

# WaMRI-Newsletter

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## WHO Collaborating Centre for Health Promoting Water Management and Risk Communication



Institute for Hygiene and Public Health  
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### Drinking water supply in the rural area of the Mekong Delta, Vietnam

The lower Mekong's basin, which covers the countries Cambodia, Laos, Thailand and Vietnam, is the habitat of approx. 60 million humans. More than 100 different ethnic groups are represented in this area and make it one of the most culturally diversified regions of the earth. Most inhabitants are farmers and fishermen, who might have sufficient land and aquatic resources but not in terms of money. A third of the population lives on less than 400\$ per capita per year and has often no access to the most necessary state institutions, which are otherwise accessible to city dwellers. Regarding the drinking water supply, there are also numerous problems in this region.

### Geography of Vietnam

The socialist Republic of Vietnam lies in the extreme southeast of the Asian continent, forms a long swung coastal strip of approx. 1,750 km, up to the south Chinese sea. The north of the country borders on China. The center of the country, an extremely narrow coastal strip, is limited in the west by Laos and Cambodia and describes a southwest elbow into the gulf of Thailand. With 81,6 million inhabitants (2003), the population of Vietnam is similar to the one of Germany. The surface expansion of both countries is also comparable. Vietnam, with a surface of 329,600 square kilometers, is approximately 7,5 % smaller than Germany (reunited).



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Vietnam expands, like only few other countries of comparable size, over two climatic zones: a temperate climate in the north, comparable with the one in southern Europe, and a tropical climate in the south.

The capital Hanoi is situated in the north of the country. The heart of northern Vietnam is Tonkin (Bac Bô) and consists of a large alluvium in the delta of the red river. In the south of Vietnam extends the swampy and very fruitful delta of the Mekong river, along which the province Can Tho and its capital of the same name are located. Cochinchina (Nam Bo), its frequently flooded earth banks reaching the inland, constitutes the economical core area. The former city of Saigon, now renamed Ho-Chi-Minh City, is situated at the northeast edge of the Mekong delta and represents the industrial center of the country.

### The Mekong river

The catchment area covers approx. 800,000 km<sup>2</sup> and from its source in the high plateau of Tibet up to its delta in Vietnam, the river overcomes approx. 4800 km. Having a transnational watercourse, the Mekong flows through China, Thailand, Cambodia and Laos and a part of its catchment area reaches Myanmar. More than 60 million humans depend on the water of the Mekong river, for irrigation, drinking water supply and as route of transportation.

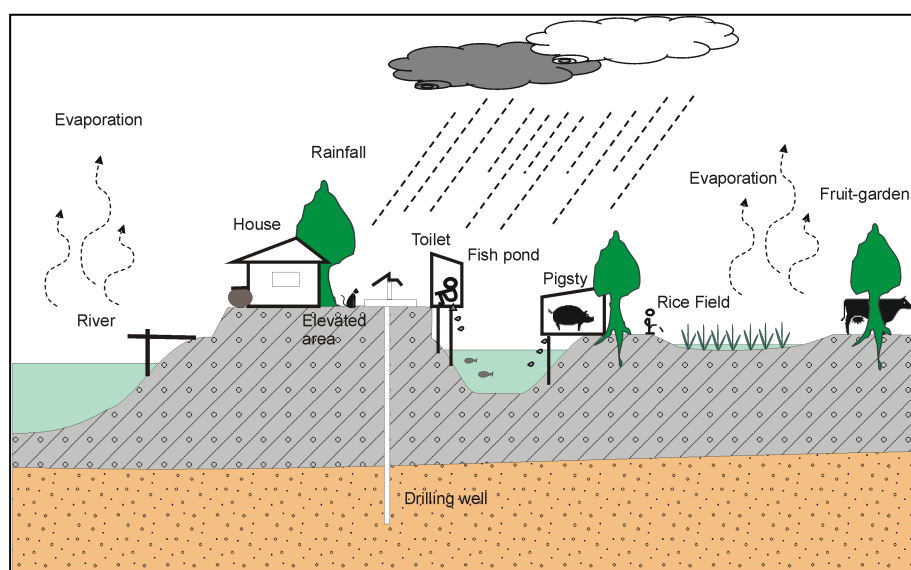
The water distribution varies according to the monsoon precipitation cycles.

