



UNESCO-IHE
Institute for Water Education

Annual Report

2012

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UNESCO-IHE is the largest international postgraduate water education and research facility in the world.

The Institute confers fully accredited MSc degrees and awards PhDs in cooperation with partner universities. Since 1957, the Institute has provided post-graduate education to more than 15,000 water professionals from 162 countries, the vast majority from the developing world. 131 PhD fellows are currently enrolled in a water-related research programme. The Institute carries out numerous research and capacity development projects throughout the world.

UNESCO-IHE envisions a world in which people manage their water and environmental resources in a sustainable manner, and in which all sectors of society – and particularly the poor – can enjoy the benefits of basic services. The mission of UNESCO-IHE is to contribute to the education and training of professionals and to build the capacity of sector organizations, knowledge centres and other institutions active in the fields of water, the environment and infrastructure, working in developing countries and countries in transition.

The Institute encourages its alumni community members to actively engage in knowledge and information generation and exchange. Alumni attain senior positions in their home countries and often become nationally and internationally recognized experts and policy makers. Many have made significant contributions to the development of the water and environmental sectors. UNESCO-IHE alumni remain part of a global network linking alumni, guest lecturers, experts and renowned centres of knowledge, together providing a vast source of expertise to the sector.

At the centre of a vast international network of water-related institutions, UNESCO-IHE functions as an interface between knowledge networks and centres, public and private sector organizations, scientific and professional associations and other members of the international water community. Through these partnerships, the Institute broadens its knowledge base and increases its effectiveness in developing the capacities of water sector organizations and individuals worldwide. UNESCO-IHE centres its education, research and capacity development programmes around a number of key themes.

The current focal areas are Water Security, Environmental Integrity, Urbanization, Water Management and Governance, and Information and Communication Systems, as well as the emerging areas of Water Conflict Management and Climate and Global Change Adaptation. Through each of these themes, the Institute addresses the major issues and challenges faced by many developing countries and countries in transition.

Rector's Statement

In 2012, the Institute continued its core business of providing education, research and capacity development to allow the effective response to the existing and emerging global water challenges, particularly for the benefit of developing countries and countries in transition. Water challenges are steadily gaining strategic importance, as fresh water resources become scarcer for a growing global population. UNESCO-IHE has years of international experience dealing with current issues, including water supply and sanitation (WASH), the water, energy and food security nexus, and disaster management. These topics are embedded in the Institute's educational programmes and strategic partnerships.

'Stimulating Local Innovation on Sanitation for the Urban Poor in Sub-Saharan Africa and South-East Asia', the project funded by the Bill and Melinda Gates Foundation which UNESCO-IHE is carrying out with partners in the South, is the largest research and capacity building project for pro-poor sanitation ever conducted in the world. Rotary International and UNESCO-IHE joined forces to increase access to graduate education for water professionals from developing and emerging countries to improve the standards of water and sanitation globally. Hydropower and food security are embedded in the Institute's education and research, as is disaster management, ranging from topics such as flood risk management to the provision of drinking water supply at refugee camps.

UNESCO-IHE remains as active as ever in the international water arena, and was heavily involved in the 6th World Water Forum in Marseilles, France, where 35,000 people gathered to discuss 'Time for Solutions'. UNESCO-IHE coordinated the cluster "Conditions for Success - Enabling Environments", convened a multi-stakeholder panel on water governance and co-convened sessions on water education, water communications, water cooperation, food security and the science and water policy interface.

In 2012 UNESCO-IHE continued to be a frontrunner in the provision of joint education, with some 40% of MSc students enrolled in the programmes given jointly with partners. The numbers of MSc students at the Institute increased, and 42% of the total number of students are female, an accomplishment unique in the sector. Active and graduating PhD fellows continued to rise, as well as scientific publication outputs,

with a remarkable increase in peer-reviewed journal articles. Working in partnership is an overarching principle of the Institute. In 2012 advances were made toward strengthening the bonds with and increasing bonds between (future) alumni and the Dutch water sector. During the Institute's first Alumni Day, the 'Water Sector meets Future Water Leaders' event was launched, a Public Private Partnership event creating bonds between (future) alumni and the Dutch water sector.

UNESCO-IHE's Alumni Tracer Survey results were published in 2012, and the conclusions further attest to the impact the Institute's education has in alumni career development, and the positive role our alumni play in global development by working on the needs of developing countries and countries in transition with regard to water-related capacity building.

With the UNESCO-IHE Governing Board's unanimous approval of the Business Plan 2013-2018, the Institute steps into the future with confidence, and looks forward to the continued employment of the high commitment of its staff, students, researchers, alumni and partners to meet the global challenges in the water sector. To this end, steps were taken to further clarify the UNESCO-IHE Global Campus for Water & Development concept, an international networking organization (mainly virtual) where partner institutes work together to generate regional and local impact with high quality research and education to solve water problems.

There is an emerging recognition that in the future, water should and hopefully will function as a peace-builder rather than a primary source of conflict. Part of the UN's efforts in upcoming years will be to try and turn potential conflicts surrounding water scarcity into avenues of cooperation, and I look forward to the Institute's contributions to that spirit, starting with the launch of the UN-Water's International Year of Water Cooperation at UNESCO headquarters in Paris.



Professor András Szöllösi-Nagy
Rector, UNESCO-IHE

2012 at a Glance

159 full-time staff equivalents over the whole year: 53% academic and 47% non-academic staff

4 MSc programmes related to water and environment with 22 specializations

261 new MSc students

193 MSc degrees awarded

131 registered PhD fellows

16 PhD graduations

11 active post-doctoral researchers

359 professionals in 62 regular short courses

Education

40% of all MSc students were enrolled in the MSc programmes given jointly with partner institutes.

The growth of student numbers can partly be attributed to the diversification of fellowship funding.

The new Postgraduate Professional Diploma Programme in Sanitation and Sanitary Engineering was developed with Bill and Melinda Gates Foundation funding, and a Hybrid Master Specialization in Sanitation and Sanitary Engineering is also under development.

The process of re-accreditation with the Dutch-Flemish Accreditation Organization (NVAO) was launched.

The assessment of the performance of the quality assurance, staff and facilities of partner universities, where relevant to joint programme activities, was concluded in 2012.

A Double Degree Programme in Sanitary and Environmental Engineering given

jointly with Universidad del Valle in Colombia ran for the first time.

The new joint degree in Limnology and Wetland Management was launched, with partners BOKU University of Natural Resources and Life Sciences in Austria, and Egerton University in Kenya.

Together with partner institutes, business plans were developed for the joint programmes during a workshop held at UNESCO-IHE.

Research

There were record numbers of both registered PhD fellows and PhD graduations.

Scientific publications overall continued to grow; in particular the increase of articles in peer-reviewed journals was notable. The paper 'Modelling storm impacts on beaches, dunes and barrier islands' became the most cited article in Elsevier's leading *Coastal Engineering* journal since 2008.

The SWITCH Project Consortium and the European Union won the IWA Sustainability Award 2012 for innovation. Several staff members also won prestigious prizes with their research.

The agreement for the Erasmus Mundus Joint Doctorate programme on Environmental Technologies for Contaminated Soils, Sediments and Solid waste was signed, leading to a European PhD degree in Environmental Technology, issued jointly by the University of Cassino (Italy), University Paris-Est (France) and UNESCO-IHE.

12 projects were awarded UNESCO-IHE Partnership Research Fund (UPaRF) funding, bringing the total UPaRF portfolio to 45 research projects with more than 50 partner institutes in 37 countries.

UNESCO-IHE contributes its expertise in governance, capacity development, and knowledge management in the new € 8 million interdisciplinary research project WeSenseIt, which allows citizens to become active stakeholders in capturing, evaluating and communicating information.

