WHO Collaborating Centre for Health Promoting Water Management and Risk Communication
Institute for Hygiene and Public Health
University of Bonn

WaMRi-Newsletter

No. 9, February 2006

Dear Reader,

The **Protocol on Water and Health** to the 1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes finally entered into force. On 4th August 2005 it became legally binding for the 16 ratifying countries. It is the first major international legal approach for prevention, control and reduction of water-related diseases in Europe. Please read more about it in our first contribution of the WaMRi-Newsletter. This issue also deals with the **project Swist III**, focussed on River Swist in North Rhine-Westphalia as an example for microbial load of watercourses due to diffuse polluters. The report from the Aral Sea Basin Water and Food Conference summarizes its main findings entitled as "**Managing Water and Food Quality in Central Asia**" which took place in Almaty, Kazakhstan, on 1-2 September 2005.

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

Content

The Protocol on Water and Health: Milestones of the implementation 1999-2006

Thomas Kistemann

Reflecting the critical importance of freshwater for humans' health and wealth, the perception of "water" has undergone an explicit change over the last decade: the importance of water is no more reduced to economic aspects, but "water has social, economic and environmental values and should therefore be managed so as to realize the most acceptable and sustainable combination of those values." This is how water is defined in the Protocol on Water and Health (PWH), the first major international legal approach for the prevention, control and reduction of water-related diseases in Europe (see: http://www.unece.org/env/water/text/text_protocol.htm).

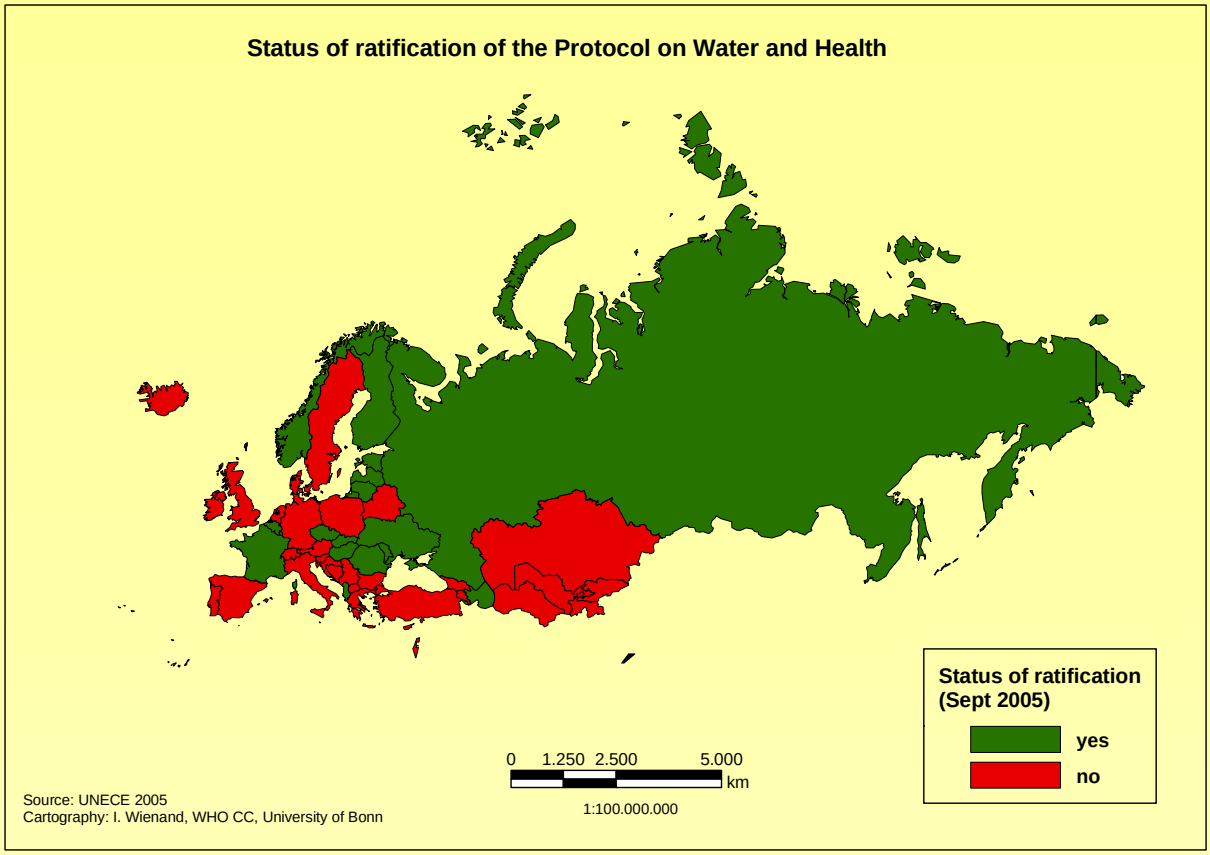
The objective of the Protocol is to promote at all appropriate levels, nationally as well as in transboundary and international contexts, the protection of human health and well-being, both individual and collective, within a framework of sustainable development, through improving water management, including the protection of water ecosystems, and through preventing, controlling and reducing water-related disease (Art. 1 PWH).