In order to increase and optimize the agricultural production, irrigation structures have been developed, particularly in the delta.



### The SANSED Project

This project, promoted by the BMBF, is realized in cooperation with the university of Bonn, the University of Bochum, as well as the WHO CC of the university of Bonn. A goal of the project is to close agricultural nutrient cycles with hygienically harmless substrates from decentralized water management systems. Because of its central situation in the Mekong delta and the existing University of Can Tho in the province capital, the province Can Tho has been designated as study area. During the first phase of the project, drinking water supply structures in the rural area were identified and the existing systems were analyzed. Rain water, as well as ground and surface water are all sources of drinking water in the Mekong delta.



Typical situation of water supply and disposal in the rural area of the Can Tho province

Groundwater from the second aquifer comes from a depth varying between 60 - 200 m. Since it is artesian water, the use of hand pumps is possible without large expenditure. Before 1989, drilling was performed all over to search for groundwater wells (UNICEF particularly). Since then, a coordination has taken place via the rural water supply center, which assigns the drilling companies and organizes a cooperation with the center for public health, the woman union, the Ministry of Health, the geological office and the central office for water supply of the province. However, assigning private drill companies, who proceed to illegal well drillings, is simpler and economically more effective for the population. As a result, in 2003, 10,000 hand pumps were installed officially in the province Can Tho, although 54,000 wells were known to be in operation.



Water is directly collected from public network supply and filled into the receptacles (left)

From there, water can be picked up by hand with a scoop (right)



The uncontrolled drillings through the soil have strongly increased the permeability of the superficial geological layers (above the groundwater level) and the first aquifer can no more be used, as it has been contaminated by impurities. Chemical analyses of the groundwater quality show strong fluctuations, varying from one study site to the next.

Within the delta, there are zones where groundwater has a high salinity, and is not suitable for human consumption. It is yet unclear whether this salt originates from a marine water intrusion or fossil seawater. Meanwhile, the population uses this salty groundwater for cleaning purposes and animal care. Wells dispensing salty water are not shut down.

Regarding the microbiological quality, the analyzed groundwater shows usually a good condition. Contamination takes place particularly at the pump cock or within the pump, if this is badly maintained, or if the wrong pump type is used. Besides hand pumps type VN6, which are used by UNICEF, there are also Chinese reproductions of this model that are sold. These are of course less expensive, but of a cheaper quality.

During the storage process, the water quality frequently worsens. In the household, drinking water is traditionally stored in large clay jugs of approximately 120 liters. Independently of the water origin, aluminum sulfate is added to the water, to allow particles in suspension to flocculate. Aluminum sulfate is available in a crystal form on the market.



Subsequently, the cleaned water is poured into a second container and taken out as with a scoop when needed. The water remains up to 4 weeks in these containers. Contamination by microorganisms regularly occurs, and the microbiological standards of drinking water, as defined in the WHO Drinking Water Guidelines, are not met. Since the population is informed over radio, newspapers and community health personal, about existing health risks of water consumption, people have been trained to boil the drinking water before they drink or use it. Boiled water is usual kept in regularly cleaned thermal cans. For cleaning purposes, also pond and channel water are used.

Many Vietnamese in the Mekong delta reject groundwater as good drinking water source, while surface water is regarded as the suitable drinking water. The surface water originates from channels, rivers and ponds and is always strongly microbiologically and chemically contaminated, since their water is exposed to various points of contamination. Channels are water routes for ships, but also waste water discharges (garbage, toilets, scullery, animal husbandry and bathing/washing). Thus, oil residues, rubbish, feces, soap etc. are found in the water used for human consumption. In order to obtain water with the minimal contamination, residents of the delta collect water from channels only at times where there is low or no activity or during flooding (note: tidal range in the delta can be clearly recognized).



„Sky Toilet“ for public use

During the monsoon season, rain water is often used as drinking water. In many places, one can see gutters directly bound to clay receptacles. One waits 2-3 minutes for the first rain to run down the roof and collects new rain water afterwards. Because of its particular clarity, restaurants offer in some regions rain water as special drink.