240 participants in 17 online courses

4 refresher seminars held for alumni

511 scientific publications

177 running projects

almost 15,000 alumni

Total turnover of just under € 34 million

Overall positive result of € 81,000

Capacity Development

The programmatic cooperation with the Asian Development Bank started its full operation, managing a fund of 2.5 million US dollars to support water operations in ADB's Developing Member Countries (DMCs) and ADB staff. Currently there are 18 running projects, with 13 new proposals being developed.

Seven new NICHE projects were included in the UNESCO-IHE portfolio, of which UNESCO-IHE has a leading role in three.

In the USD 11.1 million project 'Stimulating Local Innovation on Sanitation for the Urban Poor in Sub-Saharan Africa and South-East Asia' funded by the Bill and Melinda Gates Foundation, the Postgraduate Professional Diploma Programme in Sanitation and Sanitary Engineering and the Hybrid Master Specialization in Sanitation and Sanitary Engineering were developed. Over 100 online course participants received certificates, 23 MSc students started, 5 post-doc researchers and 20 PhD fellows were active.

Advisory services were provided for the national governments of the Netherlands (defining water cooperation programmes with Benin and South Sudan) and Bangladesh (development of the Bangladesh Delta Plan).

UNESCO-IHE took part in a water mission to Myanmar after 20 years of isolation; seminars were held at the Ministry of Agriculture and Irrigation and Yangon Technical University, and about 75% of alumni present at an alumni meeting organized by the Netherlands Embassy had studied at the Institute.

Within the completed ENP Mediterranean Environment programme (part of Horizon 2020), UNESCO-IHE delivered a total of 30 short courses in 14 countries, involving 20 staff members and 10 guest lecturers, training about 1000 professionals.

Institutional Developments

The 6th World Water Forum on the theme of 'Time for Solutions' took place in March, gathering 35,000 people in Marseilles, France. UNESCO-IHE

coordinated the cluster "Conditions for Success - Enabling Environments," convened a multi-stakeholder panel on water governance and co-convened sessions on water education, water communications, water cooperation, food security and the science and water policy interface, shared a booth with UNESCO Water Family members, and organized an alumni evening.

UNESCO Director-General Irina Bokova spoke about the current state of water diplomacy at the first UN Water Talks organized at the Institute.

The UNESCO-IHE Alumni Tracer Survey results were published, with conclusions including overall positive career development, increase in salary, improved personal and professional networks, and overall competences for former students.

Alumni Day was launched, with the announcement of the Alumni Prize initiative and the first 'Water Sector meets Future Water Leaders' event, a Public Private Partnership event creating bonds between (future) alumni and the Dutch water sector.



Partnerships and Networks

Partnerships and networks add value to many of the Institute's activities and are essential for linking global knowledge to local sector agendas, and for improving North-South, South-North-South, and South-South collaboration. Partnerships refer to collaboration modalities in which institutes put together resources to develop new products, while networks are looser cooperation mechanisms set up for the purpose of awareness raising, policy development, sharing of experiences and dissemination.

Eight **Rotary International** sponsored students began their 18-month MSc programme in October. In November, the President of Rotary International Mr Tanaka visited the Institute to meet these students, accompanied by a group of high-level Rotarians from various districts. Rotary International and UNESCO-IHE joined forces in 2011, to increase access to graduate education for water professionals from developing and emerging countries, developing leaders and change agents in order to improve the standards of water and sanitation globally. Through the partnership, the Rotary Foundation offers eight scholarships annually. Scholarship recipients have regular contact with sponsoring Rotarians from their home country and with Rotarians in the Netherlands, and will improve water and sanitation conditions upon return to their own community after graduation. Other joint activities include project review and impact evaluation of the scholarships; and subject matter expertise to inform the Rotary Foundation's water and

sanitation philosophy and policy.

In 2012, the number of students active in Master of Science programmes implemented with partner institutes continued to rise, with 40% of all students enrolled in such programmes. These MSc programmes are **jointly carried out** and are based on a Credit Transfer System, with students conducting part of their studies at different locations.

Together with university partners, **business plans** were developed for the joint programmes during a workshop hosted at UNESCO-IHE. In total, 20 university partners are currently involved in the delivery of UNESCO-IHE's MSc programmes. For a complete list of all partners in MSc level education, refer to Annex 7.

The **new joint programme** in Limnology and Wetland Management was launched, with partners BOKU University of Natural Resources and

Life Sciences in Austria, and Egerton University in Kenya. This programme replaced the former Limnology and Wetland Management programme, and will lead to a joint degree.

UNESCO-IHE's Governing Board unanimously approved the Business Plan 2013-2018. As a result, steps were taken to further clarify the Global Campus concept. The **UNESCO-IHE Global Campus for Water & Development** is an international (mainly virtual) networking organization where partner institutes work together to generate regional and local impact to solve water problems. The basic principle of the Global Campus is to provide free access to educational material (including lectures, modules and lecture notes) and research findings (including data, models and innovations) of these, allowing enrichment these materials, thus increasing the quality to the benefit of all partners. The Institute aims to extend its outreach and enhance its impact with the resulting high performance



standards, excellent academic quality, high-impact research and education, maximum international exposure and shared scientific interests, but also by sharing business opportunities in the global education, capacity development and research arena for water and environment. Further steps to elaborate on the non-virtual aspects of Global Campus will be taken after approval of UNESCO headquarters.

In 2012, UNESCO-IHE continued to intensify its collaboration with **UNESCO**. Joint activities with UNESCO water centres included the MSc specialization in Water Conflict Management with the PCCP programme of IHP and capacity development activities for the UNESCO Category II Institute HidroEx in Brazil.

UNESCO Director-General Irina Bokova spoke at the first **UN Water Talks** about the Current State of Water Diplomacy held at the Institute. UN Water Talks is a new series of events

organized together with the City of Delft and the Delfland Water Board, where United Nations dignitaries are invited to reflect on a variety of current issues as keynote speakers.

At the **6th World Water Forum** in March 2012, the Institute coordinated the cluster “Conditions for success - Enabling Environments”, convened a multi-stakeholder panel on water governance and co-convened sessions on water education, water communications, water cooperation, food security and the science and water policy interface with its partners. UNESCO-IHE shared a booth with UNESCO Water Family members.

UNESCO-IHE contributed to the fourth edition of the **UN World Water Development Report**, ‘Managing Water under Uncertainty and Risk’, which was launched at the 6th World Water Forum in Marseilles by Irina Bokova, UNESCO Director-General, and Michel Jarraud, UN-Water Chair.

The **UNESCO-IHE Partnership Research Fund (UPaRF)** was established in 2008 to increase the output of development-relevant research on contemporary issues in the water sector and to combine the strengths of the different partner institutes. In 2012, the UPaRF portfolio contained a total of 45 research projects with more than 50 partner institutes in 37 countries. The partner institutes include about 50 universities/research institutes and 12 water sector organizations from developing countries and 15 institutes from developed countries. The ‘Research’ chapter contains more information on these programmes.

The Institute has continued its strategy to involve its partners in research and capacity development projects in 2012. For a complete overview of all projects started, running or ended in 2012, see Annex 4. The chapters on research and on capacity development contain more in-depth information about these projects.

Bilateral Partnerships

At present, UNESCO-IHE has cooperation agreements with 74 institutional partners worldwide. The following institutional agreements were signed in 2012:

IDEAM, Colombia, and Deltares, the Netherlands

Signed: June 2012

Goal: Knowledge sharing and capacity development in the areas of flood risk management, integrated water resources management, climate change, prediction models and early warning systems between UNESCO-IHE, Deltares and the Institute of Hydrology, meteorology and environmental studies of Colombia (IDEAM)

The International Institute of Social Sciences, the Netherlands

Signed: January 2012

Goal: Exchange of staff, joint research and sharing educational activities.

