-down investment programmes often score badly in terms of sustainability. In South Africa the push from the government to support sanitation has resulted in the provision of toilets to 11 million people. However, the crucial integration with health, hygiene and training has been neglected. The rapid up-scaling resulted in poorly thought through designs (single pit latrines with unmovable top structures), meaning that the toilets were abandoned once the pit was full. The approach focused on initial infrastructure delivery rather than long term service

delivery, leaving households and local authorities in no position to maintain services in the long run.

During the week there were, however, many examples of successful projects where a bottom-up approach had been used. One example was the Kasese District of Uganda where the District Water Engineer had committed to involve whole communities in the planning of new water and sanitation facilities. In doing so, previously common conflicts over land and access could be avoided.

By focusing on behaviour changes and raising awareness among the public, a demand for sanitation facilities can be created. These people-driven processes may prove crucial for driving sanitation forward particularly in dispersed rural areas.

Challenging Taboos

In most cultures sanitation is seen as a private matter and is often hard to discuss. Several presenters gave examples of communities where certain members required separate facilities (for example women and their brothers-in-law might not be able to use the same facility). However, most of these examples showed that by investing in early and high-quality community consultation and dialogue, such constraints can be overcome. This 'leit motif' was laid out by Kamal Kar who gave a key note speech in the opening session highlighting how such taboos have been overcome at community and national levels in Bangladesh and in other countries using a programmatic approach known as Community-led Total Sanitation (see Box 5).

Many presenters echoed this theme during the World Water Week, showing that it is possible to challenge taboos and thus create communication on sanitation. A representative from WaterAid Bangladesh shared experiences from a courageous project succeeding in creating a dialogue on menstrual hygiene. Another sensitive subject discussed was how to address the practise of manual scavenging, particularly in India.

Box 4: WASH on the Agenda

The use of the term WASH to denote the beneficial interactions between water, sanitation and hygiene, is becoming widely accepted. The WASH programme launched by the Water Supply and Sanitation Collaborative Council, for example, aims to raise awareness around issues of sanitation and hygiene. Evaluation of WASH projects in Kenya and Kerala, India, show that schools working with the WASH programme have more toilets, a higher frequency of students practising handwashing (both at home and at school) and better attendance of girls.

A series of regional ministerial sanitation conferences are also having a positive impact; AfricaSAN reported an increased interest from ministers including ministers of finance; SACOSAN (South Asia) is now preparing for a fourth meeting; Latinosan and EASAN both held in the past 12 months, were the first meetings of their kind in Latin America and East Asia respectively.

Range of Available Sanitation Technologies

The over-riding message relating to technologies from the week was that there are a wide range of proven and effective technologies that can be effectively used in appropriate situations. A selection of those presented included:

- Various composting toilets (with and without urine diversion) that enable re-use of excreta in agricultural activities
- Shared and community-managed sanitation blocks for dense urban areas, temporary settlements and areas with limited tenure security
- Simplified sewerage which offers a low-water-use, cost-effective alternative to both on-site toilets and conventional sewerage in dense urban settlements
- Waste stabilisation ponds and other appropriate wastewater treatment options
- Decentralised wastewater treatment (DEWATS) which have been successfully deployed in India and Africa.
- Decentralised and centralised composting alternatives
- Mechanised faecal sludge emptying and transporting equipment
- Interceptor stations to enable disposal of faecal sludge in sewer networks

Prospects and Opportunities

Excreta as a Resource

Many presentations highlighted the opportunities presented to sanitation by the rising prices in the international food and fertiliser markets. Use of treated excreta as a soil conditioner and fertiliser has been promoted for many years both as a way of improving the marketability of sanitation and as a means of reducing adverse impacts on the environment through the discharge of untreated wastes and subsequent loss of nutrients in the soil. In many cases however the lack of a real market for the products of these systems has constrained their widespread adoption. This is particularly true for systems that use urine-

Box 5: Community-led Total Sanitation

In Community-led Total Sanitation the community are empowered to make decisions about their own sanitation situation. Led initially by trained facilitators, the community 'walk through' an analysis of their defecation practices. They calculate how much excreta is generated in the community and build up maps of where the excreta lie around on the ground. They then discuss possible solutions and gradually move towards making a commitment to eliminate open defecation. This approach, which places emphasis on basic management of excreta rather than a particular type of latrine, enables the community to take small achievable steps. It highlights behaviours over infrastructure and focuses on empowered communities. In the countries where CLTS has been used, there is a growing cadre of "community mobilisers" who can spread the approach to neighbouring communities. Key to its success lies in a willingness to confront the real problem (shit on the ground) rather than hiding the issue behind highly technical discussions on latrine designs.



Photo: Thomas Henriksson

diversion at source (in the toilet) as they often require major shifts in private behaviours. The general consensus during the week was that well-designed composting toilets and wastewater treatment facilities would become increasingly marketable over the coming years – thus reducing some of the negative cost burdens previously associated with sanitation.

This is likely to have a significant positive benefit in Sub-Saharan Africa where declining soil fertility, low fertiliser use, inappropriate land and water management, falling agricultural productivity per capita and poverty remain huge challenges.

An Increasingly Professional Sector with Multiple Actors

It was widely accepted that the perception of sanitation is shifting from a charitable development sector to one with significant economic importance. Part of this shift is reflected in a more mature discussion around the roles of government, NGOs and the private sector. Many presentations illustrated cases where private actors played a key role in service delivery (for example as faecal sludge managers in Freetown, as managers of public toilets in India, and as purveyors of household sanitary ware in Kenya). Several excellent cases focused on the effective use of marketing techniques to place products that were affordable in rural and urban markets, enabling households to aspire to well-designed sanitation goods and services.

The role of the private sector was acknowledged and several large private corporations hosted a workshop under the aegis of the World Business Council for Sustainable Development

(WBCSD) to debate how they can contribute to improved sanitation both “within the fence line” and beyond.

However, attracting the private sector has proven difficult. The need for long term commitments is not always compatible with market demands, and the low income of the target group limits private spending. The role of the government as a regulator is critically important.

Sanitation in the Water and Development Discourse

Many presenters commented on the specific opportunities provided by this year’s focus at World Water Week on sanitation. Within the field the arguments and ideas around sanitation have been much discussed, but practitioners welcomed the opportunity to debate with water professionals and show how sanitation is sine qua non for meeting many of the MDG targets – particularly those relating to reduction of infant and maternal mortality, malnutrition, education and poverty.

Challenges and Obstacles

Urban Growth

The world’s urban population is massively increasing. The most rapid growth is found among the low income populations in periurban and slum areas. Finding suitable sanitary solutions for these high density areas has proven to be a great challenge. The layout of the settlements is too chaotic for traditional sewerage systems, and there is often not enough space for latrines.

Possible options are simplified sewerage, low-cost combined sewerage and community managed sanitation blocks.

Several frameworks have been developed that could be used to develop effective urban sanitation solutions – going beyond the traditional linear solutions towards conventional sewerage-based solutions. These include Household Centred Environmental Sanitation, Strategic Sanitation Planning, and Sanitation 21. The real challenge is to ensure that sanitation for the poor and unserved is on the top of the local political agenda and then build capacity to deliver visionary solutions.

Women and Girls

Evidence shows that girls and women are those who suffer most from lack of sanitation. Visits to public toilets or the search for a secluded spot to relieve oneself is often associated with the risk of rape. In cultures where women are expected not to leave the house, shared facilities or garden latrines may prove to be inaccessible. If school toilets are poorly maintained or shared with boys, girls often choose not to attend classes. This goes especially for girls who have reached the age when they start menstruating. Poor sanitary conditions also increase the workload put on girls and women, since they often are ones responsible for fetching water and for looking after sick family members.

Discrete but Coordinated Budgets

Water and sanitation have traditionally been funded together, with water getting significantly more funding than sanitation. For sanitation programmes to work, what is needed is coordinated inputs from several ministries – usually including the ministries of health (for long term hygiene and sanitation promotion), public works or water (for construction of institutional sanitation and coordination with water investments), education (for toilets in schools) and water resources or environment (for environmental regulation). There was a strong message from the week that discrete budgets for sanitation – linking inputs from several ministries to specific targets and outputs – is the surest way to secure adequate long term funding and the strongest potential coordinating mechanism.

The allocation of sufficient money to sanitation is hampered when the national budget is largely made up by donor money which can be earmarked (e.g. for water supply or HIV/Aids). Sector professionals need to build support in the Ministry of Finance if they are to achieve the needed financial targets.

Countries Suffering from Long Term Conflicts

Several speakers commented repeatedly on the specific sanitation challenges faced by countries suffering from long term conflicts. Specific approaches are needed in IDP camps, refugee camps and areas subject to repeated population movements. National governments in these countries may also be unable to formulate policies and strategies on sanitation,

which may result in a failure to attract donor funding or other external investments.

Advocacy and Information

Despite recent gains, more and better communication is still needed. Plain language, simple terms and strong visuals are powerful when it comes to engaging the public. Calculations of cost-benefits and cost-effectiveness can help governments understand what they are losing right now from not working with sanitation. Finding the right ways of addressing the problem is also crucial. Convincing governments to invest only in the poor can be difficult. Formulations, such as “poor inclusive”, can be powerful to attract investment.

Knowledge Gaps

Though several important areas for new research and ideas remain, many speakers at the conference emphasised the need to (a) communicate the importance of sanitation outside of the sector; and (b) find better ways to spread existing knowledge and capacity at field level.

Communicating the Links between Sanitation and Health to Health Sector Professionals

The importance of clean drinking water for health, for example, has become widely known and accepted. Yet the public perception of the link between sanitation and health remains weak. While the international health agenda is dominated by curative medicine and vaccinations, a critical and highly cost-effective health intervention (basic sanitation and handwashing) remains neglected by health professionals.

