



## **INPIM E-NEWSLETTER**

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### **THE INPIM E-NEWSLETTER**

December, 2008; Number 82  
<http://www.inpim.org>  
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UNESCO-IHE

## DETAILS

### NEWS

#### **Bolivia expands watershed-based irrigation**

IDB finances construction of new infrastructure and systems for sustainably managing scarce water resources. Bolivia will build 33 community irrigation systems covering 9,000 hectares in seven Departments throughout the country under a US\$34 million program financed by the Inter-American Development Bank. Drawing on lessons from past irrigation programs in Bolivia's arid and semi-arid regions, the new program will be designed with a watershed approach that ensures that a sustainable quantity and quality of water will be available to all users within a particular area. The program will also finance activities to increase the capacity of Bolivia's National Irrigation Service to grant and register water rights and resolve conflicts among various users. These activities will include creating a National Irrigation Information System that will integrate data about climate, land use and water rights to assist policy makers and investment planning. "We have learned that building irrigation canals is not enough," said IDB Team Leader John Horton. "Only by insisting on a watershed protection approach, guaranteeing the long-term availability of water to those irrigation systems, can farmers be assured of multiple crops each year and an increased ability to target the best market opportunities."

Beneficiaries of the program are expected to initially expand their yields of traditional crops such as quinoa, potatoes, corn, hay and rice thanks to the new irrigation systems. They higher income from additional yields could eventually allow these producers to compliment these crops with higher value horticultural crops for domestic and export markets. The IDB program includes resources to develop a future pipeline of additional projects above and beyond the 33 financed by this loan.

(Source: <http://water.environmental-expert.com/resultEachPressRelease.aspx?cid=23771&codi=40322&idproducttype=8&level=0>)

#### **Spain Contributing \$10 Million to ADB's Multi-Donor Trust Funds for Water, Energy**

MANILA, PHILIPPINES - The Government of Spain has agreed to contribute a total of \$10 million to multi-donor trust funds operating under the Asian Development Bank's (ADB) Water Financing Partnership Facility and Clean Energy Financing Partnership Facility. With its pledge of assistance, Spain joins Norway, Australia, Austria and Sweden as financial contributors to the funds under the facilities. "We are grateful for this significant contribution, which will strengthen support to the water and energy sectors in the region," said Werner Liepach, Principal Director of ADB's Office of Co-financing Operations. The multi-donor funds, which are administered by ADB, provide finance for investment

projects and technical assistance work in the water and clean energy sectors. They are made available to central and local governments, government agencies and other entities. The Water Financing Partnership Facility was set up in 2006 to mobilize co-financing from development partners in support of ADB's Water Financing Program of 2006 to 2010. The Program targets large scale investment, reform and capacity building in rural and urban water services and river basin water management.

The Clean Energy Financing Partnership Facility, which was launched in April 2007, seeks to improve energy security in ADB's developing member countries by increasing their use of clean and renewable sources of energy.

(Source: <http://www.adb.org/media/Articles/2008/12688-asian-water-financings/>)

### **IDB and UNSGAB Team Up to Support Water Sector in Arab Countries.**

The Islamic Development Bank (IDB), the Muslim world's premier multilateral financial institution, estimates that Arab countries may need to invest up to \$200 billion in water-related infrastructure over the next ten years, in order to meet the rapidly growing demand for water and sanitation services. It is estimated that as many as 50 million people still do not have access to safe drinking water in the Arab world with a further 97 million lacking access to adequate sanitation. While only a fraction of the investment requirements is currently being met by the private sector, IDB sees a greater role for the private sector in meeting demand for water and sanitation infrastructure services over the next decade, indicated Dr Ahmed Mohamed Ali, President of the IDB Group, at a high-level meeting of the United Nations Secretary General's Advisory Board on Water and Sanitation (UNSGAB) recently held at Riyadh's Conference Palace and hosted by the Kingdom of Saudi Arabia, in partnership with the Arab Water Council and IDB. This high-level event, which was chaired by His Royal Highness Prince Willem-Alexander, the Prince of Orange and Crown Prince of the Netherlands, in his capacity as chairperson of UNSGAB, was held in conjunction with the 1st Arab Water Forum and the Prince Sultan International Prize for Water award ceremony. Along with some 20 members of this top UN panel on water, some 17 Arab water ministers and deputy ministers also participated, in addition to representatives from the League of Arab States, Japan, Germany, The Netherlands, United Kingdom and Italy (as it assumes the G8 Presidency). The Prince of Orange, for his part, praised IDB's role in supporting the development of the water sector across the Arab region through both investment and capacity building activities.

Addressing UNSGAB, Dr Ali reminded that, while the Arab region was home to 5 percent of the world's population, it only possesses 1 percent of its renewable water resources, making it the driest region in the world. Today's average annual water availability per capita is merely a third of what it used to be in 1960, and is expected to drop by more than a half by 2050 to 550 m<sup>3</sup> per capita per year, just slightly above the absolute water scarcity threshold of 500 m<sup>3</sup> per capita per year, he added. Population growth, urbanization and declining

water quality are putting unprecedented pressure on the Arab region's dwindling water resources, some 60 percent of which emanate from outside the region itself, Dr Ali continued. This worrisome situation is being further exacerbated by climate change, food security concerns (in the aftermath of the global food security crisis that saw food prices surge dramatically in Spring 2008) and the looming global recession resulting from the unfolding global financial crisis. With as much as 80-90 percent of the total water allocation going to irrigation, there is growing competition in the Arab Region amongst the main water using sector: domestic, industrial and irrigation. Recognizing these formidable challenges, Dr Ali said, the IDB Group Vision 2020, a blue print for its long-term objectives, singled out the provision of water and sanitation as one of its main themes. To date, IDB has provided more than \$2.5 billion of assistance in the water sector to its 56 member countries. This financing, which represents around 15 percent of its aggregate project financing commitments, targeted some 250 water-related projects worth in excess of \$10 billion. Around US\$1.5 billion of this assistance targeted the Arab region, including \$1.1 billion for water supply and sanitation projects. IDB is equally active on the institutional capacity building front, for example, in its capacity as a founding member of the Cairo-based Arab Water Council, a regional water policy think-tank, and the Abu Dhabi-based Arab Water Academy, a regional capacity building programme hosted by IDB's Dubai-based International Centre for Biosaline Agriculture (ICBA) in partnership with the Abu Dhabi Environment Agency (EAD).

Arab water Ministers such as Saudi Arabia's Abdullah Abdulrahman Al-Hussayen, Minister of Water and Electricity, and Egypt's Dr Mahmoud Abu-Zeid, Minister of Water Resources and Irrigation, for their part, highlighted the need to pay greater attention to the financial sustainability of water investments through adequate water tariff structures and a stronger focus on water demand management. At the conclusion of this 3-day meeting, Dr Ali and His Royal Highness Prince Willem-Alexander signed a cooperation agreement between IDB and UNSGAB, which will focus primarily on financing, sanitation services, water operators partnerships and integrated water resources management.