NBI, Egypt and NBCBN

Signed: March 2012

Goal: To enhance cooperation between Nile Basin Capacity Building Network (NBCBN) and the Nile Basin Initiative (NBI) to make global, regional and local knowledge, information and experience available and to develop the capacities of both individuals and organizations working in and for the water sectors in the NBI institutions and all its member countries.

Abbaspour (Power and Water) University of Technology (PWUT), Iran

Signed: December 2012

Goal: Collaboration on education (joint programmes, exchange of staff and students, curriculum and teaching materials), development of joint research and capacity development activities.

Sejong University, South Korea

Signed: May 2012

Goal: Collaborative research and academic exchange.

The Ecuadorian National Water Secretariat (SENAGUA), Ecuador

Signed: December 2012

Goal: Establishment of a channel of permanent collaboration between both parties for the joint execution of plans, projects and activities related to the sustainable use of water resources, the prevention and mitigation of natural disasters and, in general, the transfer of knowledge for the integral use of water resources in Ecuador.

Agencia Nacional de Investigación e Innovación (ANII), Uruguay

Signed: June 2012

Goal: Identification of opportunities to conduct joint educational activities and capacity building activities.

The Honor Power Foundation (HPF), China

Signed: June 2012

Goal: Research fund for sustainability of water resources and environment in China, co-sponsorship of two visiting researchers per year from partner institutes in China for three months research at the Institute and co-sponsorship of one PhD candidate.

Asian Institute of Technology (AIT)

Signed: March 2012

Goal: Establishment of the double degree MSc programmes in Environmental Technology for Sustainable Development and in Water Science and Engineering, Specialization in Hydraulic Engineering - Land and Water Development (UNESCO-IHE name) and in Water Engineering and Management (AIT name), both of which will lead to joint degrees.

Huaihe River Commission, China

Signed: November 2012

Goal: Implementation of MSc research projects in flood forecasting and management.

International Association of Dredging Contractors (IADC)

Signed: October 2012

Goal: Support for research and education activities in the specific area of Coastal Engineering and Port Development provided by UNESCO-IHE.

International Atomic Energy Agency (IAEA)

Signed: October 2012

Goal: Exchange and dissemination of information, including joint publications; assistance in training and capacity building, joint educational and training courses; participation in expert missions to assess country requests for support and strengthening of research.

Delft University of Technology

Signed: December 2012

Goal: Exchange of staff, joint research and sharing educational activities.



In December 2012, the renewed Memorandum of Understanding was signed between Delft University of Technology (TUD) and UNESCO-IHE. The MoU reflects a continuation of an existing long-lasting and very fruitful cooperation in education and research in water management, water science and engineering. It emphasizes the dedication of both institutions to contribute to the improvement of the water science and engineering field through staff exchange, sharing of educational activities and resources, joint research and publications, PhD promotions, and sharing of external contacts. The continuation of the cooperation with TUD is extremely important in mainstreaming the role of the city of Delft in becoming the major water capital in the world. "The water-related intellectual capacities available in the city are enormous; the contributions of TUD cannot be overemphasized in that regard. We work a great deal together in terms of MSc and PhD programmes. This new MoU opens up new horizons to further increase the effectiveness of our cooperation in education and research, primarily for the benefit of developing countries and countries in transition", according to UNESCO-IHE Rector Professor Szöllösi-Nagy.

Education

UNESCO-IHE offers a wide range of accredited educational programmes for engineers, social and natural scientists and managers working in the water, environment and infrastructure sectors. Educational options at the Institute include four Master of Science programmes with a total of 22 specializations, a PhD programme, a post-doctoral programme, and a range of short courses and online courses.

In 2012, **261 MSc students** started their studies, which is a substantial increase compared to last year. This growth was visible in both the joint as well as Delft-based programmes, with the number of students in the 18-month Delft-based programmes rising after a two-year dip. Increasing numbers of students were also enrolled in programmes jointly implemented with partner institutes, including Erasmus Mundus, with 40% of all MSc students enrolled in the joint modalities. The complete overview of UNESCO-IHE student numbers can be found in Annex 1.

193 MSc students completed their study in 2012 and a total of 2000 applications were received for the MSc programmes. The latter demonstrates that the Institute's programmes are in high demand.

The growth in student numbers can, in part, be attributed to the diversification of fellowship funding. The following list shows the sponsors, donors and fellowships that were instrumental in allowing students to follow the Institute's MSc programmes.

Agencia Nacional de Investigacion e Innovacion
Asian Institute of Technology
Austrian Development Agency
Bill and Melinda Gates Foundation
Consejo Nacional de Ciencia Y Tecnologia

DGIS-UNESCO-IHE Programmatic Cooperation
Erasmus Mundus
HidroEX International Centre for Education, Capacity Building and Applied Research in Water
Indonesia Port Corporation
International Fund for Agricultural Development
Korea Water Resources Corporation
Meyboom
Middle East Desalination Research Center
Ministry of Public Works Indonesia
Netherlands Initiative for Capacity Development in Higher Education, Viet Nam
Netherlands Initiative for Capacity Development in Higher Education, Tshwane University of Technology, Pretoria Project
Rotary International
Secretaria Nacional de Ciencia e Tecnologia
Stimulation Knowledge Innovation through Life-long Learning
Stuned
US Office of Naval Research
Water Engineering Fund
Waterschap Hollandse Delta
Witteveen + Bos
World Bank / Joint Japan World Bank Scholarship Programme



Grover Mamani Casilla,
Bolivia
Specialization **Sanitary Engineering**
Sponsor **Bill and Melinda Gates Foundation**

I am part of a very interesting Sanitary Engineering programme, namely the joint programme of UNESCO-IHE and Universidad de Valle, in Cali, Colombia. Therefore, I am able to gain knowledge in the international environment at UNESCO-IHE. On the other hand my modules in Cali are more focused on the local issues and how to implement the gained knowledge.



Maria Luisa Salingay,
Philippines
Specialization **Water Quality Management**
Sponsor **NFP**

My stay at UNESCO-IHE will have a huge impact on my personal development. I have a scientific background, but felt I was missing the set of management knowledge and skills to grow into the position of manager. Thus, thanks to my studies I will be able to combine my scientific background with my newly developed management skills.



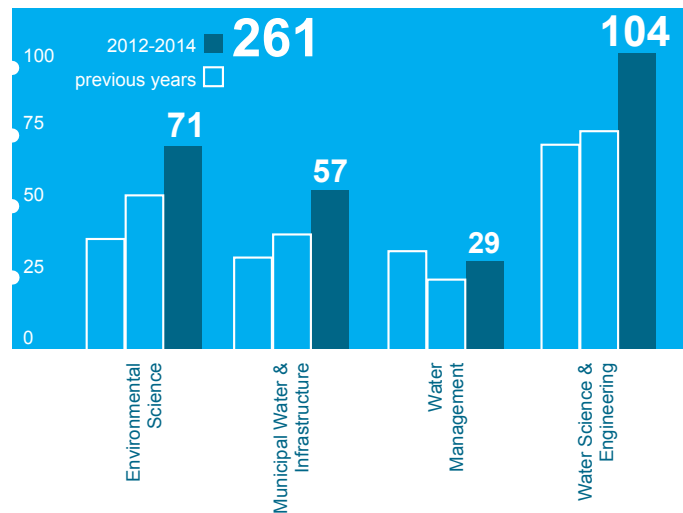
Annet Ahimbisibwe,
Kampala, Uganda
Specialization **Water Services Management**
Sponsor **Rotary International**

Uganda is still developing in the field of drinking water and sanitation, and there currently are many projects to realize this improvement. It is beneficial to have locals provide water management, as they know both the region and the culture. I therefore think I can make a good contribution toward solving the water services issues in Uganda through studying Water Services Management.