The provisions of PWH shall apply to surface freshwater, groundwater, estuaries, coastal waters, enclosed bathing waters, water in the course of abstraction, transport, treatment or supply, and waste water (Art. 3 PWH). In order to achieve the Protocol's objective, the Parties shall pursue the aims of access to drinking water and provision of sanitation for everyone (Art. 6.1 PWH). Parties are requested to cooperate and, as appropriate, assist each other in achieving the objectives of the Protocol by international, national and local actions (Art. 11-14 PWH).

The Protocol is embedded into the statutory framework of the 1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes. It has been signed by as many as 36 countries (i.e. two thirds of the WHO European region's countries) during the Third Ministerial Conference on Environment and Health, which was held in London (1999), and the subsequent one-year-period, during which it was open for signature (Art. 21 PWH).

However, it took another 6 years until the protocol entered into force on 4 August 2005. It needed to be ratified by at least 16 countries to become legally binding for the ratifying countries. To date, the 17 countries that have ratified the Protocol, are (in alphabetical order): Albania, Azerbaijan, Belgium, Czech Republic, Estonia, Finland, France, Hungary, Latvia, Lithuania, Luxemburg, Norway, Republic of Moldova, Romania, Russian Federation, Slovakia, and Ukraine (http://www.unece.org/env/water/status/lega_wh.htm).

And the ratification process forges ahead: six more countries may be expected to ratify the Protocol in 2006.



Among the commitments, which the Parties have accepted by ratifying the Protocol, are the following:

- within two years of becoming a Party, each Party shall establish and publish targets for standards and levels of performance that need to be achieved or maintained for a high level of protection against water-related disease (Art. 6.2 and 6.3 PWH).
- within three years of becoming a Party, each Party shall, as appropriate, ensure that comprehensive national and/or local surveillance and early-warning systems, contingency plans and public authorities' capacities for responses to outbreaks, incidents and risks are established (Art. 8 PWH).
- each Party shall ensure that public authorities make information relevant to the implementation of the Protocol (namely concerning the establishment of targets and target dates, surveillance, early-warning systems and contingency plans) available within a reasonable time to the public (Art. 10 PWH).

The UN Economic Commission for Europe (UNECE) and World Health Organization's Regional Office for Europe (WHO/EURO) jointly provide the secretariat functions for the Protocol, coordinating activities for its implementation (Art. 17 PWH). WHO handles the health aspects, while UNECE takes care of the legal and procedural aspects. Parties as well as non-Parties are invited to nominate representatives to carry out the functions as national focal points for activities under the Protocol.

