

WHO Collaborating Centre for Health Promoting Water Management and Risk Communication

Institute for Hygiene and Public Health

University of Bonn

Director: Prof. M. Exner



WaMRi-Newsletter

No. 7, December 2004

Dear Reader,

since the first edition of our WaMRi-Newsletter in March 2002, we have experienced a continuing augmentation of our readership all over the world. As a result, we receive more and more comments and contributions to our Newsletter. Based on this development, we decided to promote a bidirectional interaction, in which we would like to integrate your ideas and news in the fields of water management, water & health and risk communication. For that, we encouraged you in October to make contributions to our newsletter. Please feel free to make further contributions (see contact-address at the end of this newsletter).

We hope you will find this new concept appealing and inspiring for your work / reading interest.

We would like to inform you that the authors are responsible for the content of their articles and that they do not reflect the opinions or positions of the WHO CC.



We wish all our readers
Merry Christmas
and a happy new year

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Global climate change and waterborne diseases

Thomas Kistemann, Louise Lajoie, Alexandra Wieland

Introduction

The connection between climate change or weather and people's health status is known since Hippocrates's age. It is also known that the availability and the quality of freshwater play a crucial role for human health, as well as for the wellbeing and the socioeconomic development of societies.

It is easy to understand the relationship between climate and water availability, and "while it is acknowledged that quantity and quality are linked, the role of climatic factors associated with degradation in water quality and waterborne disease has just begun to elucidate." [1]

Even today, one third of the world population suffers from water scarcity, both in terms of water quantity and water quality. More than 2 billion people are affected by water shortages in over forty countries: 1.1 billion do not have sufficient drinking water and 2.4 billion have no provision for its sanitation. It is estimated that by "2025, 48% of the world's population will live in water-stressed river basins". [1]

Global climate change will affect the distribution and accessibility of safe water and thereby substantially influence the incidence of water-related diseases and deaths, especially in developing countries. Changing temperature and precipitation patterns will lead to a higher frequency of extreme weather events. Drought periods as well as flooding will deteriorate the quality of watersheds and, subsequently, of water intended for human consumption. These mechanisms threaten to cause rising incidences of water-related diseases (i.e., water-borne, water-washed, water-based and vector-borne diseases). Societies face huge challenges to minimize negative effects of climate change on human health.



Source: European Community 2004

In the following lines we introduce briefly the major factors that constitute a threat of human health.

On the one hand, the lack of available and accessible fresh water, and on the other hand, the lack of a water, qualitatively suitable for different human applications (drinking, bathing, washing, cleaning, irrigation, cooling etc.) are the main determinants of water-related health problems.

Water scarcity

Precipitation is the predominant source of water required for human consumption, agriculture and food production, and industrial waste disposal.

It is estimated that 54 percent of accessible runoff water is appropriated by humans [2]. As *per capita* use increases due to lifestyle changes (leisure and domestic practices) and population growth, the proportion of appropriated water rises. Coupled with spatial and temporal variations in water availability, this means that water for human use is becoming increasingly scarce.

The average person in the developing world uses 10 litres of water per day. Water is collected by an average walk of 6 kilometers, mostly by women and children [3].

The outcomes are significant increases in disease, poorer food security, conflicts among users and limitations on many livelihood and other productive activities. Current predictions are that by 2050, at least one in four people are likely to live in countries affected by chronic or recurring freshwater shortages [4]. At present, many developing countries, mainly situated in Northern and Southern Africa and the Middle East, have difficulty in supplying the minimum annual *per capita* water requirement of 1,700 cubic meters of renewable fresh water necessary for active and healthy life.

Water scarcity also has direct adverse health effects in that it restricts personal and domestic hygiene. Inadequate washing procedures and frequency facilitate diseases, such as trachoma, relapsing fever and typhus [5].

Water quality

Chemical risks

Even where there is enough water to meet current needs, many rivers, lakes and groundwater resources are increasingly polluted.

The most frequent sources of pollution are human and industrial waste, agricultural pesticides and fertilizers.

Pollution of drinking water by waste water is the most frequent health hazard related to chemical pollution worldwide.

The situation is particularly bad in developing countries, where institutional and structural arrangements for the treatment of municipal, industrial and agricultural waste are unsatisfactory.

Chemicals in drinking water can have acute and chronic toxic effects on humans. The World Health Organization (WHO) established guideline values (GV) for potentially hazardous water contaminants.