Number of MSc Students

Students | Academic period



With **Bill and Melinda Gates Foundation** funding, the new Postgraduate Professional Diploma Programme in Sanitation and Sanitary Engineering was developed, and a Hybrid Master Specialization in Sanitation and Sanitary Engineering is also under development, where teaching takes place through distance education and the research part face-to-face. The Diploma Programme will start in March 2013, with the first 20 participating students already confirmed from Sri Lanka. The concept of the programme lends itself well to expansion into other disciplines.

UNESCO-IHE's MSc programmes are accredited by the Dutch-Flemish Accreditation Organisation (NVAO) until 2013. The **re-accreditation** process kicked off with the preparation of the self-assessment reports for the four MSc programmes. A positive visitation from the assessment panel took place in September; the NVAO's final decision is expected in 2013. The Double Degrees with Univalle and KNUST and the Joint Degree with AIT, Egerton/ Vienna, and Prague/ Ghent are part of this re-accreditation, as the Institute requested to be able to issue joint degrees for four MSc specializations. UNESCO-IHE is a front-runner in joint education with partners.

In the framework of re-accreditation, the assessment of the **performance of partner universities** was concluded in 2012, a process that started the year before. Audits were held at the Asian Institute of Technology (Thailand), Sriwijaya University (Indonesia), Haramaya University (Ethiopia), Egerton University (Kenya) and Universidad del Valle (Colombia) to assess the quality assurance, staff and facilities where relevant to joint programme activities.

Elaborating on the **University Teaching Qualification (UTQ)** programme for UNESCO-IHE and partner university staff introduced in 2011, accreditation was pursued for the Institute's own UTQ programme. In the UTQ programme, lecturers are trained to formulate learning objectives, choose fitting didactic approaches and test the relevant objectives in an appropriate examination.

The **Erasmus Mundus Flood Risk Management programme** continued jointly with the Technical University of Dresden (Germany), Technical University of Catalonia (Spain) and University of Ljubljana (Slovenia). UNESCO-IHE teaches six months of the programme, and supervises a portion of the students during their research phase. Flood Risk

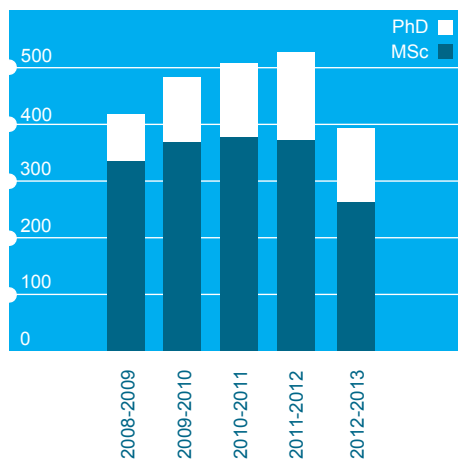
Management was awarded funding for up to 19 fellowships each year for the coming five years from the Erasmus Mundus Programme, and the first self-paying students joined the programme. The **Erasmus Mundus Environmental Technology and Engineering MSc programme** also continued its second year, with partners Ghent University (Belgium) and the Institute of Chemical Technology Prague (Czech Republic).

The agreement for the **Erasmus Mundus Joint Doctorate programme on Environmental Technologies for Contaminated Soils, Sediments and Solid Waste** was signed in 2012. The Joint Doctorate programme awards a European PhD degree in Environmental Technology, issued jointly by the University of Cassino (Italy), University Paris-Est (France) and UNESCO-IHE.

The **Double Degree programme with Sriwijaya University** is currently broadening its scope to include other disciplines such as Coastal Engineering and River Basin Development, and attract funding from the Indonesian Ministry of Public Works and National Planning Agency.

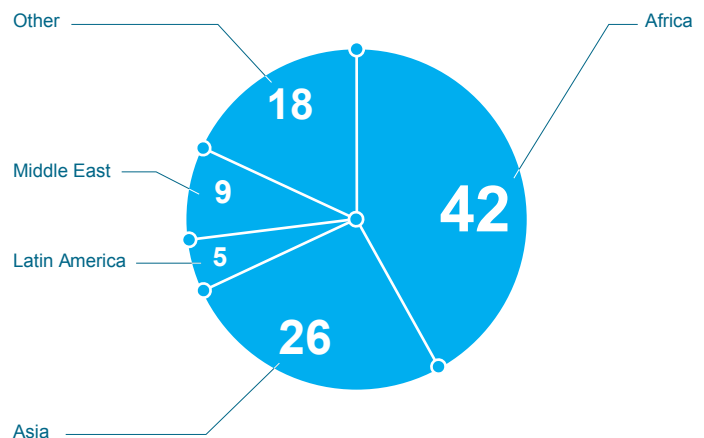
Number of Degree Students

Students | Academic period



Regional Distribution of Students Academic Year 2012 - 2013

Percentage



Eight applications were received for the **Double Degree programme in Sanitary and Environmental Engineering** that ran for the first time in 2012. Three students started in the programme jointly given with Universidad del Valle in Colombia, using sources of funding such as the Bill and Melinda Gates scholarships, and those generated under an agreement with COLFUTURO.

In October, the **new joint programme** in Limnology and Wetland Management was launched, with partners BOKU University of Natural Resources and Life Sciences in Austria, and Egerton University in Kenya delivering part of the programme. This programme replaced the previous Limnology and Wetlands Ecosystems programme with Egerton University and the Mondsee Institute of Limnology.

A **workshop** was held in Delft, where business plans, including a marketing strategy, were developed for the joint programmes together with the partner institutes. The workshop was attended by Asian Institute of Technology (Thailand), Egerton University (Kenya), Haramaya University (Ethiopia), Kwame N’Kruma University of Technology (Ghana), Sriwijaya University (Indonesia),

University of Nebraska (USA) and Universidad del Valle (Colombia). A complete overview of the MSc joint programme partners is given in Annex 7.

359 professionals participated in the Institute’s 62 **short courses** held in 2012. The short course on small hydropower development, covering the full cycle of planning and designing small hydropower plants, attracted some 100 applicants. Most of the 30 participants were funded by Nuffic, but there were a number of self-payers.

The Institute’s 17 **online courses** were attended by 240 professionals, a rise from 199 participants in 2011. The four new online courses of Cleaner Production and the Water Cycle, Environmental Flows, Industrial Effluent Treatment and Urban Drainage and Sewerage were run for the first time.

35 **WaterNet** students in from the University of Zimbabwe and the University of Dar es Salaam participated in the Water and Environmental Law and Policy online course. WaterNet is a regional network of 56 education and knowledge Institutes in Southern and Eastern Africa offering joint education, training and research in the

field of Integrated Water Resources Management. UNESCO-IHE is one of the founding members of WaterNet and provides academic advice to the network.

414 applications for the **Regional Refresher Courses** were received, and a total of 103 alumni participated in the four courses in Africa and Asia. In Africa the course ‘Linking ecological cities to (pro-poor) governance in slums’ was held in Zimbabwe, and the course ‘Developments in water quality monitoring. Optimization and modernization of surface water quality monitoring programmes’ was held in Rwanda. In Asia, the course ‘Building flood disaster resilience of cities, meeting internal and external challenges of the future’ was held in Nepal and the course ‘Challenges and approaches in river delta planning. Sharing experiences from the Mekong, Ganges-Brahmaputra, Ciliwung and the Rhine-Meuse Delta’ was held in Viet Nam. All courses but the last were sponsored by Nuffic.