(Source: [http://www.isdb.org/irj/portal/anonymous/idb\\_news\\_en](http://www.isdb.org/irj/portal/anonymous/idb_news_en))

## **Water agencies deliver spending agenda to Obama**

AWWA has joined with the Association of Metropolitan Water Agencies, National Association of Water Companies and the National Rural Water Association in developing 'A National Agenda for Drinking Water' to assist President-Elect Barack Obama and his incoming administration. The report addresses topics including economic stimulus, long-term infrastructure investment, drinking water standards, source water protection, climate change, and system security. It specifically asks for "dedicated funding" for water infrastructure in any economic stimulus package, "dispersed in such a way as to be quickly accessed by utility managers, with a minimum of delay and 'red tape.'" It calls the \$1 billion included in the earlier stimulus package "a good start," but says that "much more money is needed" to fund the wide range of projects nationwide that have been affected by the credit crisis. It advocates

equal funding for drinking water and wastewater projects. Recommendations for longer-term infrastructure investment include low- or no-interest loans and tax incentives, as well as grants in some instances. The report asks for the Drinking Water State Revolving Loan Fund and USDA Rural Water Loan and Grant programs to be funded at a minimum of \$1 billion annually; federal assistance programs to help utilities become economically self-sustaining; and new mechanisms for innovative approaches to capital, such as "some form of infrastructure bank."

It flatly rejects "any proposal" of a federal water tax, charge, or levy against either utilities or customers. On the standards front, the report advocates "the deliberative, science-based" processes of the Safe Drinking Water Act and calls for the administration to "reject legislative prescriptions for decisions that should be made through the regulatory process." Emerging contaminants are addressed in the section on source water protection, which the report recommends be addressed through more research and revisions to the Clean Water Act where necessary. It asks that USEPA's carbon-sequestration efforts be made to protect drinking water sources "over the very long run," and for USDA activities to protect source water to be "fully utilized." The impact of climate change on drinking water resources should be addressed with dedicated funding for research and to help utilities adapt to the changing demands climate change may bring, the paper recommends. Finally, the report says that water system security measures should "not force water utilities to change processes" in favor of "what some may perceive are 'inherently safer technologies;'" that they should not enable federal officials to order water utilities to shut down; and that water utilities not be subject to regulation by multiple federal agencies. It also asks for protection of "sensitive data regarding water utilities" and that any new federal security mandates be accompanied by federal financial assistance.

(Source: <http://water.environmental-expert.com/resultEachPressRelease.aspx?cid=9116&codi=40427&idproducttype=8&level=0>)

## **Water conservation reaches new heights in LA**

The twin office towers of Watt Plaza in Century City are the first Class A commercial high rise in Los Angeles to undergo a 100% retrofit with Falcon Water free urinals. The resulting 2.2 million gallon per year water savings at this single building provides welcome relief for the drought stricken area and exemplifies the success of comprehensive planning by local officials. This retrofit of Watt Plaza's urinals comes as Los Angeles Mayor Villaraigosa, the Los Angeles Department of Water and Power (LADWP), and Metropolitan Water District (MWD) are implementing a comprehensive plan, introduced in May 2008, to secure an adequate water supply for the City. As part of this plan, the LADWP offered a package of incentives for business and citizens to conserve water. More than 13,000 Falcon Water free urinals have been put into action in the greater Los Angeles area, saving an estimated 528.7 million gallons each year. Local organizations that have led the water free urinal charge include Staples Center, Hollywood Bowl, Dodger Stadium, and Nokia Theater, and the

Rose Bowl Stadium. Area school systems including Placentia Yorba Linda and Corona Norco have also adopted Falcon Water free urinals to achieve water conservation goals and reduce operating costs. 'Falcon's technology, track record, and impact on the environment speak for itself,' stated James Krug, Chief Executive Officer of Falcon Water free. "However, without great leadership, great technology never makes it to the forefront. The real heroes are Mayor Villaraigosa and the City Council, the Metropolitan Water District, and the LA Department of Water and Power. These leaders had the vision and foresight to provide a platform for Falcon and other conservation trailblazers to assist the City, as LA continues on its exemplary and necessary water conservation program. Together, we're proving that being good to the environment can coincide with being good for business.'

The water savings due to the Falcon Water free urinals in Watt Plaza would fill 489 tanker trucks and operating cost savings are expected to be \$10,000 per year. In addition, greenhouse gas emissions are reduced due to lower demand for energy that is normally required for water transport and treatment, particularly in high-rise buildings that rely on lift pumps to provide water service to upper levels. The water savings at Watt Plaza is projected to reduce CO2 emissions by 39,600 pounds per year, according to the Pacific Institute Water-to-Air Model, which correlates water and energy demands to calculate CO2 emissions. The decision to install Falcon Water free in the 23-story pair of office towers at Watt Plaza initially grew out of concerns over recent water restrictions and rising water rates, according to Cameron Benson, General Manager for Watt Plaza. "This easy upgrade greatly reduces our building's total water use, something that anyone in drought-stricken areas can appreciate," stated Benson. The water free urinals connect to the building's existing drain lines but other than the absence of flush valves and water, they appear and operate the same as traditional urinals. The \$10,000 per year savings is a combination of water and sewer cost savings plus reduced maintenance costs because there are no flush valves to malfunction or break.

**(Source:** <http://water.environmental-expert.com/resultEachPressRelease.aspx?cid=10534&codi=39782&idproducttype=8&level=0>**)**

### **"Efficient" irrigation tool may deplete more water**

An Israeli water engineer was sitting under a tree one day when he noticed a leaking faucet slowly drip water to the tree's roots, a nearly 50-year-old irrigation tale says. The idea inspired the invention of modern drip irrigation, also known as micro-irrigation. The method runs water through plastic tubes that release the flow through small holes directly to crop roots or stems. The precise application allows drip-irrigated crops to be watered more frequently than with traditional sprinkler methods. Yet farmers waste fewer resources because most water is absorbed through transpiration. As a result, many governments have encouraged drip irrigation as a water-conserving technology that can boost crop yields. But drip irrigation may have a downside, according to a study published in last week's Proceedings of the National Academies of

Science. In traditional flood or sprinkler irrigation, 'wasted' water - the water not absorbed by crops - seeps into the ground and recharges the below-surface aquifers used by area farmers. As drip irrigation becomes more common, recharge of groundwater may be less frequent, the study said. 'I think it's very true that drip irrigation and drip irrigation subsidies definitely contribute to food security and increased farm income,' said Frank Ward, the study's co-author and a professor of water resource economics at New Mexico State University. 'The only downside...is that drip irrigation could be using more water.'

If Ward's study is true for areas beyond the study's focus area - the U.S. Rio Grande Basin - agricultural development organizations may need to evaluate whether costly drip irrigation is truly an efficient technique, the study said. This is of particular concern as global food crises and water shortages force many regions to decide between growing food or conserving water. The Stockholm International Water Institute estimates that feeding the world's undernourished population and the additional 3 billion people expected by 2050 will require 50 percent more water resources than today. The vast majority of the world's available fresh water - some 70 percent, according to the United Nations Food and Agriculture Organization (FAO) - is withdrawn for agricultural usage. Most crops are not irrigated with the drip method due to higher costs. In the United States and Spain, where the technology is used most, it comprises 6.75 and 2.75 percent of the total irrigated area, respectively, according to the International Commission on Irrigation and Drainage. But drip irrigation is becoming more popular. More farmers in the United States, the Middle East, and North Africa are turning to the technology, especially to grow permanent tree and orchard crops. Ward first became aware of drip irrigation's potential to diminish water reserves when several irrigation engineers, farming consultants, and water agency administrators in the Rio Grande Basin informed him of the problem. They told Ward that farmers who adopted the technology were using a larger portion of the region's groundwater. 'They worried [that] farmers would conserve themselves right out of an aquifer,' he said.