GVs are based on various parameters: the contaminant's estimated NOEL (no observed adverse effect level), the fraction allocated to drinking water, the daily drinking water consumption, the body weight and an uncertainty factor.

Microbial risks

Most water-induced disturbances are infections.

These infectious diseases are classified into four main groups [6].

Waterborne diseases

This is a group of infections that are caused by the ingestion of faecally contaminated water.

Cholera and typhoid fever are classical examples of diseases caused by highly infectious organisms, i.e. only a few organisms are needed to cause a severe diarrhoea. Furthermore, shigellosis, hepatitis A, amoebic dysentery and other gastrointestinal diseases also are recognized to be waterborne.

In contrast to other diseases, like the flu, for which a relation to climate or "weather" is generally accepted, the interaction of the environment and climate influencing water quality is not accepted by the public. However, waterborne disease agents can have a widespread effect on the quality of drinking water as a result of heavy rainfall, flooding and other changes in climate modes [1].

Diseases associated with inadequate water supplies

These illnesses are due to the lack of adequate water for washing, bathing and cleaning. Pathogens are transmitted from person to person or from contaminated surfaces to person by the faecal-oral route.

Eye, skin and diarrhoea illnesses occur often under these circumstances (trachoma, scabies, flea and tickborne diseases).

Water based diseases

Water provides the habitat for intermediate host organisms, in which some parasites spend part of their life cycle. These parasites are the cause of helminthic disease.

Their infective larval forms inhabit freshwater, find their way back to humans by boring through wet skin (schistosomiasis), are ingested with water plants, crustaceans or fish that are eaten raw, are not sufficiently cooked (liver and lung flukes) or are swallowed as minute crustaceans (Cyclops water fleas) that are themselves infected.

Water-related (vector-borne) diseases

Water also may provide a habitat for water-related insect vectors of disease. As they breed in water, adult mosquitoes may transmit malaria, filariasis and virus infections such as dengue, yellow fever and Japanese encephalitis. Such agents of disease vary in their preference for specific mosquitoes and the water they inhabit, but they are usually very specific in their host and environmental requirements.

Water-related disasters

Throughout the last decade of the 20th century, over 666,000 people died in natural disasters, of which 90 percent were water-related events. The vast majority of victims (97 percent) were from developing countries [7].

Worldwide, floods constitute the most frequent reported disaster events, while droughts claim the greatest number of victims [5].

Health effects of floods can be divided into direct and indirect effects. Direct effects are health effects caused by floodwaters, such as drowning and other injuries, while indirect effects such as waterborne infections, can result from flood-caused system damages. Health problems in association with floods may persist for months to years (e.g. in case of psychological effects) following a flood. [8].



Source: Greenpeace

Conclusions

Water has a central role in societies. Historically, health, wealth, and economic development always have greatly benefited from an effective management of water supplies. Reliable and well managed water supplies are the single most effective investment in economic and social development, and no other part of socioeconomic development has continued to be as cost-effective in relation to the wealth created.

Today, water scarcity, reduced water quality and water-related disasters are reasons for concern for the world's water resources and their health impact. However, most of the diseases associated with water are communicable. They are either waterborne, associated with inadequate hygiene of supplies, water-based or water-related.

From the public health point of view, it would be useful to reduce the burden of disease by creating an early warning system based on the susceptibility of the population and the climate variability. Therefore, an understanding of how climate change and waterborne diseases can be related is absolutely necessary.

Despite substantial progress during the International Drinking Water Supply and Sanitation Decade (1981-1990), much must yet be done to increase access to safe water and sanitation facilities, with special emphasis on school environments, to promote hygiene behaviour change and to develop effective measures to control emerging pathogens. There are the major challenges that must be met in order to reduce the burden of water-associated illness health in the next decade.