Immediately after it has been collected, rainwater has a good chemical and microbiological quality and can be used as drinking water after boiling. However, the use of rainwater is not nationally promoted, and therefore, a self initiative of the population is necessary. The water is scooped either by hand or pumped, depending upon financial possibilities. In former times, the flesh of a special type of pumpkin has been added to the water, in the clay recipients, in order to improve the water taste.

Meanwhile, a political reorientation has begun in regard of the innovation of water supply structures. Many single water supply enterprises are seen as ecologically unfavorable for the resource (water). Alternatively, small water treatment plants that operate in villages refer to an oxidation technique and sand filters. The treated drinking water is then stored in an elevated tank and supplied to the next households over a network of plastic pipes. The operator of the water plant is paid according to the fluctuations of the water price and must guarantee the general safety of the plant. The population has different opinions about this kind of water supply. The main reason for the refusal of this system is the need to pay water fees. As a matter of fact, it is more favorable, economically speaking, to invest the money into the purchase of a pump.

Traditionally, household water consumption can be determined very simply by reading the water level on the tanks. If households are connected to the water pipeline, the level of consumption can be read directly on a water meter; this is however seldom the case. Instead, the receptacles are filled directly from the water pipeline, the water is stored in these and the consumption can be seen by their filling level.

Aside the technical improvements, it is also mandatory to develop suitable concepts and break or integrate the traditional ways of thinking, in order to improve the drinking water hygiene. At the moment, considerations aim, among other things, to find a suitable disinfection method for receptacles and to keep water free from germs after its collection. Here, ceramic filters and UV irradiation are conceivable. The use of ozone, that can be produced via electricity from solar cells, is also being considered. Beside these concrete applications, solutions based on the multi-barrier principle must be found in order to protect the ground water layer and reduce amounts of feces in water. Recycling of manure allows not only a better water quality, but contributes also to the improvement of public health and, because economically advantageous, of the life quality.

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**The protocol on Water and Health ("London-Protocol")  
in the context of an international environmental policy**

The protocol on Water and Health is a result of the third European conference "Environment and Health", which took place in London in 1999. Numerous international conferences and agreements have preceded this conference, and are briefly presented in the following lines.

In **1972**, the first international **United Nations Conference on the Human Environment** took place in Stockholm. The principal political interest of the industrialized countries was to agree upon measures appointed to limit environmental pollution of industrial origin as well as to protect ecological systems and prevent a threatening global environment disaster. Concerning the developing countries, the center of attention was rather focused on reinforcing the economic development by fighting against poverty, improving the educational and vocational system, guaranteeing the medical supply and insuring the good quality of water.

The Stockholm conference brought a first awareness on the theme. The participants of industrialized countries could convince the ones of developing countries that problems due to drought, flood and insufficient hygienic conditions have a big economic impact and that no contradiction exists between environmental protection and development. From this discussion resulted the "compromise" formula: *"poverty is the biggest polluter"*.

This formula enabled the representatives of developing countries to express their opinion about environmental protection without having to make cuts in their development policy goals. Furthermore, it has been stated that environmental problems (e.g. deforestation of tropical rain forests, marine pollution, hole in the ozone layer and greenhouse effect) cannot be solved without involving mankind, through his social and economic contributions.

The "Action plan for the human Environment", approved by the UN general assembly in 1972, one could find conventions for environmental protection, measures applying to the collection of environmental data, the environmental research, the monitoring and the exchange of information, the careful handling of resources, the elaboration of environmental administrations, the promotion of education and training and as well as the information of the public. To adopt and coordinate this new action plan, the United Nations created the environmental program unit (UNEP), whose headquarter is based in Nairobi, Kenya.

**Have resulted of this conference:**

Declaration on the Human Environment

Action Plan for the Human Environment

Resolution on Institutional and Financial Arrangements

Creation of the UN Environment Programme

The United Nations, as independent expert committee, created in **1983** the World Commission on Environment and Development (WCED), whose secretariat is in Geneva. Their mandate was the elaboration of a report concerning the perspectives of a worldwide sustainable and environmentally sound development up to 2000 and further on.