After initially dismissing the concerns, Ward and Spanish researcher Manuel Pulido-Velazquez created a model of the basin's hydrology. The model included the total water diverted from streams, applied to crops, evaporated into the air, and returned to the ground. At maximum levels of drip irrigation subsidies (the U.S. government offers subsidies to offset the technology's higher cost), the analysis concluded that farmers in the irrigation district would apply 40,000 acre-feet (49.3 million cubic meters) less of water per year. Yet due to the loss of 'wasted water' and the additional water demands associated with the higher yields of drip irrigation, the entire district would face a deficit of 36,700 acre-feet (45.3 million cubic meters) of water per year. 'Farmers themselves believe they are using less water,' Ward said. 'They apply less, but because plants unknowingly may use more, they deplete more.' Not all researchers are convinced. 'It's an absurd proposition,' said Mahbub Alam, an irrigation specialist at Kansas State University. 'Drip is the answer to be able to manage water much better and still have good production and do more with less.' But the efficiency of drip irrigation varies considerably by region and crop. In some Great Plains states, for instance, farmers who use a spray irrigation method known as central pivot often lose much of their water to evaporation. In contrast, if drip irrigation

is used, the application often occurs below the surface and very little water evaporates, said Charles Burt, chairman of the Irrigated Training and Research Center at California Polytechnic State University. 'In Kansas and Texas, it is entirely possible, but not guaranteed ...that evapotranspiration under drip is less than with pivot because it depends on the management and design of the sprinklers,' Burt said. With less water vanishing into the air, he explained, crops would lose less water than Ward estimated in his study of New Mexico.

Yet drip irrigation's significant boost for crop yields cannot be ignored. California has become the world's No. 1 producer of almonds over the past 30 years, due in part to the increased reliance on drip irrigation. Almond farmers have required some 15-20 percent more water, but average yields nearly doubled, said Blake Sanden, an irrigation farm advisor with the University of California Cooperative Extension. 'You cannot produce high-yield crops without a fairly significant input of water,' Sanden said. 'In the end of the day, hungry people will win the game.' In addition to irrigation technologies, farmers' crop decisions play a significant role in water conservation outcomes. Rice, for example, uses about twice as much water per hectare as wheat, according to the FAO.

**(Source** <http://water.environmental-expert.com/resultEachPressRelease.aspx?cid=28754&codi=40414&idproducttype=8&level=0>)

### **Measuring water from space**

Observations from satellites now allow scientists to monitor changes to water levels in the sea, in rivers and lakes, in ice sheets and even under the ground. As the climate changes, this information will be crucial for monitoring its effects and predicting future impacts in different regions. Sea level rise is one of the major consequences of global warming, but it is much more difficult to model and predict than temperature. It involves the oceans and their interaction with the atmosphere, the ice sheets, the land waters and even the solid Earth, which modifies the shapes of ocean basins. Measurements from tidal gauges show that for most of the twentieth century, sea levels rose by 1.8 mm per year on average. Since the 1990s, a number of altimeter satellites have been measuring the height of the ocean surface and this has dramatically improved our understanding of sea level rise. Currently, three altimeter satellites cover the entire globe every 10 to 35 days, and can measure the height of the sea surface to a precision of 1 to 2 cm. These measurements show that since the start of 1993, sea level has been rising by 3.3 mm a year, almost double the rate of the previous 50 years. "It could be that we are seeing a decadal fluctuation, and in the near future the rate will fall again," says Anny Cazenave, from the Laboratoire d'Etudes en Géophysique et Océanographie Spatiale (LEGOS) in Toulouse, "but I do not think so. For several years now, the rate of rise has not changed significantly." Cazenave's team, and other groups, calculate that for 1993-2003, about half of the sea level rise was due to the oceans expanding as they became warmer, and the other half was due to shrinking land ice. Since 2003, ocean warming has had a temporary break but

sea level has continued to rise. Now, about 80% of the annual sea level rise can be attributed to accelerated land ice loss from glaciers, Greenland and Antarctica. This has been revealed by a brand new satellite technique, called space gravimetry.

The GRACE mission comprises two satellites, launched in 2002, which measure how the Earth's gravity field varies with time. The gravity field depends on how mass is distributed on Earth, and affects the speed of satellites in orbit. By closely monitoring the speed of both satellites, as they orbit the planet, it is possible to measure the change in mass of water or ice in different regions. The method has shown that the Greenland ice sheet is losing about 150 gigatonnes of ice each year, two thirds of which is large chunks of ice flowing rapidly into the sea. The combined effect of ice loss from Greenland and West Antarctica has contributed about 1 mm per year to the rising seas over the past five years. Using GRACE, Cazenave and others have also looked at changes in water storage in river basins. In the period from 2002-2006, they found that some basins, including the Congo and the Mississippi, have been losing water, but river systems in the boreal regions are gaining water. Meanwhile, scientists at the European Space Agency, collaborating with DeMontfort University in the UK, have begun to use data from the satellites that measure sea level, to assess lake and river levels on land.

Fresh inland water is much in demand, but those managing it suffer from a grave lack of information about how much of it there is. "The number of river gauges is diminishing every day, and many catchments are now entirely unmeasured," says Jérôme Benveniste of the European Space Agency's data processing centre ESRIN, in Frascati, Italy. "But we have 16 years' worth of data on river and lake levels. It's just a question of processing it all." The work Benveniste is leading can recreate water levels in reservoirs, or lakes, and reconstruct the annual ebb and flow in large river basins like the Amazon. Other teams are combining these surface water level measurements with gravimetry measurements from the GRACE satellites, to derive the amount of ground water stored in each catchment. "International cooperation is essential in achieving this goal, with global coverage and local validation of the data," says Benveniste. "At the moment, Europe is leading the field." This research was presented at the "Complex Systems: Water and Life" Frontiers of Science conference, organized by European Science Foundation (ESF) and COST, 29-31 October, Taormina, Sicily.

(Source: <http://water.environmental-expert.com/resultEachPressRelease.aspx?cid=8884&codi=39807&idproducttype=8&level=0>)

## **WEFTEC.08 is the largest in conference's 81-year history of Water Environment Federation**

Record-setting numbers of 21,950 attendees and 1,111 companies using 290,000 net square feet of exhibit space have designated WEFTEC.08 – the Water Environment Federation's 81st Annual Technical Exhibition and Conference – as the largest event in its 81-year history. The previous records of

19,929 attendees, 1,017 companies and 268,405 net square feet of floor space were set just last year at WEFTEC.07 in San Diego. The conference was the premier gathering of water environment professionals that offered the most dynamic educational and training experience in WEFTEC's history with 31 workshops, 115 technical sessions, and 10 facility tours that addressed the timeliest issues in water, wastewater treatment, storm water management, energy, green initiatives, science, research, and legislative and political issues. Professor John Anthony Allan anchored a well-balanced opening general session program with a keynote address featuring the concept of "virtual water" which measures how water is embedded in the production and trade of food and consumer products. The Honorable Richard M. Daley, Mayor of Chicago received a standing ovation from the 800 attendees for his speech, "Making Chicago a Global Leader in Water and Sustainability," given in a session on water infrastructure and sustainable innovations. Mayor Daley shared the recently unveiled Chicago Climate Action Plan and also insisted that the Nation's cities must reinvest in infrastructure and will need help in financing. "Whoever is the next President of the United States needs to address what has been an inadequate level of federal investment in our infrastructure, including water systems, roads, bridges, highways, public transportation and school construction," he said.