NGOs and Local Governments with Insufficient Technical Competence

The correctional shift towards a holistic socio-cultural approach has meant that sanitation no longer is something which falls exclusively under the responsibility of engineers. If the process is driven too far, it may result in a loss of technical expertise. In one seminar a speaker from UNEP warned that NGOs are getting weak in the technical area. Other speakers emphasised the lack of capacity in local governments, particularly in countries which are decentralising.

Global and Regional Definitions

As more and more work is done in the field of sanitation, many speakers called for better monitoring and evaluation of progress. While the international system of the Joint Monitoring Program (JMP) provides an important longitudinal measure of progress, more work is needed to develop meaningful and more detailed parameters at local level. Only then can real progress (from open defecation, to fixed place defecation, to improved latrines, towards sustainable sanitation) be measured.



Photo: Mikael Ullén

Conclusions and Recommendations

The State of the Sector – Sunshine and Showers

There is growing awareness of the importance of sanitation. The evidence base for health benefits is robust. Technical solutions exist. However, awareness (particularly among women and children) is not as high as it needs to be. Most decision-makers are more able to imagine contracting HIV/Aids than living without a toilet and political pressures prevent cities and local governments prioritising sanitation. The need for improvement is urgent.

Practical Ideas – Four Seasons in One Day

Practical ideas and solutions do exist:

- Where access is very low, sanitation is primarily about behaviour change (i.e. Community-led Total Sanitation in Bangladesh).
- Where access increases, sanitation is primarily about improving the quality of the services provided (for example in Ghana).
- In dense urban settlements the additional challenge is to link people's efforts with the city system (i.e., in Kumasi, Dar es Salaam, Karachi).
- In the long term, new technologies hold the promise of a more sustainable future (i.e., eco-cities in China).

People are crucial. New ways of thinking for demand-responsive approaches are being developed and rolled out to address the real needs of the unserved.

Remaining Challenges – Storms Approaching

Some of the key gaps relate to the need for:

- Local Information – making the case at local level (Cost effectiveness studies, health impact studies, community self-assessments).
- Finance – more money is needed but mostly for long term support (i.e. health extension workers) – this requires new financing mechanisms.
- Government Leadership – success stories all reflect strong government leadership to remove confusions and lead co-ordination (e.g. Madagascar, Ethiopia, India, Bangladesh, China and Rwanda). This is needed in all countries.

The concept that there is an “end point” of water borne reticulated sewerage needs to be more sophisticated. Sanitation has strong links to environmental management, climate change, food security, etc. A new vision is needed that recognises the changing geopolitical landscape. This vision must be the gold standard that is applicable to rich and poor alike.

Building for the Future – A New Sunrise

Finally, there is a need to enthuse a new generation of sanitation experts and activists. Young professionals need a reason to get into sanitation. A lot is going on to ensure that communities, governments and the private sector participate in the sanitation sector, but little is being done to motivate young people to enter the field. 2008 World Water Week in Stockholm went some way to address this gap.

Theme Report – Environmental Pollution and Ecosystems

Lead Rapporteur: Prof. Paul Appasamy

Junior Rapporteurs: Ms. Lisen Runsten and Ms. Yin X Yan

Context

Globally, freshwater pollution and ecosystem degradation have increased due to increasing competition for water. The impact on ecosystems by flow alteration and pollution from human and industrial wastes is growing. Initiatives to address the problems are limited by a high degree of uncertainty. Inadequate data, complexity of modelling and inability to properly value ecosystem services are often cited as reasons for not taking action. There is a high and often neglected environmental cost of this inaction. At both the global and local levels this failure to act has serious environmental consequences for ecosystems and the human populations dependent on them. Many of the actions for reducing environmental degradation are focused at the local level. While results of these local actions are promising, scaling-up to the river basin and regional levels and the ability to tailor solutions are major challenges.

We cannot continue to manage and develop land and water resources in a way that undermines the life support system which we all depend upon.

Opportunities for Progress

The 2008 World Water Week highlighted the opportunities for progress on several fronts to address environmental degradation.

Triple Green Approach

The geography of hunger and poverty often coincides with that of increasingly degraded land. If we are to improve livelihoods, for example in Sub-Saharan Africa, we must simultaneously improve, not degrade, land and water resources. The “triple green” approach combines sustainable agriculture, environmentally sound sanitation practices and water harvesting. Not only can this approach help to meet the Millennium Development



Photo: Frida Lanshammar



Photo: Mikael Ullén

Goals (MDGs) to reduce poverty, but it can also contribute to environmental sustainability through more efficient use of the finite resources of nutrients, land and water.

Environmental Flows

Environmental flows refers to the timing and quantity of water required to sustain aquatic and riparian ecosystems and the services they provide to people. Assessments of environmental flow requirements have been undertaken over two decades in a number of countries, namely USA, South Africa and Australia. However, widespread assessment and implementation of recommendations is limited. This can be primarily attributed to lack of data, institutional coordination and national targets. A new scientific approach (ELOHA) for estimating environmental flows at the regional or national scales appears promising.

Virtual Water

The concept of “Virtual Water” provides opportunities for conserving water through trading of water intensive products from water abundant to water scarce areas. By doing so virtual water could be used as a strategy to protect ecosystems. The location choice of water could be adapted to local water availability.

Payment for Ecosystem Services

Freshwater ecosystems provide many goods and services to people. Payment for Ecosystem Services (PES) is a tool that allows the value of ecosystems to be incorporated into the economic framework

of water management. PES is a contractual transaction between a buyer and seller for an ecosystem service or land-use management practice. Application at the river basin level could mean that a downstream user of water pays an upstream community, organisation or individual to manage the land in a way that ensures a sufficient quantity of good quality water flows downstream. PES is a tool that highlights the need to invest in ecosystems.

New Models for Understanding Vulnerability and Risk

Modelling of vulnerability and exposure with regard to water resources will enable governments to design better strategies to adapt to climate change. Governments and planners are constantly seeking a better tool box for predicting the future availability of water. Thus, developments in modelling and concepts have provided opportunities to create policies and strategies to better manage water resources and protect ecosystems. These tools are receiving the attention of policy makers and planners, shedding light on responsibilities and risks as well as providing standards for new governance structures.

Challenges

While there are promising developments with regard to concepts and tools for reducing pollution and degradation of ecosystems, there are also serious obstacles and challenges with implementation. While much is known about the impacts of human activities on ecosystems, very few examples exist where recommendations from these assessments have been implemented in policy or on-

the-ground. Recognising the inherent complexity and uncertainty, the emphasis should be placed on learning-by-doing.

More concerted efforts are necessary for coping with climate change. Adaptation strategies are critical for vulnerable communities. Adaptation generally refers to land and water management actions at the local level. Governments should make informed decisions if social and economic risks are to be avoided. This is challenging because water is a local resource, the availability of which is location specific, while climate change and its impact on ecosystems is global and transcends national boundaries.

Knowledge Gaps

Several knowledge gaps were identified during the week, such as the need for better tools for monitoring, hazard identification and locating pollution sources. Others include:

Virtual Water and Water Footprint

While social systems have the option of importing virtual water, ecosystems are more vulnerable since they are dependent on the spatial and temporal variations of local water regimes. Expanding the concept of the water footprint to the whole supply chain will provide a better understanding of the water requirements of a business. Similarly, pollution can also be incorporated in calculations of product life cycles. Future development of these concepts will require improving data availability, methods and standards, and bringing together stakeholders who are involved in the process.

Wastewater Reuse

Wastewater is an important water resource. One insight is that for almost every user, water has already been used. Reuse of treated wastewater plays a valuable role in development and poverty alleviation, particularly in water shortage situations. But far more research needs to be undertaken on wastewater reuse. Indiscriminate reuse can contribute to health hazards and also to pollution of land and water.

Environmental Flow and Ecosystems

Modelling of environmental flows of major rivers in the US is underway and many studies have been conducted on rivers in South Africa and Australia. Many projects are also underway in other parts of the world as awareness of the importance of environmental flows increases. However, as new and existing water projects continue to impact and disrupt key ecosystems and cause health problems, there is a need to replicate assessments in other rivers and scale up to basin and regional levels.

Payment for Ecosystem Services

More research is needed in the valuation of ecosystem services, particularly when non-market services are provided, such as the water purification or flood protection value of wetlands. This need is urgent in situations where water development projects are

planned, so that a complete picture of the costs and benefits associated with that development is provided to decision makers.

Conclusions and Recommendations

Environmental resources and fragile ecosystems are under threat largely because of “inaction” in many dimensions. While freshwater ecosystems have been strongly affected by direct human activities for centuries, new interactions due to changes in climate are causing environmental damage. These threats require adaptive capacity in institutions as well as ecosystems.

A systemic approach is essential to include adjoining terrestrial and marine ecosystems since they significantly affect the condition of freshwater. Building institutions that can implement the systemic approach is one of the most important tasks to be addressed now. There is a strong need for coordination and promotion of sustainable practices. A high degree of uncertainty in the details of future scenarios remains, but there is an urgent need to act in the face of uncertainty and not wait for more data before certain actions are taken.

The sustainable development of cities requires the active participation of civil society. NGOs can create awareness about the water footprint of many commodities that people commonly use or consume. Changes in values and attitudes are necessary to enable sustainable water use in both urban and rural areas.

Governments should structure the obligations of upstream water users to protect those of downstream users and ecosystems. They can exercise care in designing water projects to avoid disrupting environmental flows and ecosystems. They can compensate or pay for the protection of ecosystems (PES), and also develop policies and make investments in green water. They can assess the environmental, social and economic aspects of water footprints. Governments have to work out a strategic framework for adaptation strategies to counter climate change, which could include early warning or insurance systems. They could also build resilience through financial measures and institutions for adaptation.

Businesses can partner with governments and NGOs in many of the same areas. Businesses should be encouraged to calculate the water footprint of their products and try to develop alternatives that consume less water. They can develop insurance systems for climate change adaptation and also help to build resilience in vulnerable communities. Businesses can develop low cost sanitation measures that can improve the environment in both urban and rural areas, and should avoid converting good agricultural land for biofuels and other development.