The expert committee consisted of 19 designated persons from 18 states dispersed over the world. The former minister of Environment, and former Prime Minister of Norway, Gro Harlem Brundtland (who is since 1998 general director of the World Health Organization = WHO) was elected as chairwoman. The presidency changes yearly since 1988.

Four years later (1987), the Brundtland Commission published a final report, "Our Common Future", which is also known as **Brundtland report**, which influenced significantly the issues of the international debate over development and environmental policies. Two international conferences (1987 in London and 1988 in Milan) were discussed in this report; it also became the main argument for the initiation of the first Earth Summit held in Rio de Janeiro in 1992.

"Our Common Future" has been very important for international debates concerning development and environmental policy, because the concept of a "sustainable development" was developed for the first time. The Commission defined a **sustainable development** as *a broad-based economic progress accomplished in a manner that protects and restores the quality of the natural environment, improves the quality of life for individuals and broadens the prospects for future generations, ... and where economic and environmental goals are inextricably linked.*

The realization that improvements in "environmental health" could only be achieved through a cooperation between the environmental protection and health sectors led to the **first Conference** of the member states of the WHO - European region on **"Health and Environment" 1989 in Frankfurt/Main**. At this Conference, the respective ministers of Health and of Environment from 29 states met in common forum and adopted the "European Charter on Environment and Health", in which the priority of human health (before economic growth) was highlighted. The ministers agreed on the basic principles, mechanisms and priorities for environment and health programmes; established the WHO European Centre for Environment and Health; and agreed to hold a follow-up conference five years later.

The report of the Brundtland Commission called for an urgent need of action of the international community. But the demands and suggestions raised in this report, in order to become effective, had to be followed by the adoption of commitment contracts and of conventions, applicable at an international scale. As instrument of implementation, the UN instituted a conference, planned exactly 20 years after the 1st world-wide conference on environment.

Not only political problems concerning the environment were the concern of the conference **"Rio Earth Summit"**; the need for urgent solutions for global development problems linked to environment and politics were also treated. One solution appeared to be the development of a world-wide sustainable development. Human beings were brought at the centre of concerns for a sustainable development, as they depend on the environment, but also because of the impacts of their behavior and/or means of action on the world-wide observed environmental changes.

**Have resulted of this conference:**

The Rio Declaration on Environment and Development

The Framework Convention on Climate Change

The Convention on Biological Diversity

Principles of Forest Management

The Agenda 21

During the Second European "Health and Environment" conference held in Helsinki in 1994, the World Health Organization presented the " Environmental Health Action plan for Europe (EHAPE)". Following the publication of the EHAPE, the ministers of Health and of Environment of the participating states agreed on the adoption of a country action plan; so were developed the "National action plans on environment and health (NEHAPs)" across Europe. In June 1999, environment and health ministers committed themselves to endorsing and strongly supporting the implementation of NEHAPs in the London Declaration, at the Third Ministerial Conference on Environment and Health. At this conference, the experiences made out of the development and conversion of the NEHAPs were evaluated and the deficits were analyzed. In order to support the activities in the individual countries, the WHO initiated a "Steering Committee" in which representatives of the governments of Bulgaria, Estonia, Germany, Hungary, Lithuania, Malta, Federation of Russia, Sweden, Switzerland and Great Britain participated. These states have been designated to analyze their experiences at the national level. The institute of Public Policy and Social Research at the Michigan State University coordinates the evaluation and offers the scientific support of the cumulated international data.

**Have resulted of this conference :**

The Protocol on Water and Health

The Charter on Transport, Environment and Health

The Declaration of the 3. Min. Conference on Health and Environment

A major goal of the Protocol on Water and Health has been to protect human health and wellbeing by improving water management strategies, including the protection of ecological water systems, and by preventing, fighting and decreasing water-borne diseases on all suitable levels in the domestic, transnational and international framework, in the context of a sustainable development. The Protocol is the first international agreement of its kind adopted specifically to attain an adequate supply of safe drinking water and adequate sanitation for everyone (individual as well as whole community), and to effectively protect the resource used as drinking water ([http://www.unece.org/env/water/text/text\\_protocol.htm](http://www.unece.org/env/water/text/text_protocol.htm)).