A complete overview of short courses, online courses and regional refresher courses is given in Annex 2.

MSc Programmes and Specializations 2012

MSc Programme in Environmental Science

Environmental Planning and Management	Db	Db	Delft-based MSc specialization
Environmental Science and Technology	Db / Jdd	J	Joint programme
Environmental Technology and Engineering	Jem	Jdd	Joint double degree programme
Environmental Technology for Sustainable Development	Jdd	Jem	Joint Erasmus Mundus programme
Limnology and Wetland Management	J		
Water Quality Management	Db		

MSc Programme in Municipal Water and Infrastructure

Sanitary Engineering	Db / Jdd
Urban Water Engineering and Management	Jdd
Water Supply Engineering	Db / Jdd

MSc Programme in Water Management

Water Conflict Management	Db
Water Resources Management	Db
Water Services Management	Db
Water Quality Management	Db

MSc Programme in Water Science and Engineering

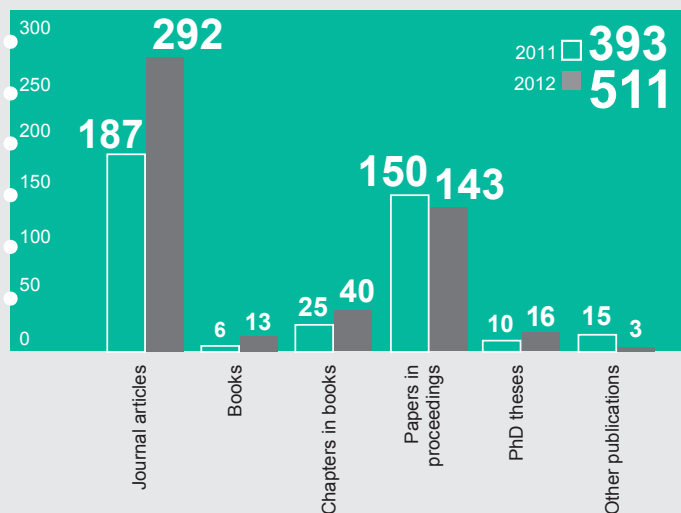
Agricultural Water Management for Arid and Semi-Arid Climates	Jdd
Agricultural Water Management for Enhanced Land and Water Productivity	Jdd
Ecohydrology	Jem
Flood Risk Management	Jem
Hydraulic Engineering and River Basin Development	Db
Hydraulic Engineering - Coastal Engineering and Port Development	Db / J
Hydraulic Engineering - Land and Water Development	Db
Hydroinformatics - Modelling and Information Systems for Water Management	Db / J / Jdd
Hydrology and Water Resources	Db / J
Integrated Lowland Development and Management Planning	Jdd

Research

UNESCO-IHE centers its education, research and capacity development programmes around Water Security, Environmental Integrity, Urbanization, Water Management and Governance, Information and Communication Systems. Through each of these themes, the Institute addresses the major water issues and challenges faced by many countries around the world. To illustrate the Institute's research activities, this chapter presents a selection of projects for each theme.

Research Outputs

Outputs | Year



Programmatic cooperation with the Directorate-General for International Cooperation (DGIS) began in 2008. Some of this collaboration entails research connected to capacity development. The internal **UNESCO-IHE Partnership Research Fund** (UPaRF) was founded to facilitate such research. Besides financial resources from the DGIS collaboration, UPaRF also contains base funding from the Dutch Ministry of Education and Science. This fund stimulates interdisciplinary and cross-core research projects with partners, and focuses on the themes of integrated management of water supply and sanitation, sustainable management of aquatic ecosystems and land use, water allocation and decision processes in river basins and mitigation of/ adaptation to climate change. In 2012, 12 projects

were funded, bringing the total UPaRF portfolio to 45 research projects with more than 50 partner institutes in 37 countries.

Although UPaRF was a very important programme for developing research at the Institute, UNESCO-IHE remained very active in other research programmes as well. In 2012, the Institute's research activities were also **funded by various agencies** including the Bill and Melinda Gates Foundation, Dutch Ministry of Infrastructure and Environment, European Commission, Foundation for Scientific Research of the Tropics and Developing Countries, Netherlands Organization for Scientific Research - Science for Global Development (NWO-WOTRO), SenterNovem, United States Geological Survey, USAID, and several private sector organizations. Annex 4 contains a

complete list of projects started, ongoing or finished in 2012.

131 PhD fellows were active at the Institute, eight staff members were working on their PhD study, and **16 PhD graduations** took place, both an increase from the year before. Additionally, 11 post-docs researchers were also registered, making UNESCO-IHE the largest international post-graduate water education and research facility in the world. More information on the PhD graduations and the registered PhD fellows, including the subjects of their theses, can be found in Annex 3.

The number of **scientific publications** produced by the Institute's academic staff continued to grow. This year, the increase in the number of journal articles was especially notable, with a total of 268 in peer-reviewed journals. Annex 6 contains a complete list of publications.

The interdisciplinary FP7 research project **WeSenseIt** - Citizen Observatory of Water started in October. It links modelling with the social dimension of emergency management, and has a total budget of 8 million euros. The objective is to develop a citizen observatory of water, allowing citizens and communities to become active stakeholders in capturing, evaluating and communicating information. UNESCO-IHE contributes to this project with its extensive experience in researching the integration of data, modelling, and decision support systems, and contributes its expertise in governance, capacity development, and knowledge management.



Several of UNESCO-IHE's academic staff members and their research won awards in 2012.

Prof. András Szöllösi-Nagy, Rector of UNESCO-IHE, was awarded the Water Prize of the Prince Albert II of Monaco Foundation for his contribution to the sciences in creating a better understanding of the environment, in particular for reforming the teaching of multidisciplinary water resources for the benefit of developing countries.

Dr Giuliano Di Baldassarre, senior lecturer in Hydroinformatics Systems, received two prestigious awards for young scientists. He became the Laureate of the EGU awards 2012: Division Outstanding Young Scientist Award, for his outstanding contributions to four distinct disciplines of hydrology: estimation of uncertainty of hydrological information, parameter estimation (model calibration) for numerical inundation models, communication of risk and assessment of the impact on flood risk of land-use change and climate change. He also received the American Geophysical Union (AGU) 2012 Hydrologic Sciences Early Career Award. The Hydrologic Sciences Early Career Award Committee cited Dr Di Baldassarre's combined excellence in research, teaching, and student mentoring, in addition to the humanitarian aspects of his work on mitigating flood risk in developing countries in Africa.

Dr Ranasinghe, Associate Professor of Coastal Engineering and ICZM, won but declined a prestigious ARC Future Fellow grant, created by the Australian Government in 2008 to promote research in areas of critical national importance by giving outstanding researchers incentives to conduct their research in Australia.

Mr Love, a PhD fellow from Zimbabwe, won the prestigious Tison Award 2012 together with

Dr Corco (a former PhD fellow from Colombia) from the International Association of Hydrological Sciences. The Tison Award is awarded annually to an author or group of authors below the age of 41 for publishing an outstanding paper in one of the IAHS publications. The awarded paper deals with improving process understanding through innovative experimental research and conceptual modelling in meso-scale catchment in Southern Zimbabwe. It was the first time that this award went to a lead author from Africa and a co-author from Latin America as well.

Prof. Schultz received the Distinguished Services Award of the International Commission on Irrigation and Drainage (ICID), in recognition of the outstanding leadership provided to the Commission. Drtt Hayde became Honorary Associate Professor of the Budapest University of Technology and Economics, at the Faculty of Civil Engineering in Hungary.