On the international front, 2,378 international registrants attended WEFTEC.08. These international attendees included 245 trade delegation attendees from 71 countries, who utilized WEF's Global Center services to facilitate their meetings with exhibitors, organize site visits, and utilize translator services. WEF also facilitated meetings, between exhibitors and trade delegates representing water and wastewater buyer interests from such countries as China, the Philippines, Israel, Bulgaria, Iraq, and South Africa, to name a few. Presidential candidates Barack Obama and John McCain were represented by Cameron Davis and Marianne Horinko, respectively at a campaign forum. Representative Daniel Lipinski (D-IL) and State Senator Carole Pamkau also participated in the session which was attended by over 400. Moderator Jack Conaty, Chicago Fox News political editor, led a lively and exciting discussion of the candidate's views on climate change, water quality, infrastructure investment, and other critical issues.

A successful hands-on community service project, "Getting out of the Gutter", featured the construction of a Rain Garden at Pulaski Park in Chicago. The event was a project of the WEF Young Professionals Committee, the Illinois Water Environment Association, the Metropolitan Water Reclamation District, and the Center for Neighborhood Technology. The \$7,000 corporate-sponsored project left behind a green space that will provide native plants and effective storm water mitigation drainage to a previously plain turf area. Other conference highlights included WEFTeach, poster presentations, student activities, and the Operations Challenge 2008 where the Water Environment Association of Texas Trinity River Authority (TRA).

**(Source:** <http://water.environmental-expert.com/resultEachPressRelease.aspx?cid=5306&codi=39139&idproducttype=8&level=0>)

## **DONORS' LENDING AND SUPPORT FOR IRRIGATION & DRAINAGE PROJECTS**

### **World Bank**

#### **Madagascar: Irrigation and Watershed Management Project**

**GEF Grant:** US\$5.44 million

**Project Description:** The Irrigation and Watershed Management Project for Madagascar aims to establish a viable basis for irrigated agriculture and natural resources management in four main irrigation sites and their surrounding watersheds. The project consists of the following components: (1) laying the foundations for improved market access and sustainable intensification and diversification of irrigated and rainfed agricultural systems in the project's watersheds; (2) for improved management, maintenance and sustainability of irrigation services provision in four large-scale irrigation schemes through rehabilitation of irrigation infrastructure, capacity strengthening of stakeholders and clarification of roles and responsibilities, and establishment of an appropriate incentive framework; (3) for sustainable management of watersheds including irrigated and rainfed agriculture, the conservation of the natural heritage, and improved productivity of the natural resources. And (4) managing and using resources in accordance with the project's objectives and procedures, and to put in place a policy framework that is favorable to upscaling of the project at the national level.

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### **Asian Development Bank**

#### **Jaffna Water Supply and Waste Water Management II**

**Amount:** US\$15.0 million

#### **Project Rationale**

Jaffna, the northern most part of the island, is a peninsula which significantly differs from the rest of the country in relation to geographic, demographic, economic, and administrative characteristics. Jaffna suffers from both income and non-income poverty. The resulting poverty headcount in 2005 was 43.4% in Jaffna District and 64% in Northern Killinochchi. Years of civil war and, to a lesser extent, recent natural calamity, have resulted in continued deprivations and increasing human poverty.

Groundwater resources in Jaffna peninsula are limited. Acute water scarcity problems are coupled with the deterioration of water quality. The aquifer, the main source of water, is fragile and at risk, exposed to contamination from sewerage and leachate seepage, and over extraction resulting from uncontrolled and unregulated water extraction for multiple uses.

Overall, less than 15% of the peninsula's inhabitants receive supply from any providers and onsite sanitation facilities are poorly maintained.

**Project Impact**

The expected impact of the Project is increased standard of living in the Jaffna peninsula.

**Project Outcome**

The expected outcome of the Project is improved water protection and management in the same area.

**Project Outputs**

Infrastructure to provide safe drinking water to the population of the city of Jaffna and its surrounding urban area, estimated to be 250,000 people and sanitation facilities to approximately 50,000 people.

**Social Aspects**

Any potential negative environmental and social impacts due to construction identified during project preparation will be addressed during implementation. Mitigation measures will be incorporated into construction contracts.

**Project Officer**

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**UPCOMING REGIONAL AND INTERNATIONAL MEETS AND EVENTS**

**Everything to do with water: A lecture for kids**

07 December 2008

Berlin, Germany

**Summary**

Everything to do with Water, a Lecture for schoolchildren up to the age of 12, is one of the highlights of the Summer Festival Programme? Wassermusik? (Water Music) of the House of the World Cultures in Berlin, Germany, taking place from 10 to 27 July 2008, always Thursday to Sunday. The Festival is organized in collaboration with the German Commission for UNESCO. It features a Radio Workshop for teenagers, the Water Academy, numerous concerts and more

**Organizers:** Haus der Kulturen der Welt (House of World Culture), Berlin

**Contact Name:** Haus der Kulturen der Welt

**E-mail:** [info@hkw.de](mailto:info@hkw.de)

**International Conference on Water Resources Policy in South Asia**

18-20 December, 2008

Colombo, Sri Lanka

SaciWATERs announces its first International Conference on Water Resources Policy in South Asia, to be held in Colombo, Sri Lanka, during December 18-20, 2008. The conference is organised as part of the regional

capacity building project Crossing Boundaries. The conference will bring together regional and international water professionals, academics, policy makers, activists, politicians and others involved and interested in South Asian water resources issues. As part of the ongoing water resources policy dialogue, the conference aims to enhance the understanding of water resources governance, its management and use in the region by critically assessing the agenda for reform.

The conference seeks to investigate and understand the varied dynamics of existing water resources management in South Asia and compare them with those in other regions. Policy is broadly understood as parties engaged in water resources management that are involved in formulating, implementing and reshaping policies at different levels. The conference will document policy reforms in South Asia and the challenges therein. It will also critically assess the impact of the different initiatives to reform water resources governance. The importance of scientific knowledge while formulating water policy and the strengthening of water resources policy studies in the region will receive special attention.

### **Conference Themes**

- The conference will broadly deal with the following topics and themes:
- Sectoral assessment of policy processes/reforms (irrigation, water supply and sanitation, hydropower, flood management, ecological water management)
- Rent seeking behaviour in water management and infrastructure development
- Success, value and limitations of participatory processes in the water sector
- International and federal hydro politics
- Inter-sectoral water allocations, negotiations and conflicts
- Gender dimensions of water governance and management
- Water management in the peri-urban areas
- Approaches to urban water provision and management
- Privatisation in the water sector
- Impact of global policy discourses on National Water Policy making
- Watershed management policies and programmes
- Water policy and climate change
- Dying wisdom or myth making: exploring the meaning and value of local water management practices
- Approaches to water policy analysis in South Asia
- Civil and political society in water management in South Asia
- Water rights and water rights reform in South Asia
- Private sector boom and public sector malaise in water resources development

### **Contact**

Plot No.125 &126, S. P. Colony, Tirmulgherry, Secunderabad - 500 015, Andhra Pradesh, India.

Tel: 091 - 40 - 65762865, 27990139 Tele Fax: 091 - 40 - 27796721

Website: [www.saciwaters.org/conference.asp](http://www.saciwaters.org/conference.asp)  
E.mail: [conference@saciwaters.org](mailto:conference@saciwaters.org)

### **Water Today's Water Expo 2009**

26-28 Feb 2009

Chennai, Tamil Nadu, India

Water Today's Water Expo 2009 is in its third edition of its annual water expo. It is a perfect, proactive platform for water and wastewater Industry offering all the exciting business opportunities under one roof. 'Water Today' with a vision about the growing potable water need world over, arranges this Mega event WATER EXPO 2009 with a special focus on Packaged Drinking Water Industry.