This protocol requires the ratification, acceptance or permission by the signatory states and the organizations of the regional economic integration and will enter into force on the 90<sup>th</sup> day after the deposition of the 16<sup>th</sup> ratification, instrument of accession or document of authorization. At present, 12 countries ratified the protocol: Albania, Azerbaijan, Tschechien, Estland, Hungary, Lettland, Luxembourg, Norway, Romania, Russia, Serbia and Montenegro, Ukraine.

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## Sustainable waste water management in the rural area - The Lambert's Mill Project(Germany)

International trade with agricultural products, animal fodder and fertilizer induces nutrients flows within and between the nations. The flows of nitrate, phosphate and potassium vary very strongly according to the global, regional and local levels. The surplus of nutrients represents a serious problem, particularly in the industrialized countries of Europe and the USA.

In Africa, Latin America and the Caribbean, a sustained land use is not possible since the soils in these countries are characterized by a pronounced nutrient depletion. In addition, in less industrialized regions, the disposal of waste water and garbage represents a danger for public health.

Presently, a pilot project known as "Lambert's Mill" on urine separation takes

place in Burscheid, North-Rhine/Westphalia. As this historical watermill went under restoration, its wastewater (collected in a tank) system had to be reconstructed as well. So the mill has been chosen to test a new wastewater concept, the *source separating toilets*, in order to accomplish an important step towards sustainable sanitation in rural areas. The concept is quite used in the industry and should now be tested and further



developed, among others, for the treatment of domestic waste water. This German project, promoted by the Ministry for environment, nature protection, agriculture and consumer protection of North-Rhine/Westphalia is based on results obtained from the experimentation of separate urine and feces collection conducted in the past in Scandinavia.

Substantial questions arise with this project: the acceptance of the new installations by the users, the impact of the waste water treatment units and the effects of emissions into the environment. After 1.5 years, thanks to the intensive scientific support of the sewage systems enterprise at Lambert's Mill, the following conclusions can be drawn :

- A source separating toilet is not only possible but to a large extent also practicable, by changing the sanitary installations. Not all installations are user-friendly; modifications are necessary for some toilet models.
- The acceptance of these new installations was very good for the majority of users; the idea of reusing waste water constituents was quite welcome.
- The storage of the collected yellow water did not lead to a loss of nitrogen as ammonia, even without conditioning. The fear of smelling nuisances never manifested.
- The separate collection of urine and feces led to substantially lower nitrogen emissions in the water, with the result that the dimensions of the water treatment plant designed to purify the remaining waste water could be accordingly smaller.

- The use of a decomposition bag for the separation of solids is effective, whereas the handling with the bag itself is problematic.  
A subsequent treatment of the collected solids to reduce the level of contamination e.g. by storage is absolutely necessary. Long-term results for this are not yet available.
- Residues of pharmaceutical products were found, mainly in the yellow water, but their concentrations were significantly lower than expected in a representative urine mixed sample.  
For some substances, a degradation could be observed during the storage, and it tended to be more effective under acidic conditions. So it is recommended to proceed to the temporary storage of the yellow water at low pH values.
- The pharmaceutical substances identified in the gray water were steroids; however, due to their good biodegradability, no trace of them could be found in the water after its passage through the soil filter.
- The use of yellow water as fertilizer has a nitrogen effect equivalent to the one of liquid manure or mineral fertilizer. But a dilution of the yellow water with liquid manure is recommended, in order to avoid corrosion damages and a too high salt concentration. Its use on arable crops, fruits and vegetables should be avoided.

The separation of urine from the remaining waste water reduces the nutrient load of this latter and leaves the waste water and the aquatic environment free from pharmaceutical products and hormones. Further investigations of the degradation these substances of are mandatory before applying yellow water as fertilizer.

It becomes clear that before reusing the nutrients on soils and before edifying a sewage management recycling program on a municipal scale, one must obligatorily separate the waste water. However, it also becomes clear that further developments are necessary, in order to create a generally accepted alternative to the conventional drainage system. In the prevailing legal situation, the activity of such an enterprise and the use of compost and urine are still seen as problematic.

Meanwhile, the project phase described here has been completed. In the subsequent step, goal is the optimization of the existing concept. Further information (in German) can be found on the homepage <http://www.lambertsmuehle-burscheid.de>. The project is supervised by PD Dr. A. Clemens, from the Institute of plant nutrition, University of Bonn (email: a.clemens@uni-bonn.de).