International agencies should develop and propagate methodologies for estimating environmental flows and protect ecosystems. Promotion of the “triple green” approach of sustainable agriculture, environmentally sound sanitation and water harvesting by “closing the loop” are also necessary. Agencies can also help to promote the concepts of “Virtual Water” and “Water Footprint” across the world to save water in water scarce areas.



Photo: Neil Chatterjee

Theme Report – Water and Climate

Lead Rapporteur: Mr. Jamie Pittock

Junior Rapporteurs: Ms. Rebecka Törnqvist and Ms. Claudia Teutschbein

Context

The links between climate change and water were discussed extensively throughout the 2008 World Water Week, culminating in two dedicated Water and Climate days. More than 30 international organisations, governmental agencies, knowledge institutes and NGOs contributed to the water and climate sessions.

While much of the discussion focused on adaptation, the links to mitigation were debated as well. There was a consensus that the water sector has to make a contribution to climate change mitigation, and needs to be a leader in adaptation.

Status of Water Resources

The World Water Week presenters built on knowledge of the limited nature of the Earth's surface and groundwater resources and ecosystems, and the degradation that is occurring, with a number of new and more emphatic findings, namely that:

- Climate change is occurring and is impacting on freshwater resources and ecosystems first and hardest.
- The relative impact of climate change needs to be considered against the demands and threats to water resources arising from growing wealth, consumption and populations and a recent addition to the development agenda.
- Growing water scarcity is heightening the management challenges and potential for conflicts.

Vulnerabilities in Water Resources from Climate Impacts

The Intergovernmental Panel on Climate Change (IPCC)'s recent reports highlighted the likely changes in water quality and quantity, and with extreme events. Globally, the negative impacts of future climate change on freshwater systems are expected to outweigh the benefits. There was a clear consensus that it was no longer possible to manage water based on stationarity.

The vulnerability of the world's 263 transboundary river basins was a focal point for discussions as interstate agreements

cover only 40 percent of these rivers, and agreements based on stationarity may fail.

Links between Sanitation, Water and Climate Change

Increasing water scarcity in many parts of the world may further limit access to water for sanitation, and consequently exacerbate health impacts and limit the ability of natural ecosystems to assimilate wastes. In large cities water scarcity is reducing the self-cleaning capacity of sewers and flooding is exacerbating stormwater overflows and resulting pollution. Water supply and treatment is likely to become increasingly energy intensive and expensive with climate change. Pumping will likely be needed from longer distances and greater depths and lead to further depletion of aquifers worldwide and increased application of water treatment and desalination. There was also discussion of the opportunities for human waste to be used in biogas generators as an energy source.

Progress

There is an increasing degree of knowledge about the nature of the climate change challenge, and most speakers emphasised that enough is known to start taking action now. Many presentations highlighted major adaptations that are being applied now, especially no regrets measures like restoration of ecosystems as infrastructure.

Progress in developing the institutions required to manage climate adaptation in the water sector, ranging from enhanced local institutions, to river basin organisations, to various national plans, was evident. Concern was raised at poor integration of national adaptation plans with national sectoral plans. New mechanisms are also developing in existing international frameworks such as the watercourses conventions for transboundary river management.

A high level discussion between developed (Netherlands and Denmark) and developing (Indonesia, Costa Rica and Lesotho) country ministers saw apparent agreement between them on

ways forward in search of wider agreement on solutions on adaptation that will be taken forward to future events. These include the 5th World Water Forum and UN Framework Convention on Climate Change (UNFCCC) conferences of parties.

Prospects and Opportunities for Further Progress

There was widespread discussion on the institutions needed for better adaptation at the local, basin, national and international scales.

A great many practical adaptation tools and methods were identified during the World Water Week. The EU proposed a useful schema with three classes of proposed actions to enhance: a) human capital, b) green infrastructure – working with nature to minimise climate impacts, and c) grey infrastructure – climate proofing existing and new infrastructure.

A group of multi-lateral development banks stated that they will continue to consider funding for all “no regrets” projects and noted that funding is generally not the limiting factor where projects are well prepared.

Challenges and Obstacles to Progress

Water professionals are familiar with: the lack of integrated decision-making in planning and governance; drivers of increasing water demand; and limited capacities of developing countries to manage water better.

The World Water Week raised new concerns at climate change policies for generation of low carbon energy using water, and greater storage and diversion of water, because they may increase water scarcity and further impact on freshwater habitats.

Knowledge Gaps

The decline in hydrological monitoring networks and lack of knowledge on the likely impacts of climate change on water resources and ecosystems saw many urge major investments to plug these gaps. Knowledge gaps identified include methods and data to: downscale climate models; distinguish climate change from variability; assess the impacts of climate change on groundwater; understand the relationship between the impacts of glacier and snow pack melt on hydrology; and see the inter-linkages between energy and water and climate.

It was also strongly argued that there would always be a large degree of uncertainty concerning the likely impacts of climate change on water resources and ecosystems, and that societies and governments need to commence adaptation measures in spite of the uncertainties.

Publication of experiences and lessons in climate change adaptation was urged so that these can be drawn on by the global community. The World Meteorological Organisation (WMO) proposal was supported by key participants for the establishment of a global Climate Information Framework, to capture and make available information to assist adaptation efforts.

Regional Dimensions

The 2008 World Water Week included a focus on climate and water issues in three key regions: Africa, Asia and the Himalayas, and Europe.

African presenters emphasised the need to invest in adaptations to cope with climate variability. Presentations highlighted the progress a number of countries had made in developing national plans and vulnerability assessments.

In Asia at least 1 billion people – depending mainly on the “Himalayan water towers” – are projected to be affected by decreasing fresh water availability by 2050. The Asian Development Bank reported that it is supporting capacity building through interdisciplinary collaboration and integration of adaptation strategies in national water policies.

The European Commission outlined its climate adaptation white paper that it plans to finalise and publish in late 2008. The paper plans to assess proposed adaptation measures against eight principles: synergies; no regrets; the precautionary principle; solidarity, flexibility and subsidiarity; knowledge; proportionality; and sustainability. Presentations highlighted the role of river basin institutions in managing adaptation, growing water scarcity in southern Europe, and the likely impacts of flooding, and on river navigation and hydropower.

Conclusions and Recommendations

The 2008 World Water Week discussions represented a more informed appraisal of the impacts of climate change on water resources and ecosystems, and greater confidence in the emerging suite of practical response measures. Key conclusions and recommendations emerging from the week are:

Knowledge

A lot has been achieved but a lot more remains to be done. Better communication is required to inform and encourage local communities and governments, to overcome the perception of adaptation as a complicated process requiring more expertise before adaptation can commence.

Recommendations:

1. All institutions, especially governments, should support the WMO’s proposal for the establishment of a climate information framework to make tailored climate change knowledge more readily available for water managers through appropriate channels to inform responses at the local and regional scales.
2. Further debate is undertaken at upcoming events (including World Water Weeks, World Water Forum, and Ramsar Convention and UNFCCC CoPs), on issues relating to climate change and water, such as: the links between climate, energy and water; taking good decisions despite uncertainty; and ways to better mainstream and upscale response measures.

3. Governments need to maintain and enhance hydrological and meteorological measurement station networks, especially in developing countries.

Impacts and Adaptation

A clear consensus emerged that the primary threats to water resources and ecosystems emerge from greater wealth and consumption and increasing populations. These threats will be exacerbated by climate change and must be addressed together.

Recommendations:

4. Better measures against the major threats to water resources and ecosystems, including greater water consumption and climate change, are urgently needed: all institutions should begin or enhance their measures for adaptation to climate change and mitigation of increasing water demands now. No regrets measures that should be targeted as priorities include: increased water use efficiency; treatment and re-use of wastewaters; application of virtual water and water footprint methods for better sourcing of thirsty commodities; enhanced rainwater harvesting; and investment in ecosystem restoration as infrastructure.
5. All institutions, particularly governments, should avoid maladaptations and better consider sustenance of water resources and ecosystems in crafting their climate change policies.

Local Scale Adaptation

Discussions identified a number of key factors for successful adaptation at local scales. These include local ownership and visible social and economic benefits or the demonstrable avoidance of losses. Predictability of funding more than the scale of funding was identified as essential for sustaining adaptive institutions. More work is required to identify how to better upscale and mainstream successful pilot projects. A dearth of peer-reviewed and published case studies of local adaptation lessons learnt is hindering development of more effective climate change responses. There may have been too little discussion of the perspectives and needs of local people. It appeared that many governments were struggling with decentralisation.

Recommendations:

6. All institutions, especially local institutions and NGOs, assess and publish lessons from their adaptation work.
7. National and international institutions redouble their efforts to learn from and support local institutions to undertake climate change response measures.

National Scale Adaptation

Country level planning has begun in many nations, but the levels of planning, integration, financing and implementing vary considerably. In particular, more effective integration of

national climate change and sectoral plans is required. There was extensive debate of effectiveness and integration of processes under the UNFCCC for national adaptation and mitigation. The high level debate at the World Water Week highlighted the potential for developed and developing country governments to agree on key climate change responses, and for adaptation policies to bring governments together.

Recommendation:

8. Governments strive to develop more effective water and climate change plans, including better integration of good water resources management into climate change and other national policies. In particular, developing country governments and donors should seek more effective means of integrating climate change adaptation into national conservation, water, poverty and development plans.
9. All institutions support developed and developing country governments to continue the productive discussions seen at the World Water Week on climate change adaptation and encourage them to reach global agreement on implementation measures, including for UNFCCC CoP15.

International and Regional Development Organisations

A substantial commitment to supporting better water and climate adaptation was expressed. Development banks and aid agencies outlined their plans to collaborate to identify best practices in adaptation and fund such action, and called for better project proposals to fund. Swedish sponsored "International Commission on Climate Change and Development" will report in 2009 on how poverty reduction strategies should consider climate change. The debate over whether climate change adaptation should occur as part of or in addition to poverty reduction funding and programmes was not resolved.