As the first meeting of the Parties (MOP) has to be convened no later than 3 February 2007 (i.e., no later than eighteen months after the date of the entry into force of the Protocol, Art. 16 PWH), the preparation of this meeting is now in full swing.

The preparatory work is discussed, tuned and advanced by a Working Group on Water & Health (WGWH), which was already established in 2000, and held its fifth meeting in late 2005 in Geneva. The WGWH constitutes, beneath the UNECE/WHO joint secretariat, of an open-ended group of about 40 delegates from interested parties, signatories, international organisations, NGOs and WHO Collaborating Centres. Currently, WHO CC representatives from Budapest and Bonn serve as chairs for the WGWH meetings.

A legal board drafted important legal and administrative prerequisites for the Protocol's implementation to be adopted by the MOP: (i) the rules of procedure for the MOP, and, (ii) according to Art. 15 PWH, a non-confrontial, non-judical and consultative procedure for reviewing compliance of the Parties with the provisions of the Protocol.

To consider components of a monitoring system complying with Article 6 (Targets and target dates) and Article 7 (Review and assessment of progress), an ad hoc expert group counselled in Copenhagen in May 2005. Elements of the proposed reporting scheme cover drinking-water coverage, sanitation coverage, drinking-water quality (with a limited set of both microbiological and chemical parameters), performance of drinking-water supply system (inter alia water production, continuity of service, pipe breaks), wastewater treatment and network performance. The Copenhagen report (see: http://www.who.dk/document/wsn/ protMtgMay05.pdf) will form the basis for a consultation amongst the Parties.

During the next months, date and venue of the first MOP have to be fixed, a work plan has to be drafted, and a declaration has to be prepared. To promote the final preparatory steps, an open-ended ad hoc group meeting, hosted by the WHO CC in Bonn in early March 2006, will arrange documents for the last session of the WGWH in Geneva in May 2006, before the first MOP.

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River Swist in North Rhine-Westphalia as an example for microbial load of watercourses due to diffuse polluters – an interim result

Esther Rind, Thomas Claßen, Andrea Rechenburg

1. Project background

In the course of implementation of the European Water Framework Directive (2000/60/EC), water management in Germany meets new challenges. Essential aspects of this process are:

- implementation of a catchment-oriented approach in accordance with an integral water management;
- establishment of combined, emission- and immission related consideration (e.g. via discharge evaluation of combined water sewers on the basis of physico-chemical and hydraulic parameters depending on the absorbency of respective watercourses).

Besides, the increasing utilization of water bodies calls for the initiation of projects which aim, amongst others, at the reestablishment of the bathing water quality (e.g. for parts of river Isar in Bavaria) (Riegler 2002). Therefore, hygiene-relevant problems come more and more to the fore, but, however, are taken into account so far only with subordinate or even no consideration in the legal bases and relevant management strategies.

Over the past years, the government of the state of North Rhine-Westphalia promoted different projects for identification of paths polluting surface waters with pathogenic micro organisms. The projects "Swist I" and "Swist II" (1999-2004) determined the quantity and the quality of the microbial loads from sewage treatment plants as well as from combined sewage overflow basins (CSBs). Considering the Swist catchment area as an example, following results could be obtained (see map 1):

- depending upon precipitation intensity, only within some minutes just as many microorganisms are discharged from CSBs as from sewage treatment plants in one day
- the microbial load from CSBs introduced in the total Swist catchment area throughout the year represents from 4- up to 20-fold of the microbial load from sewage treatment plant activities;
- a significant part of the microbial basic load in the Swist area can be explained by germs attached to particulate matter and to suspended load from sewage treatment plants and combined sewage treatments;
- with regard to water-related use of the Swist, there is a risk of infection in terms of the analysed organisms.