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## Special events on water and health

2004 / 2005

### **2004 Annual Conference and Exposition (ACE) Orlando, Florida, June 13-17, 2004**

Attend the 2004 Annual Conference and Exposition to:

- Hear from experts on cutting-edge issues
- Interact with the world's water industry professionals
- Access the world's premier water exposition

For further information, see: <http://www.environmental-center.com/events/ace04/ace04.htm>

### **Round table on the promotion of water and health issues in the European Region Oslo, Norway, 1-2 June 2004**

WHO/Europe, in cooperation with Norway, invites Member States to increase efficiency in non-infrastructure cooperation in the area of water and health. An improved cooperation can play a major role towards both the timely achievement of the Millennium Development Goals and the implementation of the Protocol on Water and Health.

A study on progress in meeting the Millennium Development Goals showed risks of failure unless major action is taken now. In particular, progress towards health goals is slower than that towards other goals, but failure to meet the health goals will likely affect the chances of reaching other goals.

The round table provides an opportunity for countries to drive priority setting in the area of non-infrastructure cooperation, and for donors to examine their current cooperation programmes in the light of these national health priorities.

For further information, see: <http://www.euro.who.int/watsan/News/NewsEvents>

### **Water & Wastewater Asia 2004 Bangkok, Thailand, 5-7 October, 2004**

PennWell Corporation, in partnership with the South East Asian Water Utilities Network (SEAWUN), will focus on the region's key water supply and sanitation issues at the 2nd Water & Wastewater Asia Conference & Exhibition, which will be held in Bangkok, Thailand from 5-7 October 2004.

Following the success of Water & Wastewater Asia 2003 Conference & Exhibition, held for the first time in Ho Chi Minh City, Vietnam, in September 2003, PennWell will continue this dynamic, regional initiative by moving the event in 2004 to the capital city of Thailand.

For further information, see: <http://www.environmental-center.com/events/wwa2004/wwa2004.htm>

**Conference on health and water quality aspects of the man-made  
recreational water environment  
Budapest, Hungary, 11-12 March 2005**

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.

**Conference topics**

- New pool and spa arrangements, features and management techniques
- Experiences concerning the health relevance water management techniques in pools and spas
- New solutions and challenges to treatment and disinfection
- Policies and regulations on pool and spa operation, with special regard to the authorization and acceptance of novel approaches and solutions
- Quality assurance and consumer protection
- Special health-based water quality requirements

Arrangements of an associated exhibition for pool and spa promotion are foreseen.

For further information, see: <http://www.euro.who.int/watsan/News/NewsEvents>

## Special events on health and environment

### **World Conference on Disaster Management Toronto, Canada, Jun 20-23, 2004**

14th World Conference on Disaster Management. Sponsor is the Canadian Centre for Emergency Preparedness. Theme: "The Changing Face of Disaster Management - Are We Really Prepared?" WCDM is one of the premier annual events that addresses issues common to all aspects of disaster/emergency management. The conference program includes speakers from many parts of the world and provides excellent opportunities for training and networking among those in Emergency Planning/Management, Emergency Response, Disaster Management Research, Business Continuity, Risk Management, Security, IT, HR, Environmental as well as for the organizations which supply and service these professions.

For further information, see: <http://www.wcdm.org/>

### **Fourth Ministerial Conference on Environment and Health 'The future for our children' Budapest, Hungary, 23-25 June 2004**

The effects of a degraded environment on children's health raise increasing concern. Every year, unhealthy environments cause the death of more than 5 million children worldwide.

The Budapest Conference is the European response to this situation. WHO/Europe has taken the lead in the action for children and has focused the Conference on 'The future for our children'.

The Budapest Conference is the fourth in a series started in 1989, bringing together ministers of health and of environment and major stakeholders. European ministers are expected to reach consensus and make political commitments to ensure safer environments for children through the adoption of a Conference Declaration and of the European action plan for children's health and environment (CEHAPE).