Use this opportunity to

- Be a part of an industry that is expected to grow \$4 billion soon
- Be a part of an industry that turn out a phenomenal 40 to 50% increase a year.
- Be a part of an industry that offers scope for private-public-partnerships
- Discover new niche markets and increase business partnerships
- Maximise your brand visibility and build the brand image

'Water Today' invites you to participate in this Mega Water Expo 2009 and avail this opportunity to forge right business ties. We have enclosed an application with tariff card and a detailed floor plan for your perusal.

### **Contact**

VIA EXPO Ltd

tel.: +359 (32) 960011, 960012

tel./fax: +359 (32) 945459

[office@viaexpo.com](mailto:office@viaexpo.com)

[www.viaexpo.com](http://www.viaexpo.com)

### **5th World Water Forum**

15-22 March 2009

Istanbul, Turkey

The World Water Forum, which is organized by the WWC every three years in collaboration with the authorities of the host country, is the largest international event in the field of water.

15,000 people from 150 countries are expected to attend the 5th Forum to discuss issues and solutions regarding water in the world.

### **Thematic Process**

The thematic process for the 5th World Water Forum follows a "pyramid" approach: all themes, topics and sessions will ultimately lead to the achievement of a clear set of experiences, recommendations and commitments for action on bridging water divides among actors, sectors and among the present and future generations. The programme framework is developed by the

programme Committee and specifies the aim, themes and topics. 6 themes have been identified:

#### **Ends**

- Global Changes and Risk Management
- Advancing human Development and the MDGs
- Managing and Protecting water resources and their supply systems to meet human and environmental needs

#### **Means**

- Governance and Management
- Finance
- Education, Knowledge and Capacity Building

Thematic Coordinators have been identified for each theme: their role is to develop within a thematic consortium the respective theme, topics and sessions to identify and share experiences and actions bridging the gaps between actors, sectors, regions and generations of relevance for the theme and to formulate recommendations, commitments and actions to further build these bridges.

(Source: <http://www.worldwaterforum5.org/index.php?id=1897>)

#### **Water Africa 2009**

01-03 April 2009

Accra, Ghana

#### **Summary**

Water Africa is an international trade exhibition for goods and services for the water and wastewater engineering sector with an accompanying seminar programme. It offers exhibitors the chance to promote their products and services to officials from central and local government, regional contractors and consultants, industrial customers and NGOs. It has been staged in various African capitals almost annually since it began in 1993. The 2009 event will be held in the Accra International Conference Centre in Ghana on 1-3 April 2009.

#### **Organizers**

Ace Event Management, with the support of the Ghanaian Ministry of Water Resources, Works & Housing and the Ghana Water Supply Company

**Contact Name:** Jacqui Hepworth

**E-mail:** [Jacqui.hepworth@btinternet.com](mailto:Jacqui.hepworth@btinternet.com)

#### **The 10th China Water Show**

28-30 April 2009

Shanghai, China

The China International Water Supply & Drainage and Water Treatment Exhibition (WSDWTF) has been held annually in Shanghai since 1999. WSDWTF is one of the most famous international water shows with the largest scale in

China. It has not only attracted many domestic water industry exhibitors and visitors, but has also attracted many participants from North America, Europe, and Asia Pacific who are willing to enter the Chinese market. With the perfect combination of specialization and integration, localization and internationalization, WSDWTF has become the most influential water event in China.

(Source: <http://water.environmental-expert.com/resultEachEvent.aspx?cid=20634&codi=4111&idproducttype=3&idmainpage=0&level=0>)

### **CIWEM Annual Conference 2009: Water and the Global Environment**

29-30 April, 2009

Olympia Conference Centre, London, UK

#### **Summary**

In April 2009 CIWEM is holding a two-day Annual Conference at Olympia Conference Centre in London that will address multidisciplinary issues across all areas of the global water and environment sector. The event includes a mix of keynote speakers, offered papers, an exhibition and many networking opportunities that will make this the key event for water and environment professionals. Exhibitors will showcase the diversity of the water and environment industry, allowing delegates to network with industry peers and experts face-to-face.

#### **Organizers**

The Chartered Institution of Water and Environmental Management (CIWEM)

**Contact Name:** Justin Taberham

**E-mail:** [Justin@ciwem.org](mailto:Justin@ciwem.org)

### **2nd International Conference on Water Economics, Statistics, and Finance**

03-05 July 2009

Thrace, Greece

#### **Summary**

This meeting is aimed at providing specialists interested in economics, statistics, and financing of water and sanitation with the opportunity of getting together and constituting a forum to debate on how utilities are financed, their various water tariff structures and their measurement of performance, national and regional water industry statistics, water facts, water consumption and charging figures. A parallel conference will be organized at the same venue by the IWA Specialist Group on Strategic Asset Management entitled Asset Management of Medium and Small Wastewater Utilities. Arrangements have been made for participants to attend this event.

#### **Organizers**

International Water Association (IWA) Statistics and Economics Specialist Group, with the cooperation and sponsorship of the Department of Environmental Engineering of the Democritus University of Thrace and the Department of Economics of the University of Crete.

**Contact Name:** Konstantinos P. Tsagarakis  
**E-mail:** [iwa@econ.soc.uoc.gr](mailto:iwa@econ.soc.uoc.gr)

### **WEFTEC 2009**

10-14 October 2009  
Orange, FL, USA

The Water Environment Federation's Annual Technical Exhibition and Conference, is the largest conference of its kind in North America and offers water quality professionals from around the world with the best water quality education and training available today. Also recognized as the largest annual water quality exhibition in the world, the expansive show floor provides unparalleled access to the most cutting-edge technologies in the field, serves as a forum for domestic and international business opportunities, and promotes invaluable peer-to-peer networking between its more than 20,000 attendees.

### **NEW PUBLICATIONS**

#### **Biological Wastewater Treatment: Principles, Modelling and Design**

Over the past twenty years, the knowledge and understanding of wastewater treatment have advanced extensively and moved away from empirically-based approaches to a first principles approach embracing chemistry, microbiology, physical and bioprocess engineering, and mathematics. Many of these advances have matured to the degree that they have been codified into mathematical models for simulation with computers. For a new generation of young scientists and engineers entering the wastewater treatment profession, the quantity, complexity and diversity of these new developments can be overwhelming, particularly in developing countries where access is not readily available to advanced level tertiary education courses in wastewater treatment.

This book addresses this deficiency.

It assembles and integrates the postgraduate course material of a dozen or so professors from research groups around the world that have made significant contributions to the advances in wastewater treatment.

The book forms part of an internet-based curriculum in wastewater treatment which also includes

- Summarized lecture handouts of the topics covered in book
- Filmed lectures by the author professors
- Tutorial exercises for students self-learning

Upon completion of this curriculum the modern approach of modelling and simulation to wastewater treatment plant design and operation, be it activated sludge, biological nitrogen and phosphorus removal, secondary settling tanks or

bio film systems, can be embraced with deeper insight, advanced knowledge and greater confidence.

Author: M. Henze, M. C. M. van Loosdrecht, G.A. Ekama and D. Brdjanovic  
Price: IWA Members US\$135.00, Non Members US\$180.00  
ISBN: 1843391880  
Pages: 528

### **Sediment and Contaminant Transport in Surface Waters**

Presents models of the resuspension, erosion, deposition, flocculation, and transport of sediments. Describes the sediment-water flux and transport of hydrophobic contaminants. Examines the effects of large-scale events such as floods and storms on the transport of sediments and contaminants. Develops detailed process models as well as sediment and contaminant transport and water quality models. Details applications of these models as well as their strengths and weaknesses. Sediment and contaminant transport is an enormously rich and complex field that involves physical, chemical, and biological processes as well as the mathematical modeling of these processes. While many books have been written on these broad topics, Sediment and Contaminant Transport in Surface Waters takes a more focused approach, highlighting areas that have been recently investigated but not covered thoroughly elsewhere.