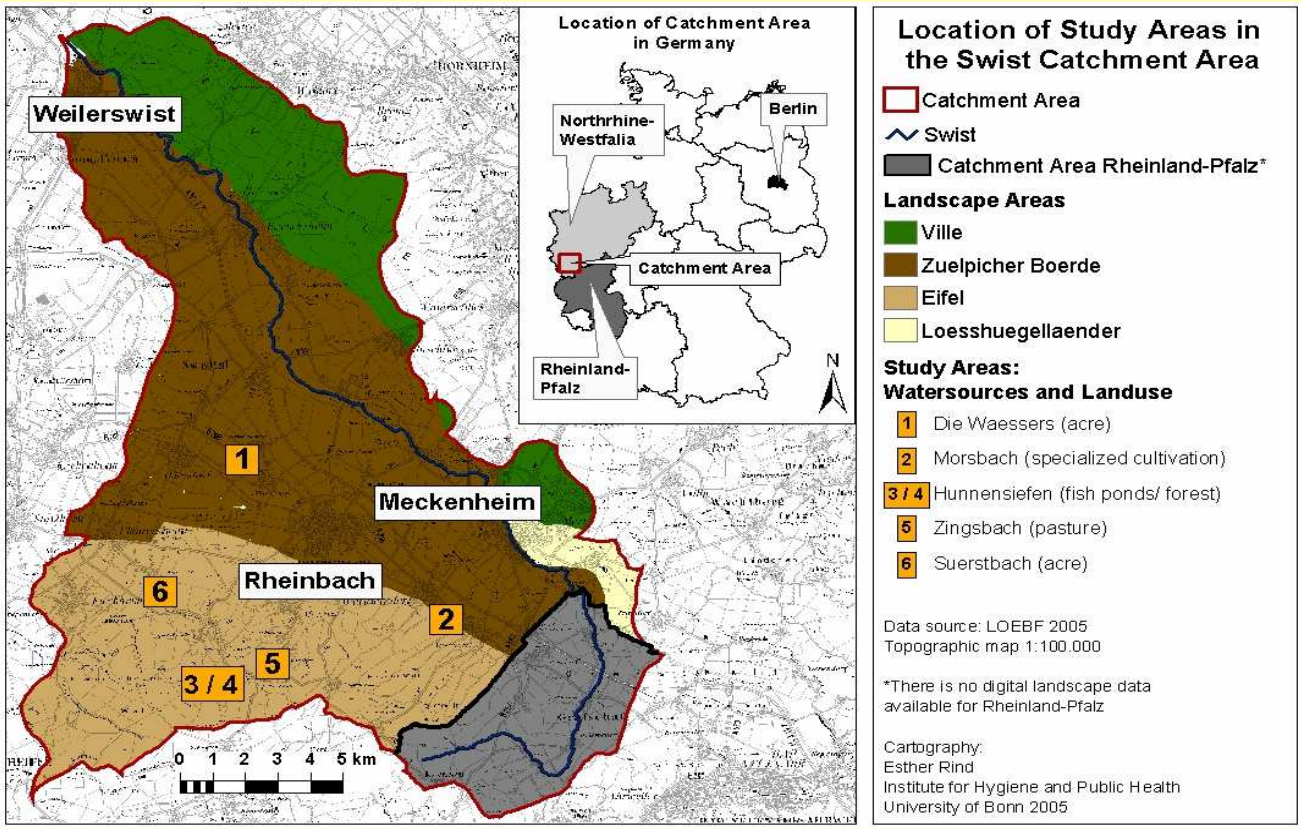
Consequently up to now, there are spatially and temporally differentiated emission balances for the sewage treatment plants discharge ("Swist I") and the discharge from combined sewer overflows ("Swist II"). Thus meanwhile, the effects of anthropogenic loads on watercourses can be well quantified by settlement wastewater from sewage treatment plants and combined sewage discharge.
The project "Swist III", in co-operation with a German water management company (Erftverband), deals with the balance deficit arising from the results of the former studies. They had showed that already in the assumed unloaded headwaters there are high loads of pathogens which cannot be attributed to the sewage treatment plants discharge and/or combined sewer overflows.