For further information, see: <http://www.euro.who.int/eprise/main/who/progs/Bud>

### **World Water & Environmental Resources Congress 2004 Salt Lake City, USA, 27 June-1 July, 2004**

The Environmental Water & Resources Institute of the American Society of Civil Engineers invites you to participate in our World Water & Environmental Resources Congress 2004 at the exciting new Grand Hotel America in Salt Lake City, Utah, June 27 to July 1, 2004.

For further information, see: <http://www.asce.org/conferences/ewri05/>

### **16th Conference of The International Society for Environmental Epidemiology 2004 New York, USA, Aug. 1-4, 2004**

This conference represents an opportunity to discuss the latest research methods and results, and the social context of environmental health investigations in one of the world's greatest cities. The proposed program will include scientific symposia, invited presentations, poster presentations, and small group discussions.

For further information, see: <http://www.iseepi.org/>



**Aquatech Amsterdam 2004:  
International Trade Event for Water Technology & Water Management - 20th Edition  
Amsterdam, The Netherlands, 28 September -1 October 2004**

Aquatech Amsterdam 2004 is the place for you to meet water professionals from all over the world who wish to keep abreast of all the latest developments in the water market. Aquatech, the international trade event for water technology and water management, will as always provide the best possible surroundings in which to make new contacts and renew existing ones. At Aquatech Amsterdam 2004 you can present your products and services to technically oriented professionals and policy-makers from government and industry. At Aquatech Amsterdam 2004 different national and international target groups will be presented on a segmented basis.

For further information, see: <http://www.environmental-center.com/events/aquatech2004/aquatech2004.htm>

**Forum 8  
World Summit on Health Research  
Mexico City, 16-20 November 2004**

The 2004 annual meeting, Forum 8, will be held in conjunction with the World Summit on Health Research organized by the World Health Organization and the Mexican Ministry of Health. There will be several common elements to the two parallel meetings: for example joint plenary sessions and coffee breaks at the beginning of each day, joint evening receptions and joint closing sessions with presentation of the Ministerial Declaration (on the part of the Summit) and Statement (on the part of Forum 8).

For further information, see: <http://www.globalforumhealth.org>

## Links

**World Water Day**

<http://www.waterday2004.org>

**WHO- Summary of the book Climate change and Human Health**

<http://www.who.int/globalchange>

**Protocol on Water and Health**

[http://www.unece.org/env/water/text/text\\_protocol.htm](http://www.unece.org/env/water/text/text_protocol.htm)

**New website of EPA on drinking water**

<http://www.epa.gov/safewater/drink/drinkportal.html>

**Information on Drinking water projects at EPA**

<http://www.epa.gov/safewater>

## New books and articles

- Collett,D.(2003): Modelling survival data in medical research. Chapman & Hall / CRC Press.
- Conlon,C.P.(2004): The year in infection-2003. Clinical Publishing.
- Gustafson,P.(2004): Measurement Error and Misclassification in statistics and epidemiology. Chapman & Hall / CRC Press.
- Jewell,N.P.(2004): Statistics for Epidemiology. Chapman & Hall / CRC Press.
- Komatina,M.M. (2004): Medical Geology - Effects of geological environments on human health. Elsevier Academic Press. Amsterdam.
- Lubitz, D.K.J.E.(2004): Bioterrorism : field guide to disease identification and initial patient management. CRC Press.
- Mascie-Taylor, C. G. N.(2004): The changing face of disease: implications for society. Chapman & Hall / CRC Press.
- Noorsij, A., van Genderen, J. and J. van Beveren (2004): Organic Compounds and Genotoxicity in Drinking Water. IWA Publishing.
- Percival,S.; Chalmers,R.; Embrey,M.;Hunter,P.R.; Sellwood,J.; Wyn-Jones,P. (2004): Microbiology of waterborne disease. Elsevier Academic Press. Amsterdam.
- Vesilind, P.A.(2004): Wastewater Treatment Plant Design. IWA Publishing
- van Raalte-Drewes, M.J.C., Feij, L.A.C., Slaats, P.G.G., van Soest, E.A.M., Vaal, P.P.R. and G. Veenendaal (2004): Scaling Propensity of water. New predicitive parameters. IWA Publishing.
- WHO (Ed.)(2003): Climate change and Human Health-Risks and responses.

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