The volume emphasizes the erosion, deposition, flocculation, and transport of fine-grained, cohesive sediments; the effects of finite rates of sorption on the transport and fate of hydrophobic contaminants; and the effects of major events such as floods and storms. Despite these emphases, the overall goal of the text is to present a general description and understanding of the transport of sediments and contaminants in surface waters as well as procedures to quantitatively predict this transport.

Author: Wilbert J. Lick  
Price: US\$130.00  
ISBN: 1843392291  
Pages: 456

### **Health Impact Assessment for Sustainable Water Management**

Health Impact Assessment for Sustainable Water Management is a pioneering international text, exploring and developing this emerging discipline. It is the first to take an international perspective seeking to draw generic lessons from both the developed and developing nations' experience in this new area of activity. The approach is being applied in policy development to strengthen the 'evidence-base' and across a wide spectrum of resource developments, industrial and urban infrastructure projects and in 'aid' projects in developing countries.

This book illustrates the importance of considering health in water management developments and demonstrates the role of health impact assessment (HIA) in this process. Case-studies illustrate a range of management approaches to different system implementation issues and scale factors, ranging from domestic rainwater harvesting for the supply of non-potable water to a large-scale hydroelectric project. The concept, objectives, terminology and challenges of HIA are introduced and illustrated by case studies including rainwater harvesting, greywater reuse, sustainable drainage and evaluations of the health impacts of flooding. Developing country case studies include a small-scale irrigation project in Zimbabwe, a large hydro-electric scheme in Lao (Peoples Democratic Republic) and the implementation issues surrounding the use of domestic wastewater as a resource in demand by agricultural enterprises in Pakistan.

The case studies illustrate different HIA approaches, including the use of quantitative and qualitative information and provide benchmarks of current practice for practitioners seeking to apply HIA in the emerging agendas in both developed and developing nations. The critical appraisals within each chapter offer both best practice exemplars as well as explanations of problems and mistakes of past project implementation, and define the requirements for the policy communities who will be increasingly required to accommodate HIA information in resource allocation decisions. As a result, this book will be of interest to planners, developers, policy makers, public health, environmental and water utility scientists and practitioners.

Authors / Editors:	Lorna Fewtrell and David Kay
Price:	US\$170.00
ISBN:	1843391333
Pages:	300 · Hardback

## **FELLOWSHIP AND FUNDING OPPORTUNITIES**

### **Malaysian Technical Cooperation Programme**

The Malaysian Technical Cooperation Programme (MTCP) was launched in 1980. The main objective lies under its philosophy that the human resource development is a vital catalyst for countries to achieve sustainable economic and social development. The Programme consolidates various forms of technical cooperation in areas where Malaysia has the valuable experience and expertise. Through these cooperation efforts, Malaysia's bilateral ties with MTCP member countries were strengthened. The MTCP Scholarship for Postgraduate Studies provides opportunities for students to pursue advanced academic study in Malaysia. This scholarship is a Government-to-Government basis, without any bond imposed by Malaysia. Scholarships are intended for promising candidates who may be expected to make a significant contribution to their own countries on their return from Malaysia. Scholarships are available for postgraduate studies at Masters and PhD level tenable at Malaysian Universities.

*Target group:* Undergraduate, Bachelor's degree  
*Purpose:* Study

### **Countries**

#### ASEAN

Brunei, Cambodia, Indonesia, Lao PDR, Myanmar, Philippines, Singapore, Thailand, Vietnam

#### OTHER SEA AND ASIA

China, D.P.R. Korea, Mongolia, Timor Leste

#### SAARC COUNTRIES

Bangladesh, India, Maldives, Nepal, Pakistan, Sri Lanka

#### NORTH AFRICA AND WEST ASIAN STATES

Afghanistan, Algeria, Bahrain, Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Palestine, Qatar, Republic of Yemen, Saudi Arabia, Syria, Tunisia, UAE

#### PACIFIC ISLANDS

Cook Islands, Fiji, Kiribati, Marshall Islands, Micronesia, Nauru, Niue, Palau, Papua New Guinea, Solomon Island, Tonga, Tuvalu, Vanuatu, Western Samoa

#### EAST AND CENTRAL EUROPE

Albania, Bosnia and Herzegovina, Croatia, Turkey, CIS, Azerbaijan, Georgia, Kazakhstan, Kyrgyz Republic, Tajikistan, Turkmenistan, Uzbekistan

#### AFRICA

Angola, Benin, Botswana, Burkina Faso, Cameroon, Comoros, Congo, Cote D`Ivoire, Djibouti, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea Equatorial, Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rwanda, Senegal, Seychelles, Sierra Leone, Somalia, Sudan, Swaziland, Tanzania, Togo, Uganda, Zambia, Zimbabwe

#### SOUTH AMERICA

Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Mexico, Panama, Paraguay, Peru, Suriname, Uruguay, Venezuela

#### THE CARIBBEAN

Antigua Barbuda, Bahamas, Barbados, Belize, British Virgin Islands, Cayman Islands, Cuba, Dominica, Grenada, Guyana, Jamaica, Montserrat, St. Kitts and Nevis, St. Lucia, St. Vincent Grenadines, Trinidad Tobago, Turks Caicos Islands

### **Requirements for Eligibility**

The scholarship is open equally to qualified candidate up to 45 years of age at the time of application. Candidates should be the citizens of above mentioned countries.

- They should, at the time of application, obtain a degree or equivalent qualification with at least upper second class honours, (or CGPA 3.0) for Master's programme; and hold a Master's degree with good grades for PhD programme.
- The candidates must demonstrate outstanding verbal, reading and writing proficiency in the English language through one of the following:
  - Test of English as a Foreign Language (TOEFL) or

- Test administered by the International English Language Testing Service (IELTS).

If deemed necessary, applicants may also be required to attend an interview and/or take an entrance test or English Test conducted by the Ministry of Higher Education or the Board of Admissions of the particular university.

- Applicants must be in good health, both physically and mentally.

### ***APPLICATION TO THE UNIVERSITY***

University's application for admission is solely the candidate's responsibility. Proof of admission is not a prerequisite to the award. Selection committee for MTCP Scholarship will only consider qualified applicants with outstanding academic achievement and professional performance. Interested applicants are advised to apply before the beginning of the academic year which falls on the month of July for most of Malaysian university. The scholarship awarded does not guarantee a placement in the university. Admission to any program is by way of applications to the university. Applications must abide to the requirement and procedure for admission set by the university.

### ***VALUE OF AWARDS***

- Each scholarship consists of:
  - A return air tickets from recipient's capital city to Malaysia;
  - An approved tuition fees by the respective university;
  - A maintenance allowance at the rate of RM1,200.00 per month;
  - A yearly grant for books and internal travel;

Thesis allowance, installation and termination grant.

- No marriage/family allowance for accompanying spouse or children.
- Government of Malaysia reserves the rights to review the value of awards at anytime, and if such changes are made, the value of scholarship will be changed and the effective date will be informed to the successful candidates.