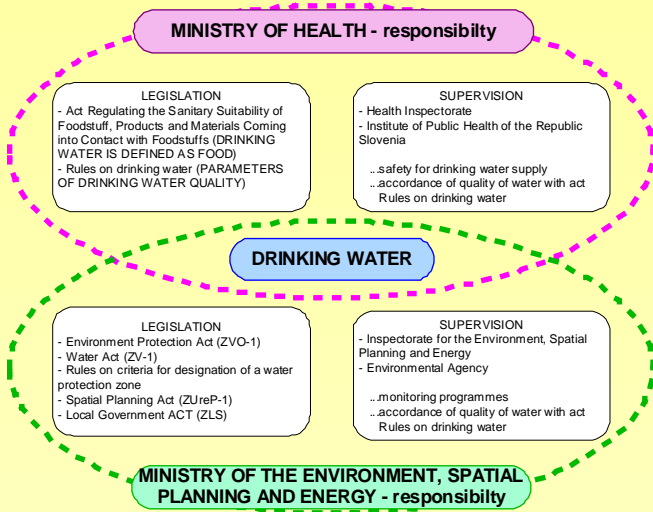
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The authorities regulating drinking water in Slovenia are divided between Ministry of Health – responsible for drinking water quality and Ministry of Environment, Spatial Planning and Energy – responsible for water resources, contributing regions and supply standards. This responsibility implies organization of supervisory work, professional support and harmonization of legislation.



Competence for drinking water

Drinking water is considered as food. Therefore, the drinking water quality in Slovenia is regulated by the food legislation. Since 2000, the Act Regulating Sanitary Suitability of Foodstuff Products and Materials Coming into Contact with Foodstuff submits all public water supplies to a control through the application of HACCP (the term "HACCP" is explicitly mentioned in this Act), for all hazards which can influence drinking water quality in public drinking water supplies. This was supplemented in year 2004 with the Rules on drinking water, where the internal control based on HACCP is also defined.

We follow the trend promoted in the 3rd edition of the WHO Guidelines for Drinking Water Quality. Within drinking water legislation, there has been a shift of emphasis towards a preventive or an "assurance of quality" approach. It encompasses comprehensive risk assessment and quality management strategies.

This constitutes a holistic approach -- from catchment to consumer -- and moves away from excessive reliance on *end-product testing* towards an infrastructure focusing on prevention, in which *processes of drinking water supply are controlled*. So far, so good, from the side of the authorities. But we find ourselves in a difficult situation, in which legislation is overtaking real conditions for this logical step: the evolution of an approach safeguarding the supply of safe drinking water, based on the trust of consumers.

First barrier is the very bad communication and the poor willingness for adjustment between the two Ministries that are both responsible for public drinking water supply. Then, we have local instances, like municipalities, which are responsible for regional safe drinking water supply and organization. Their operation sections assumes the task, sometimes with the help of public enterprises or concessions. At the municipal level, there are a lot of deficiencies in knowledge about safe drinking water supply. The communication between two or more municipalities is quite difficult and the communication between both Ministries is not much better. As we see, we have also a whole variety of water supplying organizations with insufficient professional workers and too little money to insure higher standards for safe water supply.

The next deficiency is the fact that national association of water suppliers are not effective. The Ministry of Health is now preparing the Guidelines for HACCP relative to the drinking water supply. But the Ministry revealed very frankly, that they do not have any suitable partner for communication on part of water suppliers, because their national association is not effective (they are not looking for a good communication between others experts either). So, these guidelines will be generated in one narrow circle, with limited knowledge about processes of drinking water supply.

What was done for now and what is visible in various conferences and workshops show only a very narrow success because of a too direct application of HACCP, as put in force in other food industry areas than water supply. We might say as well that one of our weak points is the lack of supply standards, like the technical regulations *DVGW* in Germany. We have some supply standards for the municipal level, but every municipality can elaborate its own limited rules.

So our elan has been stopped right at the basis. Water suppliers slowly include some kind of HACCP plans in their work. But until now, a lot of improvisation has taken place and to our mind, two very important points are neglected. The first one is the absence of professional hazard identification / risk assessment, and the second is the lack of an improvement plan with a precise schedule.

Our experience has conducted to the following remarks :

- The too direct transposition of HACCP in force in food industry to the drinking water supply lead to a kind of trap;

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- before undertaking this path, it is better to have some kind of framework at the national level, similar to the *Framework for drinking water quality management* in Australia or the *Public Health Risk Management Plan Guide* in New Zealand. It must be a consensus with full range of issues that should be quite concrete (not too general) for the management of drinking water quality;
- there must be some realistic divisions between water supplies, their size and which water safety standards they can insure ;
- because of the different responsibilities of drinking water suppliers, a sort of communication, collaboration and consultation between all involved must be organized, as it is mandatory ;
- HACCP must be an adapted and integrated part of other management systems used in the water industry (e.g. ISO 9001, ISO 14001, national technical rules...).