Based on the results of the earlier projects, the current project has the following key aspects:

- identification of microbial loads due to diffuse pollution via surface runoff and interflow of differently used surfaces (forest, acre, specialised cultivation, grassland etc.);
- representation and spatial allocation of the temporal, i.e. weather and/or season specific fluctuation range of these loads;
- classification of sub-catchment areas and time frames where the compliance and/or exceeding of guideline values and critical values is to be expected with high probability;
- calculation of the total emission balance and the respective ratios of the origin areas in the total load of Swist and its affluents;
- determination of potential contamination in order to be able to develop efficient prevention strategies.

2. The study areas in the Swist catchment area

The Swist originates on the edge of the Eifel and flows after 43 km into river Erft nearby Weilerswist (see map 1). Its catchment area covers 289 km². Most of the area is used for agricultural purposes, whereas a small part is covered with forest. Grassland dominates in the valley bottoms of the Eifel region. The Swist and its affluents serve as receiving water for numerous wastewater treatment plants. The stream water is used for irrigation and for cattle watering. Furthermore, the Swist and its inflows find a use for leisure activities (e.g. playing children, fireplaces, wild gardens). All investigation areas are assigned to typical landscape of the Eifel and the Zuelpicher Boerde (see map 1).
The territory of the Eifel is mainly characterized by agriculture (grassland) interspersed with partly larger forests. The Eifel foreland is also known for its fruit growing. The Zuelpicher Boerde covers the southern part of the Rhenish Loessboerden on the lee-side of the Eifel.



Map 1: Investigation areas in the Swist catchment area

3. Project status

Mapping and data base creation

Mapping of the selected study areas referred to soil and land use inspections also covered the surveying of all potential, visible sources for microbial loads. In study areas where only soil maps with the evaluation of soil according to the "Reichsbodenschaetzung" were available, some separate soil analyses (profile surveying, pH value, hydrophilic characteristics etc.) were conducted. We distinguished predominantly between following sources of water contamination:

- due to agriculture (e.g. watering place, cattle treading);
- due to forestry (clear-cutting, afforestation);
- due to drainage measures (e.g. drainages, ditches/trenches);
- due to traffic (e.g. railway facilities, roads);
- due to leisure activities (e.g. refuse collection, pisciculture);
- due to influence of wildlife (e.g. view proof, wildlife treading).

The following photos show two examples mapped as potential contamination sources:

Photo 1: Cattle watering place in course of the Zingsbach
Photographs by E. Rind (2005)

Photo 2: Drainage pipes at the Suerstbach

First of all, the mapping data were transferred into a data base and then for further analysis and visualization into a Geographic Information System (ESRI®ArcMap™8.2). Furthermore, already collected data from earlier projects were integrated into the data base (e.g. rainwater basin register of North-Rhine Westphalia, registers of all legal water uses, drainage plans). In the course of the project, the data base is constantly extended by newly gathered information (e.g. by field assessment in the framework of sampling).

Additionally, the Erftverband provided pedological data of the Geological Service of North-Rhine Westphalia. Besides, landscape data from the Regional Office for Ecology, Land Division and Forestry of North-Rhine Westphalia as well as data of the EU-Natura 2000 areas were interpreted into the data base.

Development and installation of the sampling mimic

In order to catch the surface runoff and interflow, special sampling racks (see photos 3 - 5) were developed by the Erftverband. A rack is 2m long, 30cm broad and 1m in deep. The inflowing surface water is collected in a removable 60 litre plastic tank. The interflow is also collected in a 60 litre plastic tank.