### **University of Groningen PhD Fellowship**

#### ***Selection criteria***

Target group: PhD degree  
 Purpose: Research  
 Field of study: All

#### **Countries**

Afghanistan, Albania, Algeria , American Samoa, Angola, Anguilla , Antigua And Barbuda , Argentina , Armenia , Aruba , Azerbaijan, Bahamas , Bahrain , Bangladesh, Barbados , Belarus , Belize , Benin , Bermuda, Bhutan , Bolivia , Bosnia-Herzegovina , Botswana , Bouvet Island , Brazil, Brunei , Bulgaria, Burkina Faso, Burundi , Cambodia, Cameroon, Cape Verde, Cayman Islands , Central African Republic , Chad , Chile , China , Christmas Island, Cocos (Keeling) Islands , Colombia , Comoros , Conch Republic , Congo,

Democratic Republic of the , Cook Islands , Costa Rica , Croatia , Cuba , Cyprus, Djibouti , Dominica , Dominican Republic , East Timor , Ecuador , Egypt , El Salvador , Equatorial Guinea , Eritrea , Estonia , Ethiopia , Falkland Islands, Faroe Islands, Fiji, French Guiana, Gabon, Gambia, Georgia, Ghana, Gibraltar, Grenada, Guadeloupe, Guam , Guatemala, Guinea , Guinea Bissau, Guyana , Haiti, Honduras, Hungary, India , Indonesia, Iran , Iraq , Israel, Ivory Coast (Cote D'Ivoire), Jamaica , Japan , Jordan , Kazakhstan , Kenya , Kiribati, Kuwait , Kyrgyzstan, Laos , Latvia , Lebanon , Lesotho , Liberia , Libya, Lithuania , Macau , Macedonia, Madagascar, Malawi , Malaysia , Maldives, Mali, Malta , Marshall Islands , Martinique , Mauritania , Mauritius , Mayotte , Mexico, Micronesia, Moldova , Mongolia, Montserrat, Morocco , Mozambique, Myanmar, Namibia , Nauru , Nepal , Netherlands Antilles , New Caledonia , Nicaragua, Niger , Nigeria , Niue , Norfolk Island , North Korea , Northern Mariana Islands, Oman , Pakistan, Palau , Panama , Papua New Guinea , Paraguay , Peru, Philippines , Pitcairn Island , Poland , Polynesia, Puerto Rico, Qatar , Reunion, Romania, Russia , Rwanda, S.Georgia & S. Sandwich Isls. , Saint Kitts & Nevis, Saint Lucia , Saint Pierre And Miquelon , Saint Vincent & Grenadines , Samoa, San Marino , Sao Tome And Principe , Saudi Arabia , Senegal , Serbia, Seychelles , Sierra Leone, Slovakia , Slovenia , Solomon Islands , Somalia, South Africa, South Korea, Sri Lanka, Sudan , Suriname, Svalbard And Jan Mayen Islands , Swaziland , Syria , Taiwan, Tajikistan , Tanzania , Thailand, Togo , Tokelau, Tonga , Trinidad And Tobago , Tunisia , Turkey , Turkmenistan, Turks And Caicos Islands , Tuvalu , Uganda , Ukraine , United Arab Emirates, Uruguay , Uzbekistan , Vanuatu , Venezuela , Vietnam , Virgin Islands , Wallis And Futuna Islands , Yemen , Zambia , Zimbabwe , Montenegro.

### ***Eligible candidates***

Junior Ph.D. researchers who conduct Ph.D. research within the scope of a cooperation between the University of Groningen and an institution in a developing country.

### ***Value and purpose of grant***

The journeys to the Netherlands and back home are included in the scholarship grant. Travel costs, travel insurance, airport taxes, living allowance, settling allowance etc.

### ***Grant award period***

Maximum of six months each year within a four-year period.

### ***Other details***

Candidates from a university that has signed a cooperation agreement with the University of Groningen will be given preferential treatment.

### ***Grant provider***

University of Groningen

### ***Application procedure***

For information on how to apply, see

[http://www.rug.nl/let/voorzieningen/internationalOffice/handleiding/beurzenEnFondsen/phd\\_fellowship\\_programme\\_rug](http://www.rug.nl/let/voorzieningen/internationalOffice/handleiding/beurzenEnFondsen/phd_fellowship_programme_rug)

**Applications must include:**

- A research proposal. This proposal should include:
- A clear research question;
- A short description of current developments in the chosen area of research;
- A plan for the work;
- A survey of relevant literature;
- A list of the applicant's publications;
- References.

For additional information see: [http://www.rug.nl/let/voorzieningen/internationalOffice/handleiding/beurzenEnFondsen/phd\\_fellowship\\_programme\\_rug](http://www.rug.nl/let/voorzieningen/internationalOffice/handleiding/beurzenEnFondsen/phd_fellowship_programme_rug)

**Erasmus Mundus Scholarship Program**

The Erasmus Mundus program is a co-operation and mobility program in the field of higher education which promotes the European Union as a centre of excellence in learning around the world. It supports European top-quality Masters Courses and enhances the visibility and attractiveness of European higher education in third countries. It also provides EU-funded scholarships for third country nationals participating in these Masters Courses, as well as scholarships for EU-nationals studying at Partner universities throughout the world.

**Selection Criteria**

*Target group:* Master's degree, Bachelor's degree  
*Purpose:* Study, Research  
*Field of study:* All

**Countries**

Saint Kitts & Nevis, Saint Lucia, Saint Pierre And Miquelon, Saint Vincent & Grenadines, Samoa, San Marino, Sao Tome And Principe, Saudi Arabia, Senegal, Serbia, Seychelles, Sierra Leone, Singapore, Solomon Islands, Somalia, South Africa, South Korea, Sri Lanka, Sudan, Suriname, Svalbard And Jan Mayen Islands, Swaziland, Switzerland, Afghanistan, Albania, Algeria, American Samoa, Angola, Anguilla, Antigua And Barbuda, Argentina, Armenia, Aruba, Australia, Azerbaijan, Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia-Herzegovina, Botswana, Bouvet Island, Brazil, Brunei, Burkina Faso, Burundi, Cambodia, Cameroon, Canada, Cape Verde, Cayman Islands, Central African Republic, Chad, Chile, China, Christmas Island, Cocos (Keeling) Islands, Colombia, Comoros, Conch Republic, Congo, Democratic Republic of the, Cook Islands, Costa Rica, Croatia, Cuba, Djibouti, Dominica, Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equatorial Guinea, Eritrea, Ethiopia, Falkland Islands, Faroe Islands, Fiji, French Guiana, Gabon, Gambia, Georgia, Ghana, Greenland, Grenada, Guadeloupe, Guam, Guatemala, Guinea, Guinea Bissau, Guyana, Haiti, Honduras, Hungary, India, Indonesia, Iran, Iraq, Israel, Ivory Coast (Cote D'Ivoire), Jamaica, Japan,

Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, Kyrgyzstan, Laos, Lebanon, Lesotho, Liberia, Libya, Macau, Macedonia, Madagascar, Malawi , Malaysia, Maldives, Mali, Marshall Islands, Martinique, Mauritania, Mauritius, Mayotte, Mexico, Micronesia, Moldova, Mongolia, Montserrat, Morocco, Mozambique, Myanmar, Namibia, Nauru, Nepal, New Caledonia, New Zealand, Nicaragua, Niger, Nigeria, Niue, Norfolk Island, North Korea, Northern Mariana Islands, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Pitcairn Island, Polynesia, Puerto Rico, Qatar , Reunion, Russia, Rwanda, S.Georgia & S. Sandwich Isls. , Syria, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tokelau, Tonga, Trinidad and Tobago, Tunisia, Turkmenistan, Turks and Caicos Islands, Tuvalu, Uganda, Ukraine, United Arab Emirates, United States, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Virgin Islands, Wallis and Futuna Islands, Yemen, Zambia, Zimbabwe, Montenegro.