As a conclusion, we still have a lot of work to do. We require a much better communication and a good level of discussion. But above all, we need a lot of common sense.

Facts and impressions from the 4th World Water Congress and Exhibition 19-24 of September 2004, Marrakech, Morocco

The 4th World Water Congress and Exhibition was held on the 19th -24th September in Marrakech, Morocco. The whole world is confronted with problems of water shortage and drinking water quality. Most of the 1.1 billion people using water from unimproved sources live in Asia and Africa. Therefore, it is more than just a coincidence that the 4th World Water Congress has been organized in Africa.

IWA president Mr. Michael Rouse pointed out that water issues bring people together across regions, continents and professions. This was reflected by the exchange of ideas, experiences and know-how between the 2300 Congress delegates coming from 87 countries. The largest delegations came from Moroccan (250), Japanese (120) and Chinese (100) institutions.

On the 20th of September the opening keynote speech was delivered by John Briscoe, the World Bank's senior water professional and spokesperson on water issues. He underlined that sustained economic growth is fundamental for reduction of poverty and improvements in water and sanitation coverage.

On the same day, Dr Jamie Batram (Grand Award), Dr Till Merkel (Young Professionals Award), John Tyson (Outstanding Service Award) and Prof. Wilderer (Publishing Award) were pre-priced with the IWA Awards 2004.

Laszlo Somlyody, professor at Department of Sanitary and Environmental Engineering of the University of Technology in Budapest, Hungary, will chair IWA for the next biennium. He was voted as the IWA president at the Governing Board meeting in Prague, Czech Republic on the 6th September 2003.

The Exhibition was a marketing platform, presenting the world's leading companies and organizations in the water sector. The event hosted 120 stands, which showed a broad variety of technical solutions ranging from high tech equipment to low cost facilities. The visitors of the Exhibition were primarily high-level professionals from diverse milieus (utilities, operators, governments, researchers, consultants and NGO's).

As availability of safe drinking water for everybody constitutes one of the achievements of Millennium Development Goals (MDG), it went along with the entire Congress thematic. Safe drinking water supply ensures not only environmental sustainability but also supports all MDG's concerning human health.

The Congress' technical program, with about 900 scientific presentations, covered seven main themes:

- Operating water and waste water systems
- Innovation in wastewater treatment processes
- Innovation in drinking water treatment
- Integrated water resource and river basin management
- Water services and economy
- Water and health
- Ecological sanitation (EcoSan)

Special attention was given to the ecological sanitation and household drinking water storage topics. Different aspects of ecological sanitation were discussed in several sessions. Ecological sanitation does not only decrease the amount of wastewater produced by sanitation facilities, but also recycles valuable nutrients in human and animal excreta. Scientific results on household drinking water storage were presented and discussed in a special workshop. During home storage of drinking water the water quality very often deteriorates and poses a risk to human health. However, many people in developing countries as well as countries in transition need to store drinking water. Therefore, the importance of developing simple and low cost technologies for treatment and storage of drinking water in the household was underlined. This would also contribute to the achievement of the MDG 7, which implies reducing the proportion of people without sustainable access to safe drinking water by 50% until 2015.

On Tuesday, the 21st September, IWA launched the Bonn Charter for Safe Drinking Water along with the launch of the 3rd edition of the WHO Guidelines for Drinking Water Quality as part of the World Water Congress. Mr. Andrew Speers of IWA opened the session, introducing contributions from Mr. Ali Fassi Fihri (Congress president), Jamie Bartram (WHO) and Michael Rouse (IWA President). In general, it can be said that the Drinking Water Guidelines are setting standards for drinking water quality, while the Bonn Charter is a framework addressing the policy-maker level by describing operational and institutional arrangements. As both documents are interrelated and complement each other, they also should be considered together (please see also the links at the end of this newsletter). This event was supplemented by a workshop later on in the week, which regarded specific issues of charter.

On Friday, the 24th September the WHO seminar on Human Health in Water Resources Development and Management covered the following issues: Health impact assessment, burden of disease and economics of health interventions, sanitation and waste water use as well as special aspects of the Bonn Charter and the Drinking Water Guidelines.

Technical visits included excursions to the Bou-Regreg drinking water treatment plant and three different hydropower facilities.