Recommendation:

10. All institutions support the stated intention of the development banks and aid agencies to identify and fund best climate change adaptation practices. Donors should find more flexible mechanisms for funding integrated national conservation, water, poverty and development plans that incorporate climate change.
11. Donors and developing country institutions should foster the debate about the interrelationship between water, poverty reduction and climate change policies, and funding mechanisms should be fostered in relevant international fora including the World Water Week and the 5th World Water Forum.

International and Regional Treaties

Treaties are drivers for better adaptation. River basin treaty organisations, such as those for the Rhine and the Danube, outline practical adaptation actions they were taking to manage water



quality, flooding and infrastructure. The UNECE Watercourses Convention demonstrated the advantages of an effective treaty process. There were calls for European governments to ratify the universal membership amendment. Similarly, many presenters called on governments to ratify the 1997 UN Watercourses Convention so that it may enter into force.

Recommendation:

12. Relevant national governments that are yet to do so should ratify the UNECE Watercourses Convention's universal membership amendment, and also the 1997 UN Watercourses Convention so that these measures may enter into force.

Industry sectors

Outside the finance, water, food and beverages sectors, relatively little business engagement on climate issues was evident at this World Water Week.

- a) Finance sector. Financial institutions present at the World Water Week indicated their desire to support water and climate adaptation projects more extensively but said they lacked adequate funding applications. Better communication of requirements and support to develop better applications is required.
- b) Energy sector. Understanding of the links between climate, energy and water was a major issue developed at this World Water Week.
- c) Water and sanitation sector. New data was presented at this World Water Week highlighting both the threat from climate change to water supply and sanitation, as well as the contributions this sector can make to mitigation through greater energy efficiency and conversion of waste into fertilisers and biogas for energy generation.
- d) Agriculture, food and beverages sector. Virtual water, water footprint and water stewardship were themes further developed at this World Water Week with a focus on agriculture and the implications of greater water scarcity, including that

induced by climate change. These concepts could be applied as adaptation tools.

Recommendations:

13. Integrated decision-making is critical. Water professionals and institutions need to redouble their efforts to engage other sectors more effectively to “get water out of water.”
14. The sanitation sector is urged to consider the issue of climate change adaptation in its agenda.

The 2008 World Water Week discussions advanced consideration of climate change adaptation and sustenance of water resources and ecosystems in four key ways, by:

1. Framing the threat of climate change more precisely within the broader set of challenges for better water management;
2. Agreeing that adaptation should start now despite the current level of uncertainties, and identifying a suite of practical adaptation measures that can be applied immediately;
3. Promoting a better balance and linkages between water-related climate adaptation and mitigation measures;
4. Identifying key knowledge gaps to be filled over time.

This year's World Water Week debate primes upcoming events, including the 5th World Water Forum and UN FCCC CoP 15, to further advance humanity's efforts to better manage climate change and water. Parties to the UN FCCC CoP 15 should note this message from the water sector: climate change is unequivocally impacting on water resources and ecosystems, and the water sector is ready to contribute to climate change mitigation and lead in key adaptation measures. Governments need to take more care to ensure the climate response measures that they adopt do not further impact on water systems. The water sector needs government support to accelerate climate change adaptation, including better integrated national sectoral plans and more flexible provision of resources for implementation.



Photo: Mats Lannerstad

Theme Report – Transboundary Waters

Lead Rapporteur: Dr. Marius Claassen

Junior Rapporteurs: Mr. Jonathan Kvist and Ms. Ella Thomason

Context

Growing populations and accelerated social and economic development increase pressure on water resources and are leading to water scarcity in many regions. A particular concern is food security. One of the biggest tasks in developing countries is to ensure food security for a growing population. Increased productivity in the agricultural sector is essential, but growing enough food will still require large amounts of water. The recent volatility in food prices put global food security under the spotlight but local food security is particularly vulnerable to climate change. The challenge is to find sustainable ways to produce more food with less water. Professor John Anthony Allan, the 2008 Stockholm Water Prize laureate, suggested that individuals should consider reducing their water footprint from 5 cubic meters per day to 2.5 cubic meters per day, particularly by adopting a vegetarian diet. Such savings on the demand side will go a long way to balancing consumption and sustainable production. Increased variability in water availability will require investment in water infrastructure. Water security is a necessary condition for durable social and economic development and countries often share water resources upon which their development depends.

Progress made

Vulnerability at the local level often results from a lack of access to resources and the inability to convert such resources to food, health and wealth. Solutions to these challenges, however, often lie at different scales from which the symptoms arise. For example, the livelihoods of those living in the Okavango Delta may be affected by agricultural development in Angola and water demands in Namibia. The predictions of higher variability related to climate change exacerbate the problem in such water scarce areas.

The concept of virtual water is firmly established but its application is proving to be a challenge. While the conventional approach to virtual water relates to the amount of water required to produce a particular product, migration of people also changes demand patterns. It may seem that sharing water between countries is already complex and that the extension of this to virtual water would compound the conflict, but it could act as a tool to facilitate cooperation. Countries that understand that their development depends not only on the water sources within their jurisdiction may have greater acceptance of a transboundary approach. In politically charged regions, the reliance on virtual water being imported is often seen as a security issue as most countries aspire to be as food self-sufficient as possible.

Participants in the 2008 World Water Week agreed that governance, and in particular the need to link actors and drivers, is important. The “dialogue model” was presented and describes the relationship between government, society and science. Many speakers highlighted the need for participation in the governance process. This includes local issues or local conflicts over water. Gender issues were discussed and it was agreed that women should play a greater role in water management. There is also a need for a better understanding of the different constituencies in the “society” cluster.

There is a shift in thinking from a focus on water sharing to benefit sharing. Water resources can be deployed to multiple uses, such as hydropower, agriculture, domestic supply and tourism. These “benefits” from the same resource can often accrue to different riparian countries. In particular, the social and economic value lies in the benefit and not the resource. Investment and inputs are needed to generate these benefits. Thus the sharing of responsibilities is equally important.

There are different views on the utility of the Integrated Water Resource Management (IWRM) paradigm. Some argue that the approach promotes devolution of decision-making, therefore making it more difficult to solve problems at larger scales. In applying IWRM, practitioners should be careful not to focus just within the basin, since solutions are often to be found outside the basin. Examples of such solutions are virtual water trading, interbasin transfers, migration, and regional political and economic processes. The experience with implementing IWRM is that it requires a lot of funding, especially in a transboundary context (such as the Mekong Commission and the Nile Basin Initiative). A realisation of the challenges associated with climate changes may increase the need for funding and speed up the implementation of IWRM.

Solutions should be sought outside of the problem area, particularly because virtual water transcends conventional boundaries. Furthermore, effective governance is required to achieve development outcomes. Such outcomes will be a function of benefits derived from water resources and therefore the subject for discussion should be benefit sharing, not water sharing.

Opportunities

The benefit sharing approach, linked to multiple uses of water can go a long way towards poverty alleviation and securing livelihoods. The concept of benefit sharing has been broadly accepted, but there are not enough concrete examples of benefit sharing being implemented.

There have been significant advances in technologies to monitor and assess the biophysical environment and access data. Google Earth has become the norm on spatial orientation and remote sensing provides high resolution images, which is combined with powerful data processing to make spatial data more accessible. Furthermore, better and more affordable field

equipment combined with faster communication networks, allows for a more in-depth understanding of the biophysical environment. There is now a need to put this data and information to good use in effective management of transboundary waters in support of development priorities.

Agreements and conventions can facilitate transboundary water resource management, but these need to be ratified and implemented. Agreements on how resources and associated benefits are shared require more than political cooperation. It is argued that conventions are often not signed and ratified by countries because they are not applicable to countries not sharing water resources and not even necessary for those that do share waters. In some cases, it is more important for riparian countries to harmonise their relevant policies and laws. National sovereignty is also seen as a barrier to ratifying conventions. Domestic development and domestic concerns has been prioritised in, for example, Latin America. Another reason to why conventions are not implemented is a lack of agreements on data and knowledge. Agreements often focus on the resource and therefore do not provide the flexibility to optimise benefits. They also need to be updated continuously, particularly in the context of climate change and global change. Participants of the World Water Week showed strong support for the implementation of the UN Convention on the Protection and Use of Transboundary Watercourses and International Lakes, which intends to strengthen national measures for the protection and ecologically sound management of transboundary surface waters and groundwaters.

Many tools and approaches are available. These need to be consolidated and good practice must be identified and implemented. “On the ground” implementation of research findings is called for. This will highlight areas where more scientific knowledge is required, such as groundwater. Wells are drying up and require practical solutions to ensure the sustainable use of groundwater. At a regional scale, the EU's ERA-NET has set research agendas which are based on Europe rather than in individual countries. Global alliances and cooperation are necessary to advance knowledge, secure and direct funding and promote cooperation.

Challenges

It is clear that advantages or benefits can often be achieved through supranational interventions, but the mandate for such interventions is hampered by national sovereignty. Approaches need to be developed to achieve regionally optimal water resources development, while respecting national sovereignty.

Adaptation to climate change at both the local and global level is now on many countries' agendas. The response to climate change should include the combined groundwater and surface water cycle. Adaptation to climate change should focus on meeting the Millennium Development Goals (MDGs) but

also ensure that the risks to global social and economic growth are mitigated. The allocation of financial resources to meet these challenges should combine private and public sources. Institutional processes should support adaptation to climate change, particularly because decision-making is difficult under conditions of uncertainty.

While much progress has been made to express benefits in financial terms, these analyses often neglect the social and cultural benefits or losses.