UNESCO-IHE, on behalf of the SWITCH (Sustainable Water Management Improves Tomorrow's Cities Health) Project Consortium and the European Union, won the IWA Sustainability Award 2012 for innovation in the practical realization of sustainable urban water management at the IWA Biennial World Water Congress in Busan, Korea. The objective of the award is to encourage reflection by researchers and practitioners about the implications of their work and to recognize contributions which demonstrate significant progress towards the sustainable management of water resources in an urban environment. The SWITCH approach of integrating water management at the city level, through learning alliances, research, demonstrations and training, has been adopted by the World Bank and others. SWITCH has influenced water policy, patented innovations, deployed a comprehensive training package in use by ICLEI and UNESCO-IHE, and produced multiple manuals, guidelines and analysis tools.

The interdisciplinary Post-graduate Research programme on Adaptation to Climate Change (PRoACC) in the Mekong River basin started in April 2010. The programme aims to strengthen the research output of the institute in terms of scientific papers, but also to contribute to the development of better policies in the field of climate change adaptation in collaboration with its partner institutes. The programme consists of eight postgraduate researchers guided by mentors from UNESCO-IHE and partner institutes. In 2012, the first phase of PRoACC was completed with stronger linkages developed in the region between the Mekong knowledge institutes involved and the Mekong River Commission.

Policy briefs and case studies for educational purposes were produced, as well as 21 scientific publications.

The Integrated approaches and strategies to address the Sanitation Crisis in Unsewered Slum Areas in African megacities (SCUSA) is one of the ongoing UPaRF supported projects, conducted in partnership with Makerere University and the Kampala City Council in Uganda. Two PhD fellows in SCUSA made a video describing the main aspects and outcomes of the project; parts of the video were aired by the national state television Uganda Broadcasting Cooperation. The paper 'Modelling storm impacts on beaches, dunes and barrier islands',

describing the open-source storm impact model XBeach and published in 2009, became the **most cited article** in Elsevier's leading *Coastal Engineering* journal since 2008. The XBeach model was developed by a team from UNESCO-IHE, Deltares, Delft University of Technology and the University of Miami. Recent additions to the model include new breaking wave formulations, ship wave generation and curvilinear grid modelling of curved coasts and islands.

The research themes, and how they relate to the Institute's cores and research lines, are presented in Annex 5.



Research on Environmental Integrity

Environmental Integrity recognizes the complementary needs of societal development and of the consequent quality of the aquatic environment. Core issues include the equitable allocation and sustainable use of natural resources, the prevention and control of pollution, and the sustainable use of aquatic ecosystems.

Two **Marie Curie International Research Staff Exchange Schemes** were continued. One focused on Advanced Biological Waste-to-Energy Technologies (BIOWET), and is carried out with the University of South Florida (USF). The MinPollControl exchange scheme focused on mining wastes in relation to bioweathering, pollution control and monitoring and is undertaken with the Universities of Minas Gerais and Unimontes (Brazil).

Several individual **Marie-Curie Fellowships** support research at the Institute. An Intra-European Fellowship was obtained to support Dr Graciella Gonzalez' research on 'Sulfate Reduction dependent Anaerobic Methane Oxidation in Novel Membrane and Electrochemical Bioreactors', starting in 2013. Dr Amit Kumar received an International Outgoing Marie-Curie Fellowship for his research on 'Electrosynthesis of biofuels from gaseous carbon dioxide catalyzed by microbes: A novel approach/quest of microbe-electrode interactions', which will be carried out at the laboratory of Derek Lovley at the University of Massachusetts, USA. An International Incoming Fellowship will support Dr Venkata Nancharaiyah of the Bhabha Atomic Research Centre (BARC), Tamil Nadu, India to perform research on the 'Role of biofilm-matrix components in the extracellular reduction and recovery of chalcogens'.

Projects initiated in 2012 include the FP7-ENV DANube macroregion: Capacity building and Excellence in River Systems (basin, delta and sea) (DANCERS), and the UPaRF funded 'Co-management of wetland ecosystems and irrigation for enhancing livelihoods in the Lake Victoria Basin (Wetland-Irrigation).

The UPaRF-funded Ecology of Livelihoods in East African papyrus wetlands (**ECOLIVE**) project entered its final year. The project focuses on understanding how wetlands can support livelihoods without negative impacts on the wetland ecosystem, and involved three PhD fellows, one post-doc researcher and four MSc-students in 2012. Project partners are Egerton University and VIRED International (both in Kenya) and the University of Amsterdam (Netherlands).

The **UWIRA** 'Impact of untreated wastewater on natural water bodies: integrated risk assessment' project focuses on the fate and transport of contaminations in ephemeral streams and aquifers and the effects of wastewater on the environment,

water supply and public health. Palestinian partners are An-Najah University's Water and Environmental Studies Institute, Birzeit University's Institute of Environmental and Water Studies, and the Palestinian Water Authority. The collaboration between the project partners was strengthened, and an action plan on the research activities was produced to streamline the project regarding the deliverables, anticipated publications and time plans. A scientific workshop was held in Ramallah, in which 15 project partners participated and eight MSc researchers presented their progress.

The 'Permeable Reactive Barrier for Remediation of Acid Mine Drainage' and 'Constructed Wetlands with Tropical Plants for the Treatment of Landfill Leachate' projects ended. Heavy metals contained in wastewaters such as acid mine drainage and landfill leachate pose significant environmental threats worldwide due to their toxic nature. There is a clear need for a cost-effective and reliable technology for heavy metal removal, but experiences until now were limited to developed countries. The projects investigated the treatment capability with a mixture of native tropical plants under the specific conditions of Colombia and Thailand. The conclusions of the projects will continue to be built upon in the new **EVOTEC** project that aims to find appropriate media composition to be used in permeable reactive barriers to remove heavy metal pollutants, producing high-quality treated water.

The Natural Systems for Wastewater Treatment and Reuse: Technology Adaptation and Implementation in Developing Countries (**NATSYS**) project investigates localized wastewater treatment systems using green technologies, specifically the use of a constructed wetroof (CWR). With some modifications, the systems can act as a wastewater biological filter, making buildings self-sufficient, and giving the opportunity to recycle the water and to reduce water demand in cities. In 2012, a CWR was built on the roof of an office building with a total area of 336 m² in the Netherlands, and two papers were presented at a conference in Australia.

UNESCO-IHE played a leading role in the formulation of the environmental flow recommendations adopted by the Kenyan Water Resources Management Authority for the **Sub Catchment Management Plan for the Nyangores River**, a headwater tributary of the Mara River.



Research on Information and Communication Systems

Information and Communication Systems addresses the flow of information and the generation of knowledge related to the dynamics of water in the real world, through the integration of information and communication technologies for data acquisition, modelling and decision support.

The three-year EU-FP7 project **ICEWater** with a budget of four million euros started with a kick-off project meeting held in Milan. It focuses on research for water and energy efficiencies in water distribution systems, and supports one PhD fellow and two MSc students. Partners include Siemens A.G from Germany (lead), Toshiba UK office, and two water utilities (from Milan, Italy and Timisoara, Romania) are involved as end users.

The two-year project 'Integration of **anticipatory water management** in flood safety standards in the Netherlands' ended in 2012. It addresses whether and how operational water management can be further integrated in analyses of the regional flood regulations in the Netherlands. One of the strategies was Anticipatory Water Management, in which weather forecasts and predictive models of the water systems are used to make early decisions on regulatory actions in order to mitigate negative effects of critical events. The final report on the research towards visualization methods of the probabilistic forecasts in support of risk-based decision making was presented. A practical application of this theoretical research entails an operational pilot system with real-time ensemble water level predictions (probabilistic forecasts) which was developed and is now running in real time at the Rijnland Water Board, to facilitate anticipatory water management.