During the closing plenary session, the invited members of the program committee reviewed the main themes and their relevant streams, emphasized emerging issues and underlined future needs. Finally, the outcomes were discussed with the auditorium. Presentations summarizing the major outcomes of the respective presentations are available at http://www.iwa2004marrakech.com/templates/Conferences/Marrakech/sec_page_red_noimg.aspx?ObjectId=195216.

The 5th IWA World Water Congress and Exhibition will be held on 10-14 September 2006 in Beijing, China (<http://www.iwa-beijing2006.org>).

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2005

35th International Symposium on Hydraulic Engineering Aachen Energy and Hydropower - Centennial Commemoration of Otto Intze (1843 - 1904) 04.-05. January 2005

Annually at the beginning of January the IWW hosts a two-day symposium. Over the years this "International Symposium on Hydraulic Engineering Aachen" (IWASA) has become a renowned meeting point and information center among experts. The conference mainly addresses civil engineers - researchers and practitioners in hydraulic engineering and water resources management, but it is public to any interested party. Lectures are given by invited speakers coming from research institutions, companies and public administrations. Topicality and relevance of the chosen subjects attract between 350 up to 450 visitors from Germany and the neighbouring countries every year.

Organizers: Institute of Hydraulic Engineering and Water Resources Management
Aachen University

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Contact: Dipl.-Ing. Bernhard Becker

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MPMD-2005 International Conference on Monitoring, Prediction and Mitigation of Water-related Disasters 12.-15. January 2005, Kyoto, Japan

This international conference MPMD-2005, of which UNESCO-IHP is a co-organiser, deals with new technologies, traditional wisdoms, governmental policies and international cooperation for better management of water-related disasters, giving an forum of natural and social scientists, engineers, educators, policy-makers and governmental officers, who are in charge of monitoring, prediction and mitigation of water-related disasters to discuss and exchange relevant issues in the areas concerned. The conference provides various research outcomes by universities, research institutes and governmental organizations from many parts of the world. It also provides an opportunity to see water-related disaster management systems in Japan as one of the typical disaster-prone countries coping with serious disasters for many years in a humid monsoon area of the world. Immediately after this conference, the participants may also take part in the UN World Conference on Disaster Reduction in Kobe on 18-22 January 2005.

Organizers: Disaster Prevention Research Institute - DPRI, Kyoto University

Contact: Professor Kaoru Takara

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URL: <http://fmd.dpri.kyoto-u.ac.jp/~flood/kyoto2005/index.html>

Implementation of the Water Framework Directive in Europe and NRW
Status quo and perspectives (in German)
12.-13. January 2005, Berlin, Germany

In den EU-Mitgliedsstaaten sind mittlerweile die fachlichen Arbeiten zur Bestandsaufnahme für die Umsetzung der Wasserrahmenrichtlinie (WRRL) weitgehend abgeschlossen. Das Ministerium für Umwelt und Naturschutz, Landwirtschaft und Verbraucherschutz (MUNLV) in Nordrhein-Westfalen (NRW) hält es zu diesem Zeitpunkt für lohnenswert, die gewählten Vorgehensweisen sowie die Darstellung und Vermittlung der Ergebnisse länderübergreifend zu bilanzieren und zu vergleichen. Daraus können entsprechende Konsequenzen für den weiteren Umsetzungsprozess gemeinsam mit den beteiligten Akteuren diskutiert und abgeleitet werden. Dazu plant das MUNLV in Kooperation mit dem Bund der Ingenieure für Wasserwirtschaft, Abfallwirtschaft und Kulturbau (BWK-NRW) sowie der Deutschen Vereinigung für Wasserwirtschaft, Abwasser und Abfall e.V. (DWA NRW) am 12. und 13. Januar 2005 eine Konferenz in der Landesvertretung von NRW in Berlin.