Photos 3-5: Sampling rack, Suerstbach

Photographs by M. Willkomm, Erftverband (2005)

4. Further actions

Regular sampling has started after inletting of the racks was completed. Approximately 150 samples from various sources (surface runoff, interflow, drainage, fish pond) are to be taken. The samples will be taken depending on precipitation (circa once a week). The scope of the investigation lies – as it was already in the early studies – particularly in the analysis of selected, partially human-pathogenic bacteria, (e.g. *E. coli*, faecal streptococci, salmonellae) and parasites (e.g. Cryptosporidia, Giardia). Physicochemical parameters (e.g. temperature, phosphate) are of additional important information on the environmental conditions of water.

The water for laboratory analysis of physicochemical and bacteriological parameters is filled into a sterile 1.000ml glass bottle. The parasitological sampling takes place with the help of a wrapped filter made of polypropylene fibres with a nominal pore size of 1µm. After pumping the water through the filter, the filter bowl is carefully opened and cooled transported to the laboratory in a polyethylene bag.

The identification of the microbial loads due to diffuse polluters via surface runoff and interflow of differently used areas (forest, acre, special cultivation, grassland etc.) will complete the results obtained from two earlier projects. With the newly collected data a complete balance of the hygienic microbiological load of watercourses in the Swist catchment area will be possible.

Acknowledgement:
The project is financially supported by Ministry for Environment and Nature Protection, Agriculture and Consumer Protection of North-Rhine Westphalia.

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News from the Aral Sea Basin Water and Food Conference "Managing Water and Food Quality in Central Asia" Almaty, Kazakhstan, 1 - 4 September 2005

Susanne Herbst

The Aral Sea Basin Water and Food Conference entitled "Managing Water and Food Quality in Central Asia" was held between 1 - 4 September 2005 in the House of Scientists at the National Academy of Sciences Almaty, Kazakhstan. It was organized by the International Association for the promotion of co-operation with scientists from the New Independent States of the former Soviet Union (INTAS) and the National Information Point on the 6th Framework Program in Kazakhstan (InExCB-Kz) with support of MEDIAS-FRANCE.

In cooperation with the French National Center for Scientific Research (CNRS, France) and the German Research Foundation (DFG, Germany) INTAS launched a call for proposals on the Aral Sea Basin in October 2000. Three years later 19 international research teams presented their intermediate research results at the "Aral Sea Conference in Bukhara, Uzbekistan". The 2005 conference incorporated not only scientific findings of the INTAS projects, but also results from other projects in Central Asia, of which several were carried out by young local scientists.

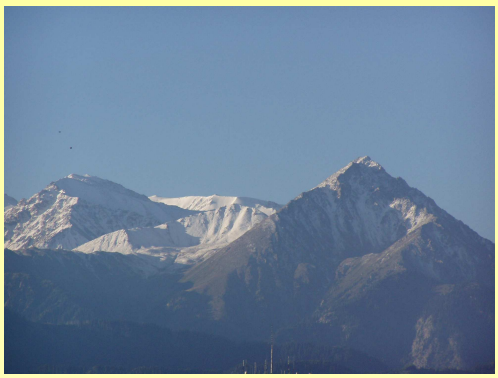

Photo 1: Foothills of the Tien-Schan mountains

The welcome speech by Dr. Anatoly Ryabtcev (Head of the Department of Water Sources at the Ministry of Agriculture in the Republic of Kazakhstan) and Dr. Alain Gérard (Executive Secretary of INTAS) were followed by keynote speeches started on recent Aral Sea rehabilitation efforts in Kazakhstan. Prof. Peter Raspor from University of Ljubljana, Slowenia focused his key note address on food safety aspects in particular with regard to the EU regulations. Central Asian countries have resources and capacity to produce foods for export to the EU countries, but should be aware of prevention strategies against food-borne diseases. In the industrialized countries, the implementation of the HACCP (Hazard Analysis and Critical Control Point) concept to food production has led to a reduction of microbiological contamination. The application of the HACCP concept including a proper risk analysis through risk assessment (scientific advice and information analysis), risk management (regulation and control) and risk communication in Central Asia would foster the admission of food to the European market.