The € 4.4 million collaborative EU-funded project **KULTURisk** coordinated by UNESCO-IHE, aims to develop a culture of risk prevention through a knowledge-based approach that assesses the socioeconomic benefits of risk prevention techniques. **KULTURisk** focuses on water-related hazards first, as the likelihood and adverse impacts of water-related catastrophes might increase in the near future because of land-use and/or climate changes. A critical literature review was carried out to identify knowledge gaps in assessment methodologies, prevention measures, and risk communication and to propose further cutting-edge research in the field of risk prevention.

Merging hydrologic models and earth observation data for reliable information on water (**MyWATER**) aims to improve

water resource analysis for operational water management through integrated use of in-situ measurements, earth observation information, meteorological predictions, and catchment simulation models. The objectives of the project are to develop and validate data-model approaches to provide access to multiple sources of data, in view of obtaining reliable information on watershed water availability and quality assessments in different environments and with different technological support. UNESCO-IHE involvement consists of PhD research and dissemination of research results. In 2012 a project report about spatially distributed modelling was finalized.

The **EnviroGRIDS** project, with 26 partners and a budget of about 7 million euros, aims at development of an integrated catchment observation and system for the Black Sea Region, supporting sustainable development. Several work packages will be concentrating on development of new infrastructure for observing environmental data and on using this infrastructure to develop parallelized (gridified) environmental models. UNESCO-IHE is involved in large-scale hydrological modelling using SWAT and in developing flood-related web-based applications for citizens and broader stakeholder groups, and has two PhD fellows in the project. Case study sites were visited in Romania, and the project outcomes were communicated to key stakeholders at the Black Sea Water Day project meeting and conference in Georgia. The project is expected to finish in 2013.

Four **PhD fellows successfully defended** their theses this year: Amel Azab with his thesis entitled 'Integrating GIS, Remote Sensing, and Mathematical Modelling for Surface Water Quality Management in Irrigated Watersheds', Wilmer Barreto with his thesis 'Multi-Objective Optimization for Urban Drainage Rehabilitation', Ahmad Fikri with 'A Methodology for Processing Raw LIDAR Data to Support Urban Flood Modelling Framework', and Carlos Velez Quintero with his thesis 'Optimization of Urban Wastewater Systems using Model Based Design and Control'.





Research on Urbanization

Urbanization is concerned with the enormous political and social pressures placed on local governments to expand services and infrastructure related to water supply, treatment and distribution, wastewater collection and treatment, storm drainage and solid waste, while minimizing the impact on the environment.

Prof. Brdjanovic held his **inaugural address** on 22 June 2012 at UNESCO-IHE on the topic of Sanitary Dreams.

The **Sanitary Engineering laboratory** at the Institute continues to expand with state-of-the-art experimental setups. Collaboration with OVIVO (Kubota membranes US) and BlueInGreen was started with the objective of evaluating innovative alternatives for supplying dissolved oxygen into mixed liquor systems with the final goal of designing more compact and efficient Membrane Bioreactor Systems (MBRs). This collaboration involved the donation of laboratory equipment.

Innovative UNESCO-IHE technology developed to **remove contaminants** e.g. arsenic, chromium and iron from groundwater at four different locations worldwide (Israel, Serbia, Jordan and Palestine) proved successful, providing local populations (more than 10,000 people) with safe drinking water. A field investigation with the demonstration pilot plant for chromium removal based on an innovative UNESCO-IHE technology in Holon, Israel was successfully completed. Filter runs with the pilot demonstrated highly efficient **chromium removal**. Partners in the project were the Water Authority of Israel, Mekorot and the Hebrew University of Jerusalem.

Monitoring of the full-scale drinking water treatment and **adsorptive iron removal plants** designed by UNESCO-IHE continued, the latter using an innovative groundwater treatment approach developed at the Institute. Both these plans provide essential contributions to drinking water supply at the Aqbat Jabr and Baqa refugee camps respectively.

The research project on **arsenic removal** including field demonstration in Serbia continued with partners TUD, VITENS, Royal Haskoning DHV, and the Serbian Water Supply Company Subotica. The new pilot plant, based on an innovative UNESCO-IHE arsenic removal technology, demonstrated effectiveness in the village of Backi Vinogradi (Subotica, Serbia) that makes use of groundwater with the highest arsenic concentration in the region.

Projects initiated in 2012 were 'Vacuum multi-stage membrane distillation – Controlling scaling and organic/biological fouling during operation with North Sea water' with AQUAVER, 'Eliminating biological and organic fouling in SWRO with coagulation pretreatment' with Kemira Finland, and 'Characterization of Transparent Exopolymer Particles', and 'Deposition of particles and colloids in seawater reverse osmosis systems', the latter in collaboration with the King Abdullah University of Science and Technology in Saudi Arabia.

Partners in the UNESCO-IHE led 'Use of Sea and Brackish Water as Secondary Quality Water in Urban Environments' (**SALINE**) project are Birzeit University (Palestine), Delft University of Technology (Netherlands), University of Habana (Cuba), The Hong Kong University of Science and Technology (China), KWR – Watercycle Research Institute (NL) and University of Cape Town (South Africa). Two PhD fellows are active in the project that aims to upgrade novel SANI processes. One is investigating the role of sulphates in wastewater treatment under saline conditions and the other is researching the efficiency of biological phosphorous removal under saline conditions.

Three **PhD fellows successfully defended** their PhD theses in areas of direct relevance to developing countries. 'Pattern Recognition for Reliability Assessment of Water Distribution Networks' by Nemanja Trifunovic, Associate Professor of Water Supply Engineering at the Institute, developed a decision support tool for reliability-based design of water distribution networks, and can be used for a snapshot assessment of network reliability based on its configuration and hydraulic performance.

The **PhD thesis** on 'Characterizing Natural Organic Matter in Drinking Water Treatment Processes & Trains' by Saeed Bagtho improves the understanding of the nature of organic matter and its behavior during drinking water treatment. It demonstrates the potential of using multiple tools for the selection, operation and monitoring of water treatment processes, and the assessment of water quality in a water distribution system. The PhD thesis on 'Water Loss Management: Tools and Methods for Developing Countries' by Harrison Multikanga is of considerable value to utility managers, researchers, and other agencies involved in managing water distribution losses in developing countries. Moreover, the developed tools and methodologies were tested and validated in practice on real case studies in Uganda.

UNESCO-IHE joined the consortium of the Australian '**Water Sensitive Cities**' project, with a total budget of 500 million AUS dollars. The objective is to improve adaptation-related decision making to focus expenditure for maximum return on investment and at the same time deliver robust infrastructure for a resilient community to flooding (and other risks). This will further develop existing Dutch and European approaches for resilient adaptation within an Australian context. The project includes an educational component that is carried out jointly with the International Water Centre in Brisbane.

Research on Water Management and Governance

Water Management and Governance deals with the multidisciplinary nature of water management and addresses the need for a holistic view of the complex water-based systems that are the subject of such management. Maintaining the integrity of natural resources can only be achieved with the involvement of the natural and mathematical sciences, engineering and technology, health and medical sciences, and the social and behavioral sciences, including law, politics and institutional development and management.

The project '**Strengthening Ethiopian Universities in Integrated River Basin Management**' was completed, consolidating the water sector of the whole country in a network of eight Ethiopian universities. The 4th partnership meeting was organized in Addis Ababa with over 100 water professionals attending. Seven Demand Driven Action Research projects were carried out by a team consisting of both academics and practitioners. Course materials for 17 water-related courses were finalized and distributed in Ethiopia, and made available online. To upgrade the libraries and laboratories of the eight partnering universities, books and equipment were purchased and staff was trained.