Venue: Landesvertretung NRW in Berlin

Organization: MUNLV Northrhine-Westfalia, DWA, BWK

Participation fee: 100,00 € for officials and members of the BWK and DWA
200,00 € for Non-members

Registration and information: iku GmbH Dortmund
Altfriedstraße 16
44369 Dortmund
Tel. 02 31 - 3 18 91

World Conference on Disaster Reduction
18.-22. January 2005, Kobe, Hyogo, Japan

The World Conference on Disaster Reduction (WCDR) is a milestone event to increase the profile of disaster risk reduction in development planning and practice. The Conference will provide a unique opportunity to promote a strategic and systematic approach at the national level to address vulnerabilities and to reduce risk to natural hazards. The Conference will build on the findings of the review of the implementation of the Yokohama Strategy and Plan of Action of 1994, aiming at: - Assessing achievements and identifying good practices; - Defining the remaining challenges, critical needs and opportunities in disaster reduction initiatives worldwide and examining emerging issues; and, - Developing a set of objectives and areas of action for disaster risk reduction to implement the objectives of the Johannesburg Plan of Implementation for Sustainable Development, as essential conditions to achieve the relevant Millennium Development Goals (MDG's).

Organizers: International Strategy for Disaster Reduction - ISDR

Contact: WCDR secretariat

E-mail: isdr-wcdr@un.org

URL: <http://www.unisdr.org/eng/wcdr/wcdr-index.htm>

2005 Source Water Protection Symposium
23.-26. January 2005, Palm Beach, Florida

The Symposium will include topic areas relating to transitioning from assessment to protection, development of effective source water protection strategies, partnership building, inter-jurisdictional issues, southeastern US source water protection issues, emerging issues, international perspectives, and other timely source water protection topics.

Organizers: American Water Works Association (AWWA)

Contact: Chi Ho Sham, Linda Moody

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URL: <http://www.waterwebster.com/AWWA2005Symposium.htm>

Workshop on "Promotion of Women's Participation in Water Management"
24.-25.February 2005, Teheran, Iran

Promoting women's role in different aspects of water management is one of the most important measures to be carried out in the compliance with meeting Integrated Water Resources management (IWRM) goals. The Regional Centre on Urban Water management (RCUWM - Teheran) intends to hold a training workshop, aimed at involving international, governmental and non-governmental organizations which have had a significant part in promoting women's role in water management and also in creating dialogue among all national organizations and institutions involved in this field. The main themes of the workshop are: - How to develop strategies concerning women's participation in water management issues. - The promotion of women's role in decision making on water resources management issues. - Capacity building - Case Studies; Effects of women's participation in water management.

Organizers: UNESCO, Regional Centre on Urban Water Management - Teheran, I. R. Ministry of Energy

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Advanced training: GIS-tools for hydrogeological practice (in German)
(23.) 24. - 26. February 2005, Fulda, Germany

Die Erfassung hydrogeologischer Daten, ihre Verwaltung, Analyse wie auch ihre weiterführende Aufbereitung sowohl für die Visualisierung als auch als Eingangsdaten für hydrogeologische Modelle und numerische Grundwassermodelle bedeutet in der Praxis einen sehr hohen Aufwand. Moderne Informationstechnologien bieten heute umfangreiche Unterstützung durch Datenbank- und GIS-Systeme. Für einen effektiven Einsatz dieser Technologien in der hydrogeologischen Praxis sind jedoch über eine reine Programmbedienung hinaus gehende Kenntnisse und Fähigkeiten in Design und Nutzung hydrogeologischer Datenbanksysteme bzw. in den für einen effizienten Aufbau von numerischen Grundwassermodellen angewandten GIS-Operationen und -Berechnungsmethoden notwendig.

Der Kurs setzt Grundkenntnisse in GIS (ArcView), jedoch keine Vorkenntnisse in hydrologischer und Grundwasser-Modellierung voraus. Übungen mit weitverbreiteten Programmen wie Access und ArcView ermöglichen praktische Erfahrung mit Datenbanken und GIS-Systemen mit spezieller Ausrichtung auf die Erfordernisse der hydrogeologischen Praxis, der Grundwasser- und der hydrologische Modellierung und auf eine direkte praktische Umsetzbarkeit. Der Kurs ist durch seinen Fokus auf eine effiziente Datenaufbereitung und -integration eine ideale Ergänzung zu reinen GW-Modellierungskursen (wie z.B. Malta I+II). Um auch GIS-Einsteigern einen Zugang zu ermöglichen, wird ein optionaler Vorbereitungstag angeboten.

Angesprochen sind Hydrogeologen, Ingenieure in Wasserwirtschaft und Umweltschutz, Ingenieurbüros, Behörden für Umweltschutz und Wasserwirtschaft sowie Wasserversorgungsunternehmen. Die Teilnehmer erhalten ein Zertifikat. Der Dozent ist Dr. Johannes Riegger (Institut für Wasserbau der Universität Stuttgart).