### ***Eligible Candidate***

The selection criteria are set by the consortium which offers the masters. Each consortium may appoint a small number of scholars for a scholarship. Candidates should apply directly to the Erasmus Mundus program.

### ***Grant Information***

*Value and purpose of grant:* The contribution from the European Union for an Erasmus Mundus scholar is 13.000 euro for a period of three months.

### ***Closing date***

Annual calls for the submission of applications state deadlines and other requirements or priorities, where and if relevant.

### ***Grant provider***

European Union

### ***Application Procedure***

Applications can only be submitted online at the participating consortium. See for additional information:

[http://europa.eu.int/comm/education/programmes/mundus/index\\_en.html](http://europa.eu.int/comm/education/programmes/mundus/index_en.html)

Should further assistance be needed, you may contact the National Structure through the email: [erasmusmundus@nuffic.nl](mailto:erasmusmundus@nuffic.nl) or [EAC-ErasmusMundus@cec.eu.int](mailto:EAC-ErasmusMundus@cec.eu.int)

The financial contribution of the European Union to the Erasmus Mundus scholarships for the academic year 2007-2008 will be 62.6 million Euros.

## **CAPACITY BUILDING AND TRAINING**

### **River Basin Modelling**

06-24 April 2009  
UNESCO-IHE

**Course fee:** €2250  
**Course Coordinator:** A. Jonoski, PhD, MSc  
I.I. Popescu, PhD, MSc

<b>Course location:</b>	UNESCO-IHE, Delft
<b>Start date:</b>	06 April 2009
<b>End date:</b>	24 April 2009
<b>Duration in weeks:</b>	3 weeks
<b>Deadline application:</b>	06 March 2009

### **Brief description**

With growing scarcity and quality deterioration of water resources in many developing countries, taking into account climate change effects and increasing frequencies of floods and droughts, the role of river basin modellers to address these problems has become a necessity. The users of hydroinformatic tools and of river basin models in particular, need a substantial experience to develop models which will increase the capacity of organizations to manage and protect water resources and optimize their utilization. After completing the River Basin Modeling short course, participants will be able to assess alternative modeling software systems, build safe and reliable models and know how to use them for planning and design.

### **Learning objectives**

The course aims at providing participants with a comprehensive understanding of the multi-purpose nature of river basins and model-based approaches to their integrated planning and management. The course covers the fundamentals of modelling, and how to build and apply reliable models for basin wide water allocation, groundwater and catchment management. The overall goal of the course is to teach water professionals that by using river basin models they can maximize economic and social well-being in an equitable manner without compromising the sustainability of the ecosystems.

### **Target group**

The course is designed for professionals (engineers and scientists) active in the water sector, especially those involved in using simulation models for river basin modelling. Pre-requisites are a basic knowledge of hydraulics and hydrology.

### **Additional information**

Water resources management has become a field where computer-based models are expected to facilitate the complex process of decision making which involves several stakeholders with varied interests and various socioeconomic objectives, of the natural resources. One of the aims of the course is to show how different types of models can be used as support in the decision making processes in river basins. Managing water resources in river basins requires water resources engineering expertise combined with use of appropriate hydro informatics models. During the course practical applications of the modelling systems are demonstrated, involving testing of different management alternatives with fully integrated models.

- Basin-wide water allocation – RIBASIM.
- Groundwater modelling – Processing MODFLOW.

- Catchment and river modelling - MIKE SHE / MIKE 11 and SWAT.

**Contact:**

[a.jonoski@unesco-ihe.org](mailto:a.jonoski@unesco-ihe.org)

**Advanced Water Treatment Technology**

06-24 April 2009

UNESCO-IHE

**Course fee:** €2250  
**Course location:** UNESCO-IHE, Delft  
**Start date:** 06 April 2009  
**End date:** 24 April 2009  
**Duration in weeks:** 3 weeks  
**Deadline application:** 06 March 2009

**Brief description**

The aim of this course is to provide an overview of both the theoretical and practical aspects of conventional and advanced water technology for surface water treatment.

**Learning objectives**

On completion of the short course participants should be able to:  
Understand the basic principles of coagulation, flocculation and disinfection processes, and select appropriate processes depending on the nature of impurities to be removed and the intended use of the treated water. Comprehend the basic principles of membrane processes and the capabilities/constraints of using membrane processes in water treatment applications, and have practical knowledge on the design and operation of these processes. Select an appropriate membrane process for a specific application, and be able to identify appropriate pre-treatment and post treatment schemes, and cleaning protocols for these processes.

**Target group**

The module specifically targets professionals in water treatment companies, consulting agencies, ministries and equipment suppliers.

**Additional information**

The short course's didactics include lectures, laboratory sessions, design exercises/workshops, and a visit to a modern water treatment plant. The lectures and workshops include computer presentation, and are of an interactive nature. During the design exercise, a computer aided design of a brackish and seawater reverse osmosis system is made using the program Rodesign 7.4 (Hydranautics), and an overview of other computer programs is given. A visit to the world's largest integrated membrane plant is also included.

**Subjects**

- Coagulation & Flocculation Processes
- Chlorination & Advanced Disinfection (Ozone & UV)
- Desalination & Membrane Related Technologies
- Ion Exchange Technology
- Water Softening Technology

## Syllabus

- Water quality aspects of lakes & rivers
- Theory of coagulation and flocculation processes, coagulation kinetics, effects of coagulation.
- Break-point chlorination, advanced disinfection processes (ozone/UV).
- Laboratory course on water treatment techniques and analysis of common water quality parameters.
- Principles of microfiltration, ultrafiltration and reverse osmosis; specific membrane problems such as fouling, scaling and cleaning, pre-treatment options; commercial membrane elements and systems, Computer Aided Design of brackish/seawater reverse osmosis plants.
- Ion exchange resins (selectivity, column operation, regeneration of resins and applications).
- Principles of chemical softening and sludge blanket softening; design and operation of pellet softening and membrane softening plants.
- Process schemes of water treatment plants

### Contact:

[m.kennedy@unesco-ihe.org](mailto:m.kennedy@unesco-ihe.org)

### Financial Management of Water Organizations

27 April- 15 May 2009  
UNESCO-IHE

<b>Course fee:</b>	€2250
<b>Course location:</b>	UNESCO-IHE, Delft, The Netherlands
<b>Start date:</b>	27 April 2009
<b>End date:</b>	15 May 2009
<b>Duration in weeks:</b>	3 Weeks
<b>Deadline application:</b>	27 March 2009

### Brief description

The aim of this course is to prepare participants for positions of leadership in water sector and utility management.

### Learning objectives

Successful participants will be able to: understand the need for commercial accounting and the components of standard financial statements in irrigation, water and sanitation entities; assess the financial position of a water organization through an analysis of financial statements; have an contextual

overview of financial issues in the water and sanitation sector worldwide; are able to undertake a tariff analysis for water and sanitation services.

**Additional information**

Finance for urban water supply, sewerage and irrigation: types of costs; cost and fixed asset accounting; financial statements -balance sheet and income and expenses statement; profitability and financial ratio analysis; demand assessment; affordability and willingness to pay; direct and contingent valuation; vendors; Economics: supply and demand curves; marginal costing, price and income elasticity; tariffs: average historical costs, long run marginal costing; metering, billing and collection; budgeting, zero and priority based budgeting; asset management plans; sources of finance for capital investment; bond markets; development banks; project finance; retained earnings.

**Contact:**

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