The Congress' technical program, with about 60 scientific presentations, covered 10 interdisciplinary themes relevant to water and food quality:

- Water resources and watershed management
- Water purification technology
- Natural Resources
- Food quality and production efficiency
- Food security and livelihoods
- Environmental impact on global change and health
- Environmental change in the Aral Sea Basin: environmental assessment and rehabilitation
- Data analysis and processing
- Conservation agriculture and best practices
- Crops, salts and yields

Photo 2: Aral Sea, DLR 2004

Furthermore, open debates on the future of research and development in the region with a progressive view on integrated, trans-national and interdisciplinary problems took place.
In the course of the conference, it became quite clear that the research community being active in the Aral Sea Basin has the expertise and experience needed to tackle environmental problems jeopardizing the water and food quality in the region. Financial constraints addressing both further research needs and implementation of mitigation strategies drawn from the ongoing research were expressed as the most pressing concern.

Therefore, some presentations reported on potential funding institutions. Besides INTAS (7th Framework Program) the **F**ederation of **E**uropean Microbiological **S**ocieties (FEMS) – promoting in particular projects on microbiology in Europe – as well as the European **CO**operation in the field of **S**cientific and **T**echnical Research (COST), the oldest and widest system for research networking in Europe, were mentioned as funding organizations.

Reports from the parallel sessions were summarized according to the following headlines: “Water Resources and Health”, “Environmental Change in the Aral Sea Basin”, “Agriculture and Food Security” and “Biophysical Foundations of Food Security”. During the final roundtable discussion – chaired by Antoine Sempéré and Gérard Begni – a need for an integrated multidisciplinary Central Asian Monitoring and Assessment Program founded on a common data base was evolved. The scientists expressed their wish to INTAS to take over the catalyzing function of initiating such a project.

Photo 3: Gérard Begni chaired the final discussion.

Links:
INTAS: http://www.intas.be
InExCB-Kz: http://www.nip.kz
MEDIAS-France: http://medias.obs-mip.fr/www/
FEMS: www.fems-microbiology.org
COST: http://cost.cordis.lu

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Special events on water, environment and health

2006

ECWATECH 2006

30 May - 2 June 2006 Moscow, Russia

ECWATECH is the International Trade Fair and Congress "Water: Ecology and Technology" targeted for water industry. Event features the effective mixture of the leading industry exhibition and discussion forum of the water sector decision makers. A total of 519 exhibitors from 26 countries participated in ECWATECH-2004. In 2006 companies leading in water sector will come to Moscow for ECWATECH for the 7th time. ECWATECH Participants are decision-makers of the water industry, federal ministries and agencies, regional and local authorities, municipal infrastructure companies, utilities, operators, commercial and public water customers, research and consulting companies.

http://2006.sibico.com

IWA World Water Congress and Exhibition

10 - 14 September 2006 Beijing, China

Over 4,000 people are expected to participate in the Congress and exhibition over five days. Leading researchers and practitioners will present the latest innovations in water management at the Congress. The water needs of the globe have never been more pertinent. Helping people within the water industry to communicate their ideas and practices will enable the progress of sustainable water management in the new millennium. The Congress themes cover most areas of the global water industry and there is a desire to create a programme which is relevant to both the developed and developing regions of the world.

http://www.iwa2006beijing.com

Innovations in Coping With Water and Climate Related Risks

25 - 27 September 2006 Amsterdam, Netherlands

The impacts of climate change upon the hydrological systems are undeniable. In the Netherlands fundamental changes in water management are underway. From a defensive policy we are moving in the direction of a comprehensive set of structural and non-structural policies, strategies, tools, appliances and measures. And, in addition to all these measures we also realise the importance of communication between the policy makers, the policy implementers and the public. It is time to discuss coping with climate change in this broad context.

http://www.moorga.com

First announcement: XIIth International Symposium in Medical Geography

"Changing Geographies of Public Health"