Data and Knowledge

A key constraint to transboundary cooperation is the imbalance of data and knowledge in basin states. Such imbalances can lead to weaker and stronger negotiation positions and produce less stable outcomes in the long term. Knowledge sharing across boundaries is crucial because all countries do not have the same capacity to dedicate resources to particular research areas but still require the knowledge gained from such research. There is therefore a need to strengthen water-related data, information and knowledge; in particular among countries in weaker positions. In transboundary aquifers, particularly in Africa, there has been focus on improving understanding through data collection, modelling, monitoring and research to provide a holistic overview of the situation on the continent.

A good example of the implications of data and knowledge is the contentious debate on biofuel. These discussions are not always based on scientific fact, which leads to subjective arguments. The biofuel debate is multidisciplinary but one area which has not been a key focus yet is the water resources required and the effects that biofuel production will have on transboundary issues. The water needs of additional primary production and

biofuel processing may mean taking water from current downstream users, whereas new entitlements may require renegotiation of rights and reallocation of water.

River basin commissions can play a regional role in increasing data availability and knowledge. There are some challenges, however, in increasing the effectiveness of such bodies. Upstream states are often less interested in participating in river basin organisations (RBOs) than downstream states, but that depends on the balance of power and existing agreements and structures. While “fixed” agreements may be much easier to implement, flexible agreements are needed to adapt to change.

In the context of the Regional Water Operators Partnership Initiatives, corporations are developing regional networks. In Arab and Latin American countries in particular, conferences are taking place and networks are developing. The effectiveness of the activities and the coordination and information sharing between countries within those networks are increasing. This promotes sharing of knowledge and experiences in the countries. Capacity building is taking place and one example of a platform for this is the Water Integrity Network (WIN).

Ultimately, the generation of knowledge should focus on the realisation of social and economic benefits – thus “science in service of society”.

Regional Dimensions

While “transboundary waters” addresses those water resources which traverse more than one country, the concepts of virtual water and water footprints highlight the fact that water is in fact shared by countries beyond those within which it physically lies. For example, food aid is often required in countries where drought has led to crop failure. This substitute food is often produced in countries that do not share water resources



Photo: Manfred Matz, SWI



with the receiving country, but the recipients benefit from the use of the water to produce food.

The link between (shared) water resources and development in Africa is particularly important. Much progress has been made, but there is a need to strengthen structures such as the African Ministers Council on Water (AMCOW) to support water for growth and development. This is in line with the African Union and NEPAD objectives of strengthening development by Africa for Africa. Currently, donor-driven investment is still overwhelming in Africa.

There is a rapid rate of political, social and economic changes in the southern African region, but practitioners are optimistic that “creativity thrives at the cusp of chaos.” Experience from the Baltic Turntable Initiative is demonstrating ways to manage the legacy of political change, such as the collapse of the Soviet Union and the Iron Curtain. A UNDP/GEF project on transboundary waters focuses on advancing water governance by targeting parliamentarians and the media, developing approaches to ensure integrated development of surface and groundwater, and how this can be achieved through financing and investment.

There have been opposing views of water-sharing in the future, ranging from “no conflicts over water” to “water wars”. There are examples where cooperation prevails over conflicts, both through signed and implemented treaties and through positive cooperation in the absence of formal agreements. The Nile Basin Initiative is a good example of a platform for collaboration between involved states.

Conclusions

The deliberations during the 2008 World Water Week demonstrated a shift in thinking. Focus moved from the biophysical water resource to the socio-political processes that can bring about positive change in transboundary waters. Participants agreed that good knowledge and data are necessary to manage the resource effectively. Without a sound socio-political process, however, such knowledge will not be translated to social and economic benefits. Such a process suggests that:

- more dialogue is needed,
- transboundary waters becomes a global issue through trade and migration, and
- empirical, interpretative science and advocacy are needed to achieve development objectives.

Transboundary waters involve much more than national boundaries. While national boundaries represent barriers to addressing development challenges at the appropriate scale, there are many other barriers that prevent effective conversion of water resources to social and economic benefits. These barriers, which can be political, policy, economic, trade, sectoral, social, cultural, environmental, or caused by lack of data or knowledge, must be understood so that they can be overcome. Approaches to addressing transboundary problems must always be anchored in the specific context and managed at the appropriate scale.



Photo: Manfred Matz, SWI

Theme Report – Water Resources Management

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Context and Major Insights

Understanding Integrated Water Resources Management (IWRM)

The use of the word management in this report relates to all aspects of planning, developing and managing water resources. Uncoordinated action in managing water resources, both at regional and national levels, was highlighted as a pervasive problem. Many examples and cases demonstrated that integration is necessary. Fewer examples, however, showed how to ensure that integrated management is carried out on a large-scale. This applies not only to water institutions, ministries and organisations, but even more so in how other sectors manage and impact water. Some main areas with significant water footprints include the planning and managing water resources for use in food production, employment generation and energy production.

It is still a great challenge to strike a sustainable balance between the three “E’s” – equity, economic efficiency and environmental sustainability – while managing water resources. Increasing populations and demand for water to satisfy current policies of economic development, livelihoods and lifestyle changes are impacting the availability, quality and sustainabil-

ity of water resources. At the Stockholm Water Prize Laureate Lecture, Prof. John Anthony Allan called IWRM a political process that is missing the “A” for allocation. What is needed is “IWRAM.” The concept of “virtual” or “embedded” water helps us to understand water consumption patterns and change them to minimise our water footprints.

Uncertainty and IWRM: Managing Water in the Context of Climate Variability

There was general consensus that increased uncertainty and variability due to climate change makes it difficult to strike the right balance with the 3 E’s. Water managers can no longer be guided by the framework of “stationarity” – decision-making based on the historical variability of water availability (precipitation, etc.) and flow. Adaptation policies will have to understand both the increasing complexity and uncertainty underlying water management. Examples from Europe (Spain, the Danube and Rhine River Basin Plans) illustrated the need for stronger and better integration of all water-related sectors, including transport and tourism. To ensure water efficiency, conjunctive management or wastewater reuse based on innovative technology, and pricing mechanisms are needed. Frameworks such as

the EU Water Directive or the Alpine Convention also illustrate the need for regional collaboration, as neither water flows nor climate change respect geographical boundaries. Adaptation approaches in the developing world need to respond flexibly. Both “hardware” (e.g. small-scale water harvesting technologies) and “software” (an enabling environment) are needed to facilitate resilience. Access to resources, knowledge, skills to diversify livelihoods and capacity building for climate governance are all critical.

Water Governance, Equity and Participation

Many noted that greater focus was placed on the economic and financial aspects of water management. Less attention was given to the environmental (water for nature) and social and equity impacts of poorly managed water resources. Discussions were largely bereft of any meaningful understanding of the complex relationship between water, poverty, gender and other dimensions of social exclusion. The challenge of meeting the MDG sanitation targets in Asia for example, are as much rooted in the absence of good governance and strong leadership, as they are in cultural practice and in the need to provide space to articulate voice, seek information and access alternative, low-cost technological options. While there has been progress in the decentralisation of water and sanitation services across Asia – the devolution of funds and decision-making authority is not concomitant with the devolution of responsibilities. Poor capacity, particularly in local governments, remains a challenge. Community-Led Total Sanitation (CLTS) provides an alternative approach in facilitating sanitation from the bottom-up through collective decision-making and action based on strong social networks of cooperation. However, a word of caution is needed as “community-led” approaches can often be based on coercion of the poor and most vulnerable in the name of meeting community goals.

Managing Trade-offs: Water and Energy

At the macro-economic and political level, decisions must be made on water-related trade-offs, especially in the energy and food security nexus. For example, biofuels and food may compete over scarce water and land resources. Biofuels may contribute to a reduction in greenhouse gases in the long-term but without appropriate soil and water conservation or synergies with the cultivation of food crops they can distort markets and destroy livelihoods, particular for poor farmers.

Water Conflicts

Water management is by definition, conflict management. Conflicts over water are deeply embedded in the social hierarchies that structure our everyday lives. These include relations of power based on gender and identity as well as competition in the face of scarcity, poor allocation mechanisms and the

absence of clear water rights or entitlements. However, facilitating access to water and sanitation services is also at the heart of peace-building processes in fragile economies as examples from India, Uganda and Darfur illustrated. Multi-stakeholder dialogues, spaces for participation and negotiation and the use of a wide-range of culturally appropriate media comprise some of the conflict sensitive approaches discussed.

Challenges

Valuing Water?

Water remains a multi-faceted commodity of economic and social value. It is increasingly seen as a political good. Water is higher on political agendas than before but this increases the risk of water being used for political gains. While the world has not witnessed the “water wars” predicted more than a decade ago, competition and conflicts over water in communities and across regional or national boundaries are still often violent. Negotiation or dialogue platforms are needed at a scale which will require better-equipped and sensitive facilitators.

Urbanisation

Growing urbanisation with contrasting mega cities and poor peri-urban areas adds complexity and challenges to the planning and management of water resources. While Public-Private Partnerships in Asia are beginning to mobilise key actors (e.g.



Photo: Thomas Henrikson

the City Sanitation Strategy in Indonesia or Urban Renewal Mission in India), prioritisation and political will are important to sustain participatory planning in the absence of strong institutions. Building consistent policy and regulatory frameworks is a challenge when governments change. The multiplicity of actors also raises questions about accountability and transparency.

Financing Innovations

While the challenge of leadership and resources for meeting the MDGs persist, there is liquidity in the private sector. Successful examples of micro-finance for water and sanitation from Egypt, the Philippines, Mexico, India, Kenya were cited. Financing water utilities should not be too difficult as they generally have a “triple A” credit rating with banks. Still, corruption and water losses remain to be addressed. The challenge lies in developing bankable projects and strengthening the capacity of utilities, local governments and regulations to manage the process and project development. Success stories need to be better documented and shared.

There is a lot of experience targeting increasing funds in the water supply and sanitation services. There is little work, however, on financing water for food, agriculture or the “soft” side of our business: management of water as a “public good”, costs related to better management, etc.

Current agricultural production methods are unsustainable. They involve large-scale groundwater overexploitation and widespread river depletion, which threaten biodiversity and aquatic ecosystems. The key is to find ways to produce more food by using less water and to ensure that biodiversity losses do not threaten ecosystems.