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**Conference on health and water quality aspects
of the man-made recreational water environment
10.-11. March 2005, Budapest, Hungary**

The use of pool and spas represent a recreational use of the water environment that is increasingly relevant. Their operation involves new technical approaches, new attractions, new materials and new chemicals to treat the water, all currently not subject to any form of unified regulation.

To fill this gap and to provide the basis for the development of evidence-based guidelines that can be the reference for new and improved regulations, this conference will provide a forum to:

allow an exchange of information between pool and spa operators on assessment of health risks and current operational procedures for dealing with such risks;

assess the current scientific basis for health risk assessment and management, particularly taking into account the WHO Guidelines on Safe Recreational Water Environments; and

gather information on current national regulatory instruments.

The conference is organized by the Hungarian National Institute for Environmental Health, with the support of the Hungarian Government and of WHO.

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**The 2005 Watershed Management Conference: "Managing Watersheds for Human and
Natural Impacts: Engineering, Ecological, and Economic Challenges"
19.-22. July 2005, Williamsburg, USA**

Conference Topics: Stream and Watershed Restoration, Constructed Wetlands, and Best Management Practices - Modeling and Monitoring of Hydrologic Processes: Rainfall-Runoff, Snowmelt, ET, Infiltration, and Other Phenomena - Effects of Fire and Post-Fire Mitigation on Watershed Hydrology - Managing Watersheds for Control of Ecological Impacts 5. Groundwater: Competing Demands, Contamination, Recharge, Mining, Salt Water Intrusion, and Other Challenges - The Economics of Watershed Management: Government Policy and Smart Growth - Managing Forested Watersheds: Roads, Fish Habitat, Stochastic Disturbances, and Other Challenges

Organizers: Environmental and Water Resources Institute (EWRI) of the American Society of Civil Engineers (ASCE)

E-mail: conf@asce.org

URL: <http://www.asce.org/conferences/watershedmanagement2005/>

3rd edition of the Drinking Water Guidelines

<http://www.who.int/mediacentre/news/releases/2004/pr67/en/>

The Bonn Charter for safe drinking water

http://www.iwahq.org.uk/pdf/Bon_Charter_Document.pdf

Selected books and articles

- Bartram, J; Cotruvo, J; Dufour, A; Rees, G and S Pedley (2004): ***Pathogenic Mycobacteria in Water***. A Guide to Public Health Consequences, Monitoring and Management. IWA Publishing.
- Corsi, S; Walker, J; Washbusch, R and J Stanridge (2003): ***Sources and Variability of Cryptosporidium in the Milwaukee River***. IWA Publishing.
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In Memoriam Dr. Friederike Dangendorf

*23.11.1964

† 19.8.2004

Our colleague and friend,

Dr. Friederike Dangendorf, passed away August 19, 2004 in Bonn, at the age of 39, after suffering a relentless disease.

Born in Siegen on November 23, 1964, she moved later to Bonn, where she spent a big part of her life and accomplished noteworthy professional achievements. After a first professional formation, she decided to complete her Abitur (school-leaving examination successfully passed in 1990) and obtained in 1997 her diploma as geographer from the University of Bonn. Her final diploma dissertation was honoured with the Heinrich Hoerlein Award. She obtained her Ph.D. in 2003, as result of a great research work in the field of Water and Health.

As research associate of the Institute for Hygiene and Public Health, University of Bonn, Dr. Friederike Dangendorf involved herself intensely and managed several scientific projects; she overtook diverse responsibilities, among which the whole teaching organization of the department and the direction of the WHO Collaborating Centre for Health Promoting Water Management and Risk Communication. As a true scientist, she never stopped challenging herself, and her great skills and knowledge brought a significant contribution to further research projects. It is very unfortunate to lose a colleague like her, who has been a pillar to our working group, and who always remained humble, despite her outstanding competence.

The many of us who have known and appreciated Friederike Dangendorf remember her as a helpful, jovial, optimistic and reliable woman, open-minded, full of enthusiasm for other cultures and rich of travelling experiences. Our team feels the loss of such a remarkable person and regrets sincerely that she left us, at an unexpected moment and much too early. She will never fade from our living memories.

The colleagues of the WHO CC

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