09 - 13 July 2007 Bonn, Germany

The first Continental European venue of the ISGM series. The world is changing rapidly. Global change includes changes of physical, social and mental environments, of demography and economy, of policies, persuasions and faith. All these changes intensively bother individual health, health behaviour, health care systems and, from a comprehensive perspective, public health of societies. We would like to encourage your participation in the symposium so that we may collaboratively explore and analyse geographical patterns and perspectives of change and persistence for human health under the arguable conditions of the 21st century's world.

http://www.imgs2007.de

14th International Symposium on Health-Related Water Microbiology

9 - 15 September 2007 University of Tokyo, JAPAN

"Waterborne infectious diseases have become one of the world's most serious concerns, and in particular, almost all Asian countries are suffering from outbreaks of such diseases and losing a lot of young precious lives. I do believe it is extremely important to invite you to the IWA Symposium in Tokyo, Japan located in the Asian region where the Symposium of the IWA study group has never been taken place. The participation of all of you in the IWA HRWM Symposium in Asia will attract public attention, promote activities for taking care of water environment, and bring about prompt solution of serious public health problems in Asian countries." Shinichiro Ohgaki, Chairman of IWA 2007 HRWM Symposium in Tokyo

http://env.t.u-tokyo.ac.jp/project/watermicro2007

Links

Water and Sanitation Program (WSN)
http://www.euro.who.int/watsan

Water Sanitation and Health (WSH)
www.who.int/water_sanitation_health

The Water Page
http://www.thewaterpage.com/

Global Rivers Environmental Education Network
http://www.green.org/resources/

International Centre for Water Hazard and Risk Management (ICHARM)
http://www.unesco.pwri.go.jp/

Selected books and articles

Bukata, R.P. (2005): **Satellite Monitoring of Inland and Coastal Water Quality.** Retrospection, Introspection, Future Directions. CRC Press. ISBN: 0849333563

Campagna, M. (2005): **GIS for sustainable development.** CRC Press. ISBN: 0849330513

Dragan A. Savic, Miguel A. Mariño, Hubert H. G. Savenije & Juan Carlos Bertoni (2005): **Sustainable Water Management Solutions for Large Cities**. VIIth IAHS Scientific Assembly. ISBN: 1 901502-97-X

Lonholdt, J. (Ed.) (2005): **Water and Wastewater Management in the Tropics.** IWA Publishing. ISBN: 1843390132

Maheswaran, R. and Craglia, M. (2004): **GIS in Public Health Practice.** CRC Press. ISBN: 0415306558

McCoy W. F. (2005): **Preventing Legionellosis**. IWA Publishing. ISBN: 1843390949

Pond, K. (2005): **Water Recreation and Disease**. Plausibility of Associated Infections: Acute Effects, Sequelae and Mortality Nonserial Publication. WHO Press, IWA Publishing. ISBN: 92 4 156305 2

Schmoll, O., Howard, G., Chilton, J., Chorus, I. (2006): **Protecting Groundwater for Health: Managing the Quality of Drinking-water Sources**. IWA Publishing. ISBN: 1843390795

Shamsi, U.M. (2005): **GIS Applications for Water, Wastewater, and Stormwater Systems.** CRC Press. ISBN: 0849320976

Smith, P. and Scott, J. (2005): **Dictionary of Water and Waste Management.** Second Edition**.** IWA Publishing. ISBN: 0-7506-6525-4

Ujang, Z., Henze, M. (2006): **Municipal Wastewater Management in Developing Countries.** IWA Publishing. ISBN: 1843390302

WHO (Ed.) (2005): **Chemical Safety of Drinking-water: Assessing Priorities for Risk Management.** ISBN: 92 4 154676 X

WHO (Ed.) (2005): **Legionella and the Prevention of Legionellosis.** ISBN: 92 4 156297 8

WHO (Ed.) (2005): **Water for Life - Making it Happen.** ISBN: 92 4 156293 5

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