The Right to Water

Water sector reforms in many countries have adopted a human-rights based approach (e.g. South Africa, Kenya), but the legacy of past inequalities in water allocation and distribution persists. In addition, there is increasing, often aggressive, competition from other sectors (industry, energy, agriculture) while mechanisms for ensuring rights are not in place.

Monitoring Progress: Indicators

Monitoring progress on integrating water resources management and MDG deliverables is challenging. While there are adequate indicators for water supply and sanitation, indicators for monitoring IWRM were debated. Several committed organisations are willing to work on this under the auspices of UN-Water.

Funding Adaptation

Discussions on the impact of climate change on water were widespread among the sessions. African leaders pointed out that discussion on climate change in the North and West mainly focus on mitigation strategies and efforts to offset the carbon footprint. A strong appeal was made for international forums to

discuss climate change from the water perspective, especially on adaptation strategies for more vulnerable countries and populations. Successful adaptation is primarily achieved through better and more integrated water resources management. Many African countries have lower storage capacity than developed countries. Increased financing targeting infrastructure to improve water security was called for. Government representatives of Denmark, the Netherlands and others gave positive official responses to this request and the need to focus discussions on adaptation and targeted strategies.

Opportunities for Progress

Virtual Water: Measuring Consumption

Acceptance by decision and policy makers of water-related economic concepts such as virtual water is a great opportunity for getting balanced integrated strategies to calculate trade-offs for more efficient, environmentally sound and equitable planning, management and development of water resources. Understanding consumption behaviour based on simple calculations of our virtual water footprint can help raise awareness and build political accountability for sustainable water management (see: www.waterfootprint.org). However, it also raises complex political questions – should water scarce regions import food rather than grow their own? How then will this be affected by unequal trade relations? What is the best means to advocate a reduced Corporate Water Footprint?

Dialogues and Multi-stakeholder Partnerships

Partnerships and stakeholder platforms add value to the process of planning and managing shared water resources in large cities, such as Lima, and in rural areas and river basins. Partnerships are also the key to leveraging more funds and political commitment for the sectors’ needs. Multiple uses of water, inter-sectoral planning and good governance are being seen as opportunities to better learn how to jointly plan and manage resources in an integrated manner (e.g. the EMPOWERS approach in the MENA region – Middle East and North Africa).

Success stories from the private sector in leveraging funds through loans or contracts demonstrated the need for strong regulatory frameworks and well defined water governance structure. These are necessary both as a consumer protection function to ensure equity, environmental protection and public health and also to minimise opportunities for corruption and guarantee water and economic efficiency.

Banking on Innovation: Wastewater Reuse

There are more opportunities and technological advancements to improve reuse of water. Adopting proper wastewater management makes wastewater an additional water resource. In some cases, these new resources bring additional economic value



from “free” nutrients, made more valuable by current increases in fertiliser prices and shipping/fuel costs. New guidelines and tools prepared by WHO now recognise that very high standards for re-using wastewater may be difficult to follow and are thus sometimes ignored. New guidelines currently being developed will enable more access and potential use of wastewater in areas where they may not have been used before, especially in irrigation and recharging of groundwater aquifers.

Ecological sanitation (eco-san) is also an established, cost effective, and environmentally sound option that can help to solve our sanitation deficit and reduce the pressure on scarce water resources while improving living conditions and lowering risks to human health.

Conclusions and Recommendations

Strengthening the enabling environment at the national and regional level must be prioritised. It can be achieved through improved policies, institutional arrangements, regulation and adoption of instruments and tools for more efficient and equitable water use and management.

Dialogue needs to be further encouraged and fostered between science, government and society. The dialogues should focus on calculated trade-offs and negotiated priorities to reach the careful balance between the three pillars of integrated water resources management: equity, efficiency and environment.

Although many lessons have been shared and success stories documented, there is a need to strengthen knowledge management in the context of capacity building and shared learning. More intense work is required to strengthen those forums.

Up-scaling success stories and pilots is needed if we plan “to go for gold” and address the MDGs within the time frame.

However, up-scaling has to be done with caution as wide-scale implementation may have unexpected adverse effects.

Better regional and transboundary integration – especially within the context of climate change risks – is needed. Calculated regional and in some cases global integration of approaches in parallel to national efforts are crucial. Economic trade-offs and negotiated sharing of benefits across political borders would result in better and more efficient use of resources.

Despite global, regional and national efforts, crisis management remains a preferred choice by decision-makers. The other more efficient choice may be a demand responsive approach to water resources management. There is a feeling that this is the only choice we can really afford in the current global context.

In closing, the World Water Week also offered many short provocative messages that we should take back with us, some of which are listed below:

- Reduce your water footprint. Consider the water impact of your diet and lifestyle.
- Promote the ratification of the UN Watercourses Convention.
- Good water governance is about leadership not simply financial resources.
- IWRM is not only a technical process. It is a political process across sectors.
- Be realistic. Develop new health standards for reuse of wastewater depending on local conditions and realities.
- No one dies due to lack of water or poor sanitation in Stockholm. Why then in other parts of the world?
- We need more infrastructure and more water storage capacity to be able to address water security.
- Water management is not rocket science. It is common sense.

Convening Organisations

5th World Water Forum Secretariat
Acacia Water
Academy for Educational Development (AED)
African Development Bank (AfDB)
African Ministers' Council on Water (AMCOW)
Agence Française de Développement (AFD)
Akvo
An International Centre for Soil Fertility and Agricultural Development (IFDC)
AquaFed
Arghyam
Asia-Pacific Water Forum (APWF)
Asian Development Bank (ADB)
Bali Fokus, (Indonesia)
Bangladesh Centre for Advanced Studies (BCAS)
Basic Needs Services (BNS, Philippines)
BothENDS
Bremen Overseas Research and Development Association (BORDA e.v.)
Building Partnerships for Development in Water and Sanitation (BPD)
Cambodian Association of Civil Engineers (CACE),
Cambodian Education and Waste Management Organization (COMPED)
Capacity Building for Integrated Water Resources Management (Cap-Net)
CARE Middle East and Eastern Europe Regional Management Unit (MERMU)
CARE USA
Central Asia and South Caucasus Water Utilities Association (CASCWUA)
Centre for Science and Environment (CSE)
Centre on Housing Rights and Evictions (COHRE)
Centre Régional pour l'Eau Potable et l'Assainissement à faible coût (CREPA)
Chalmers University of Technology, Sweden
Chinese Society for Environmental Sciences (CSES)
Church of Sweden
CIRCLE ERA-Net
Coalition Clean Baltic (CCB)
Commission on Climate Change and Development (CCD Commission)
Conservation International
Consortium for DEWATS Dissemination (CDD, India)
Co-operative Programme on Water and Climate (CPWC)
Council for Scientific and Industrial Research, South Africa (CSIR)
Creative Slovakia
CRUE ERA-Net
Danish Hydrological Institute (DHI)
DBL – Centre for Health Research and Development, University of Copenhagen
Department for Infrastructure and Economic Cooperation, Sida (INEC)
Department for International Development, UK (DFID)
Department of Econometrics, University of Geneva (UNOG)
Department of Water Affairs and Forestry, South Africa (DWAf)
Department of Water and Sanitation in Developing Countries (Eawag/SANDEC)
Department Public Health and Environment, World Health Organization (WHO-PHE)
Development Research and Technological Planning Center (DRTPC)
Development Workshop Angola (DW)
DEWATS
Diageo
DIVERSITAS
Dutch Ministry of Foreign Affairs (DGIS)
Earth Forever Bulgaria
Earthscan
Eawag: Swiss Federal Institute of Aquatic Science and Technology
EMPOWERS Thematic Group (ETG)
European Commission (EC)
European Commission's Directorate-General Environment
European Investment Bank (EIB)
European Union (EU)
European Water Partnership (EWP)
Euroteleorman Romania
Excellent Novel and Radical Ideas (EXNORA International, India)
Faculty of Life Sciences of the University of Copenhagen
Federal Institute for Geosciences and Natural Resources, Germany (BGR)
Federal Ministry for Economic Cooperation and Development, Germany (BMZ)
Federal Ministry of the Environment, Nature Conservation and Nuclear Safety, Germany (BMU)
Food and Agriculture Organization of the United Nations (FAO)
Formas
Foundation for Educational Innovations in Asia (FEDINA, India)
Freshwater Action Network (FAN)
Gender and Water Alliance (GWA)
German Agency for Technical Cooperation (GTZ)
German International Development Cooperation
Global Environmental Flows Network (EFlowNet)
Global Water Partnership (GWP)
Global Water Partnership Central and Eastern Europe (GWP CEE)
Global Water System Project (GWSP)
Green Cross International (GCI)
IEA Bioenergy Task 30
IIED-America Latina
Indian Institute of Youth Welfare (IIYW)
Indian Water Works Association (IWWA)
Institute for Integrated Economic & Social Development (BEST, Indonesia)
Inter-American Development Bank (IADB)
Inter-Islamic Network on Water Resources Development and Management (INWRDAM)
Intergovernmental Panel on Climate Change (IPCC)
International Association of Hydrogeologists (IAH)
International Bank for Reconstruction and Development (IBRD)
International Center for Water Hazard & Risk Management (ICHARM)
International Centre for Integrated Mountain Development (ICIMOD)
International Commission for the Hydrology of the Rhine Basin (CHR)
International Development Research Centre (IDRC)
International Foundation for Sciences (IFS)
International Fund for Agricultural Development (IFAD)
International Groundwater Resources Assessment Centre (IGRAC)
International Institute for Environment and Development (IIED)
International Lake Environment Committee (ILEC)
International Water Association (IWA)
International Water Management Institute (IWMI)
IRC International Water and Sanitation Centre



Photo: Getty Images

ITT Corporation
IWRM ERA-Net
Japan Water Forum
KfW Germany
KPMG
Ladakh Ecological Development Group (LEDeG, India)
Lao Institute for Renewable Energy (LIRE)
Lembaga Pengembangan Teknologi Pedesaan (LPTP, Indonesia)
Maji na Ufanisi
Ministry of Land, Infrastructure, Transport and Tourism of Japan (MLIT)
Mony Consultants Ltd (Cambodia)
Munich Re Foundation
NEPAD Business Foundation (NBF)
Netherlands Water Partnership (NWP)
Network of Asian River Basin Organisations (NARBO)
Nile Basin Initiative
Nordic Environment Finance Corporation (NEFCO)
Northern Water Network (NoWNET)
Norwegian Ministry of Foreign Affairs
Norwegian Ministry of Health and Care Services
Orange County Sanitation District
Orange County Water District
Orangi Pilot Project Research and Training Institute (OPP-RTI)
Organisation for Economic Co-operation and Development (OECD)
Palestinian Hydrology Group (PHG)
People's Dialogue Ghana (PDG)
Rainwater Harvesting Implementation Network (RAIN)
Regional Office for Europe of the World Health Organization (WHO-EURO)
Romanian Ministry of Environment and Sustainable Development
Royal Swedish Academy of Engineering Sciences
Rural Literacy & Health Programme (RLHP, India)
Saferworld
SNOWMAN ERA-Net
Society for the Promotion of Area Resource Centres (SPARC)
South Asia Water Utilities Network (SAWUN)
Southeast Asia Water Utilities Network (SEAWUN)
Southern Nevada Water Authority
SPLASH ERA-Net
Stakeholder Forum for a Sustainable Future
Stockholm Business Region
Stockholm Environment Institute (SEI)
Stockholm International Water Institute (SIWI)
Stockholm Water Foundation (SWF)
Streams of Knowledge (STREAMS)
Suez Environment
Sustainable Sanitation Alliance (SuSanA)
Swedish Environmental Protection Agency (Swedish EPA)
Swedish International Development Cooperation Agency (Sida)
Swedish Network of Peace, Conflict and Development Research
Swedish Red Cross
Swedish University of Agricultural Sciences (SLU)
Swedish Water House (SWH)
Swiss Agency for Development and Cooperation (SDC)
Swiss Federal Office for the Environment (SFOEN)
Swiss Federal Office of Public Health (FOPH)
Swiss Re
Technology for Economic Development (TED, Lesotho)
The Centre for Environment and Development for the Arab Region and Europe (CEDARE)
The Nature Conservancy (TNC)
The World Conservation Union (IUCN)
UN Framework Convention on Climate Change (UNFCCC)
UN-Water
UN-Water Decade Programme on Capacity Development (UNW-DPC)
UN-Water World Water Assessment Programme (WWAP)
UNDP Water Governance Facility
UNDP Water Governance Programme
UNEP Collaborating Centre on Water & Environment (UNEP-UCC)
UNEP-DHI Centre
UNEP Finance Initiative (UNEP FI)
UNESCO Centre for Water Law, Policy and Science
UNESCO Institute for Water Education (UNESCO-IHE)
UNESCO International Hydrological Programme (UNESCO-IHP)
Union of Agricultural Work Committees (UAWC)
United Nations Children's Fund (UNICEF)
United Nations Convention to Combat Desertification (UNCCD)
United Nations Department of Economic and Social Affairs (UNDESA)
United Nations Development Programme (UNDP)
United Nations Economic Commission for Europe (UNECE)
United Nations Educational, Scientific and Cultural Organization (UNESCO)
United Nations Environment Programme (UNEP)
United Nations Human Settlements Programme (UN-HABITAT)
United Nations Secretary-General's Advisory Board on Water and Sanitation (UNSGAB)
United Nations University – Institute for Environment and Human Security (UNU-EHS)
United States Agency for International Development (USAID)
University of Twente, The Netherlands (UT)
USAID Global Water for Sustainability (GLOWS) Program
Vietnam Institute for Water Resources Research (VIWRR)
Water and Sanitation Association of Zambia (WASAZA)
Water and Sanitation Program (WSP)
Water Environment Federation (WEF)
Water Integrity Network (WIN)
Water Supply and Sanitation Collaborative Council (WSSCC)
WaterAid
WaterNet
Wetlands International (WI)
WHO/UNICEF Joint Monitoring Programme (JMP)
Women in Europe for a Common Future (WECF)
World Agroforestry Center (ICRAF)
World Bank (WB)
World Business Council for Sustainable Development (WBCSD)
World Health Organization (WHO)
World Meteorological Organization (WMO)
World Toilet Organization (WTO)
World Water Council (WWC)
World Wide Fund for Nature (WWF)

The 2008 Stockholm Water Prize

People do not only consume water when they drink it or take a shower. They wear it, eat it, drive it and fly it around the planet without reflection. 2008 Stockholm Water Prize Laureate Professor John Anthony Allan strikingly demonstrated this by introducing the “virtual water” concept, which measures how water is used in the production of food and consumer products.

Behind that morning cup of coffee are 140 litres of water used to grow, produce, package and ship the beans. That is roughly the same amount of water used by an average person daily in England for drinking and household needs. To produce one hamburger, 2,400 litres of water are needed.

Through simplified statistics and straight-forward reasoning, the virtual water footprint enables new approaches to managing water resources. Prof. Allan has applied this concept to show how trade can enhance national, regional and global water and food security. The premise is simple – send water intensive commodities from places where they are economically viable to produce to places where they are not. This has major impacts on global trade policy and research, especially in water-scarce regions, and has redefined discourse in water policy and management. In 2008, major corporations are beginning large-scale projects to analyse and reduce their virtual water footprints.

Prof. Allan has transformed thinking on the spectrum of water challenges. By shifting focus from water to political realities that govern its use, Prof. Allan’s insights connect the water problems to the remedies that are found outside the water sector. His work has shed light on how understanding the political landscape is paramount to solving the most serious water sector issues.

“Prof. Allan has improved understanding of key concepts in the communication of water issues and how they are linked to agriculture, climate change, economics and politics that are of the highest relevance for the successful and sustainable use of water resources,” said the Stockholm Water Prize Nominating Committee.

Described by many as one of the most influential thinkers in the global water sector today, Prof. Allan remains a leading voice for sustainable water development and an expert advisor on cross-cutting water challenges, such as balancing population growth and increasing food demand in developing countries, institutional reform, valuing water and conflict resolution.



Photo: Exray

Prof. John Anthony Allan, King’s College London and the School of Oriental and African Studies, received the 2008 Stockholm Water Prize on August 21 from the hands of H.R.H. Crown Princess Victoria of Sweden.

About the Prize

The Stockholm Water Prize is an international prize founded in 1990 and presented annually by the Stockholm Water Foundation to an individual, organisation or institution for outstanding water-related activities. The activities can be within education and awareness-raising, human and international relations, research and water management. The Stockholm Water Prize Laureate receives USD 150,000 and a crystal sculpture. H.M. King Carl XVI Gustaf of Sweden is the Patron of the Stockholm Water Prize.

Founders of the Stockholm Water Prize

The Founders of the Stockholm Water Prize are Swedish and international companies and organisations who strive to push sustainability forward in the water sector. The Founders of the Stockholm Water Prize working in cooperation with the City of Stockholm are: Bacardi, Borealis & Borouge, DuPont, Europeiska Insurance, Fujitsu Siemens Computers, General Motors, Grundfos Management, Hewlett Packard, ITT Water & Wastewater, Kaupthing Bank Sverige, Kemira Water, KPMG Sweden, Läckby Water, P&G, Ragn-Sells, Scandic, Scandinavian Airlines (SAS), Siemens AG, Snecma, SJ, Uponor and Water Environment Federation.

The 2008 Stockholm Junior Water Prize



Ms. Joyce Chai from the United States received the Stockholm Junior Water Prize on August 19, 2008 from the hands of H.R.H. Crown Princess Victoria of Sweden.

With groundbreaking research on the potential human and environmental dangers of silver nanoparticles in consumer products, Ms. Joyce Chai of California, USA, stands at the forefront of modern science. Congratulating her was H.R.H. Crown Princess Victoria of Sweden, who presented the prestigious 2008 Stockholm Junior Water Prize in the presence of 700 guests at this year's ceremony.

For most teenagers, silver nanoparticles may sound like the latest ipod model. These microscopic bacteria destroyers are quickly becoming equally ubiquitous too. They are currently used to sanitize over 200 common consumer products. So effective are silver nanoparticles at killing bacteria – one gram can disinfect hundreds of square metres of substrate material – many industries, such as LG and Samsung, have naturally been interested in expanding their application. Everything from socks, soaps and baby bottles to toothpastes and refrigerators are becoming “silver lined.”

Chai's research uncovered several unsettling unknowns. When items possessing silver nanoparticles are laundered or discarded, the nanoparticles are released into the environment. While silver ions are highly toxic to aquatic plants and animals (only Mercury is more toxic), there is little knowledge on the potential toxicity of the nanoparticles. Chai performed research that takes steps

towards understanding the potential environmental risks of using silver nanoparticles. Her research repudiates the claim that silver nanoparticles are less environmentally hazardous than silver ions and questions the reliability of their use in consumer products.

In their official motivation the Stockholm Junior Water Prize Jury said, "The scientific impact of this investigation is extremely profound, and we expect that it will open the door to serious questioning and further studies regarding the widespread use of silver nanoparticles."

The projects "Restoration of Water Reservoirs Using Latent Phases of Aquatic Organisms," by Russia's Alexey Shinkarev and "Firewood Hearth Distillers for Safe Water for Vulnerable Rural Populations" by R. D. Dasun Thakshala Siriwardana, Sandun Gayath Sameera Dissanayaka, and A. Sujith Madushan Silva of Sri Lanka, won honourable mention.

About the Prize

The Stockholm Junior Water Prize is presented annually to students between the ages 15-20 for outstanding water-related projects that focus on topics of environmental, scientific, social or technological importance. The international competition is sponsored by the ITT Corporation.

The 2008 Stockholm Industry Water Award



Photo: Exray

Mr. Peter Forssman, Chairman, Stockholm Water Foundation (left), presented the 2008 Stockholm Industry Water Award to Mr. Larry R. Crandall, Vice Chair, Orange County Sanitation District, Mr. Denis Bilodeau, Director, Orange County Water District, and Mr. Doug Davert, Chair, Orange County Sanitation District at the award ceremony.

The planet faces pressing freshwater challenges – population growth, rising water demand, groundwater depletion, seawater intrusion and pollution – all must be addressed. But solutions are being crafted. The Orange County Water District and the Orange County Sanitation District, jointly developed the Groundwater Replenishment (GWR) System, which improves water supply, quality and the environment. Their impressive work to design and implement the GWR system earned them the 2008 Stockholm Industry Water Award.

The Groundwater Replenishment System is one of the world's most advanced water purification systems, which will produce reliable, high-quality water to replenish the groundwater basin, protect the basin from seawater intrusion, reduce the amount of treated wastewater released into the Pacific Ocean and provide enough water to meet the needs of an additional 500,000 people in the arid coastal region of Orange County California. The additional water source will also help Orange County Water District better manage the groundwater basin for both water quantity and quality. And it does so at half the fiscal and energy cost of importing water. The purification process has been replicated in Singapore, Australia and other arid coastal regions of the world and can be further spread to help address a looming global water crisis.

Water is purified through a three step process: microfiltration, which removes small suspended particles, protozoa, bacteria and some viruses from the water; reverse osmosis, where water is directed under high pressure through thin membranes to eliminate salts, viruses, pesticides, and most organic compounds; and ultraviolet (UV) light and hydrogen peroxide treatment, which

creates a powerful oxidation reaction that breaks down organic compounds through an accelerated decomposition process.

The result is ultra-pure quality water similar to distilled water. After the advanced water purification processes the water is returned to the groundwater basin where it is buffered with natural minerals. This water is injected along the coast to maintain a seawater intrusion barrier. The purified water blends with the existing groundwater before it is used as a source of drinking water for northern and central Orange County residents.

“Both agencies have demonstrated how communities can develop, implement and achieve sustainable water reuse,” says Dr. Lars Gunnarsson, Chairman of the Award Committee. “Their extensive involvement of private sector companies such as CDM and Trojan and Siemens, long-term commitment to research and development, and utilisation of cutting-edge technologies have established a model for water-stressed regions to replenish groundwater resources and improve water security.”

About the Award

The Stockholm Industry Water Award is presented annually by the Stockholm Water Foundation in collaboration with Royal Swedish Academy of Engineering Sciences and the World Business Council for Sustainable Development. It honours innovative corporate development and implementation of water and wastewater process technologies, contributions to environmental improvement through improved performance in production processes, new products and other significant contributions by businesses and industries that help improve the world water situation.

The 2008 Swedish Baltic Sea Water Award

Prof. Krzysztof Edward Skóra, Director of the Hel Marine Station at the University of Gdańsk received the 2008 Swedish Baltic Sea Water Award. Prof. Skóra's and the station's expansive research and educational activities to increase capacity and spread awareness on protecting the Baltic Sea earned him the prestigious distinction.

Prof. Skóra's personal research has exposed the impacts of new invasive species on the sensitive coastal water ecosystems in Poland. He also established the Hel Marine Station, which performs two critical functions to aid the Baltic environment. First, it facilitates and spreads research on the ecology of fish and marine mammals and the protection of rare species in the Baltic. Second, it educates and engages the public in continued commitment to preserve the fragile ecosystem through study visits, specialist courses and seminars. Its most popular division, the Grey Seal Research, Breeding and Rehabilitation Centre attracts 400,000 visitors annually.

"The Hel Marine Station, established under Prof. Skóra's

committed leadership, produces research of a high standard that is important for the understanding of the problems of the Baltic Sea and measures needed for its recovery. Equally crucial are the excellent educational programmes, which generate new waves of public interest, especially among the young, to preserve the Baltic Sea," said the Chair of the award committee, Ulla-Britta Fallenius of the Swedish Environmental Protection Agency.

About the Award

Established in 1999, the Swedish Baltic Sea Water Award recognises direct and practical efforts to improve water quality in the Baltic Sea. The regional award is presented annually by Sweden's Ministry for Foreign Affairs during the World Water Week in Stockholm in appreciation of the dedicated work done by individuals, corporations, non-governmental organisations and municipalities to help protect and restore the Baltic Sea's water environment. In 2008, the prize sum was increased to SEK 150,000.

Prof. Krzysztof Edward Skóra
at the Hel Marine Station.



Photo: Wojtek Jakubowski / Kosygarz Foto Press KFP



Photo: Mikael Ullén

H.E. Gunilla Carlsson, the Minister for International Development Cooperation in Sweden, presented the 2008 Swedish Baltic Sea Water Award to Prof. Krzysztof Edward Skóra, Director of the Hel Marine Station at the University of Gdansk.

Best Poster

The 2008 Best Poster Award was given to Mr. Krailert Taweekul, Faculty of Agriculture, Khon Kaen University, Thailand, for his poster "Efficient Water Use Technology for Chemically Free Vegetable Production Managed by Farmer Group." Mr. Krailert Taweekul was awarded for "showing how local knowledge about organic farming can be synthesised into a naturally fertilised water system reducing the requirements of energy, water and labour."

Posters presented during the World Water Week have always been an important component of the overall programme. Special efforts are made to make them accessible to participants and incorporated into the deliberations taking place during the World Water Week.

Mr. Krailert Taweekul will receive travel and accommodation to participate in the 2009 World Water Week in Stockholm.

WASH Media Awards

Four talented journalists from Africa and Brazil – including three working primarily in radio – received the 2007–2008 international WASH Media Awards for their excellence in reporting on water, sanitation and hygiene issues.

The journalists and their winning entries are: Ms. Winfred Onyimbo, Trans World Radio, Kenya, "Disease in bottle"; Ms. Cátia Toffoletto, CBN – Radio São Paulo, Brazil, "Water, the waste condemning São Paolo"; Ms. Claudine Efoa Atohoun, Office of Radio and Television, Benin, "Dassa, the commune of the 41 hills"; and Ms. Salome Gregory, Mwananchi Communications Limited, Tanzania, "This is Same, where fetching water means children miss classes." They won the WASH Media Award's English, Spanish, French and Gender categories, respectively.

True passion, commitment and journalistic excellence radi-

ated from the television, print, radio and web entries, said the chair of a nine-member international jury, noted television documentary-maker Robert Lamb of OnePlanet Pictures, UK. The competition featured high-quality journalism from Africa, Latin America, the Middle East, Central, South and Southeast Asia. "Public awareness built through the media paves the way for the global community to care and encourages decision-makers at all levels to act," said Mr. Lamb. "We should give due credit to these journalists who go after the all-important 'WASH story' as well as to their editors and producers and to the media organisations who give voice to people and issues that all too often are surrounded by silence."

The biannual competition is sponsored by the Water Supply and Sanitation Collaborative Council (WSSCC) and the Stockholm International Water Institute (SIWI).



Photo: Mikael Ullén

Mr. Anders Berntell, Executive Director, Stockholm International Water Institute and Mr. Jon Lane, Executive Director, Water Supply and Sanitation Collaborative Council together with Mr. Robert Lamb, OnePlanet Pictures, presented the 2008 WASH Media Award to Ms. Salome Gregory, Ms. Winfred Onyimbo, Ms. Cátia Toffoletto and Ms. Claudine Efoa Atohoun at the award ceremony.



Photo: Richard Ryan, Stockholm Visitors Board

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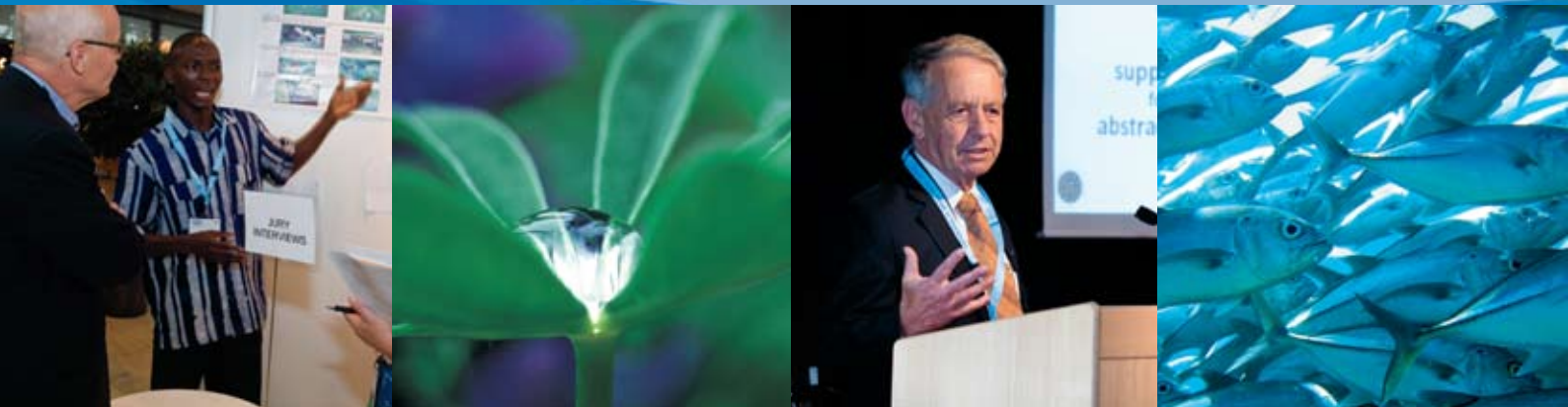


World Water Week in Stockholm

Building Capacity – Promoting Partnership – Reviewing Implementation

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