The UPaRF **WATSAN Partnership** project analyzes what makes successful partnerships in the water supply and sanitation sector, through researching the external environment in which a partnership operates, analyzing the development of different types of partnerships (public-public and public-private), and assessing the impact that the partnership has on performance of service provision. The consortium includes the water supply and sanitation companies SUEZ, National Water and Sewerage Corporation Uganda, and Vitens-Evides International (the Netherlands). The research builds on 15 MSc researchers from KNUST and UNESCO-IHE. Research findings from the project were used as inputs in the refresher course on 'Ecological City and Governance of Slums' held in Zimbabwe. A conference focusing on peri-urban water governance was organized. At the end of the year, 15 MSc theses, seven peer-reviewed publications, five research reports and 16 professional and outreach publications were produced during the whole project period.

In May, an open consultation stakeholder workshop was organized jointly with the University Water Sector Partnership in the framework of '**In Search of Sustainable Catchments and Basin-wide Solidarities; Transboundary Water Management of the Blue Nile River Basin**' project. More than 100 academics and policy makers attended the meeting,

also attended by the highest-ranking political officials. The fulltime researchers in the Blue Nile project presented their progress and received valuable feedback.

An **analytical study of UNESCO-IHE's capacity building methods** was carried out, drawing on the in-house expertise at the Institute in on-going and completed capacity building projects. Using methodological approaches from knowledge management and process management, the research consisted of a limited number of in-depth interviews covering a total of 27 NICHE projects over the past years. It resulted in a methodology for mapping capacity building interventions against specific competencies, as well as insights into the variety of approaches to capacity building.

Christine Kayoza **successfully defended her PhD thesis** at ISS entitled 'Integrated infrastructure for sustainable improvement of movement and safety in urban road corridors, the case of Dar es Salaam, Tanzania'.

Three special issues of international journals - two *Physics and Chemistry of the Earth* and one *International Journal of Water* were (co-)edited. Two papers on road planning in floodplains were **published**, showing the importance of adopting integrated approaches to reduce the potential negative cumulative impact of roads on flooding in low deltas, while keeping the benefits. Four papers were published that describe and analyze collective action on water in a very competitive environment in a closing water system in Tanzania, shedding new light on understanding water cooperation in the face of inequality and water asymmetry.

In preparation for the **5th International Delft Symposium** on Knowledge and Capacity Development in the Water Sector to be held at UNESCO-IHE in 2013, a strong Scientific Committee was established. The call for sessions and abstracts took place, and the terms of reference for country case studies were finalized and under the Organizing Committee's review.



Research on Water Security

Water Security is about sustaining a balance between water availability and demand. It involves protection against the extremes of floods and droughts by reducing the associated hazards, and managing the risks, promoting the wise use of water resources, and expanding access to safe and reliable water services.

Prof. Schultz retired and Prof. de Fraiture joined as head of the Land and Water Development chair group in March. A one-day symposium was organized for the occasion, with presentations by speakers from Wageningen University and Delft University of Technology, as well as the **valedictory address by Prof. Schultz and inaugural address by Prof. de Fraiture**.

FloodProBE has the objective of providing cost-effective solutions for flood risk reduction in urban areas, and aims to develop technologies, methods and tools for flood risk assessment and for the practical adaptation of new and existing buildings, infrastructure and flood defenses, leading to a better understanding of vulnerability, flood resilience and defense performance. The work is being undertaken in close partnership with industry, and utilizes pilot sites across Europe. A Quick Scan was developed to provide guidance for network operators and decision makers on identifying and rating those critical infrastructure networks and hot spot buildings that may be at risk from flooding, and assessing where intervention will be most feasible and cost-beneficial. This approach will support the development of effective interventions to alleviate direct and indirect flood impacts. Workshops and interviews with stakeholders and experts were held in the pilot cities of Bangkok, Paris and Dordrecht, to test and further optimize the Quick Scan.

In the Netherlands, the **Room for the River programme** (RftR) takes up a key role for advancing both components of the transition towards more holistic and sustainable water management. RftR is an example for future large-scale water management infrastructure projects like the Delta Programme that have to deal with complex interacting domains. The relevance of the RftR programme stretches beyond national borders, since similar transitions to more holistic and sustainable water management are taking place in Europe and beyond. The lessons from this evaluation are deemed to be useful for the further development and implementation of RftR, and the design and management of future (national) policy investment programmes in flood management, spatial planning and infrastructure planning. A scientific evaluation of RftR was

done, and the first conclusions were presented at the international conference ‘Room for the River: An international benchmark for a new governance approach in flood risk management?’.

The municipality of Dordrecht wants the island to be self-reliant by 2035, meaning that the people of Dordrecht can survive on the island for a period (~ month) in a possible flood situation, as the physical evacuation capabilities of the island are limited. Dordrecht became an experimental space for the assessment of the social and administrative feasibility of measures in the local trajectory of the Delta Experiment. This contributes to the strengthening of the competitive position of the Dutch water sector. The **Dordrecht multi-level flood safety pilot** was completed, and is a promising strategy in the four-year Delta programme. A final conference was held at the municipality of Dordrecht, where the strategy was presented. The PhD thesis ‘The resilience approach to climate adaptation applied for flood risk’ was also successfully defended.

The NWO-WOTRO Integrated Project ‘**Flood Resilience in the Bangladeshi and Dutch Deltas**’ assesses the strategic policies of governments, professionals and communities with the aim of reducing flood risk and vulnerability in the Bangladeshi and Dutch deltas by strengthening institutional and community capacities to manage moderate floods and increase resilience to extreme floods. The research examines how different communities implement and modify flood risk management policies in the two deltas, and will enhance mutual learning between Bangladesh and the Netherlands, giving insights into the levels of vulnerability and resilience to flooding and how to reduce flood risk exposure. The research on the potential and applicability of the multi-layer safety approach and adaptive delta management to reduce flood risk in Dhaka (Bangladesh) over the medium to long term will be compared to the lessons learned from the pilot study on Dordrecht in the Dutch Delta Programme.

The project **Flood-Based Farming in Ethiopian Lowlands** started with a multidisciplinary team, aiming to



assess the status, potential and opportunities for development of flood-based farming systems in arid lowlands of Ethiopia and to broaden the scope of the annual spate irrigation course into flood-based farming systems. During field visits in Ethiopia, discussions were held with stakeholders at the ministry, regional government, district and village levels, as well as with farmers. The report ‘Floods for livelihoods in Ethiopia lowlands: status, potential and opportunities for investment and development’ was presented at a national workshop in Addis Ababa, Ethiopia.

The practical-oriented research ‘**Spate Irrigation for Rural Economic Growth and Livelihood Improvement**’ with a 1.5 million USD budget targets Ethiopia, Yemen, Pakistan and Sudan was continued. Four students were at various stages in the Double Degree programme run together with Haramaya University, and researchers were active in Sudan, Yemen and Ethiopia. A regional workshop was held in collaboration with IMAWESA in Sudan, with 60 farmers and WUA leaders from Ethiopia, Yemen and the three biggest spate irrigation schemes in Sudan attending. A seminar was held at Stockholm Water Week, where a panel presented case studies on diversifying and optimizing the productive use of spate flow, and local technical innovations addressing water scarcity and conflicts.

Several papers were published assessing the extent of the so-called ‘**informal irrigation sector**’. The papers conclude that the informal sector in some cases is more important than the public irrigation sector, in terms of area, production, number of people involved and impact on food security, and therefore deserves far more attention and support than it currently receives.

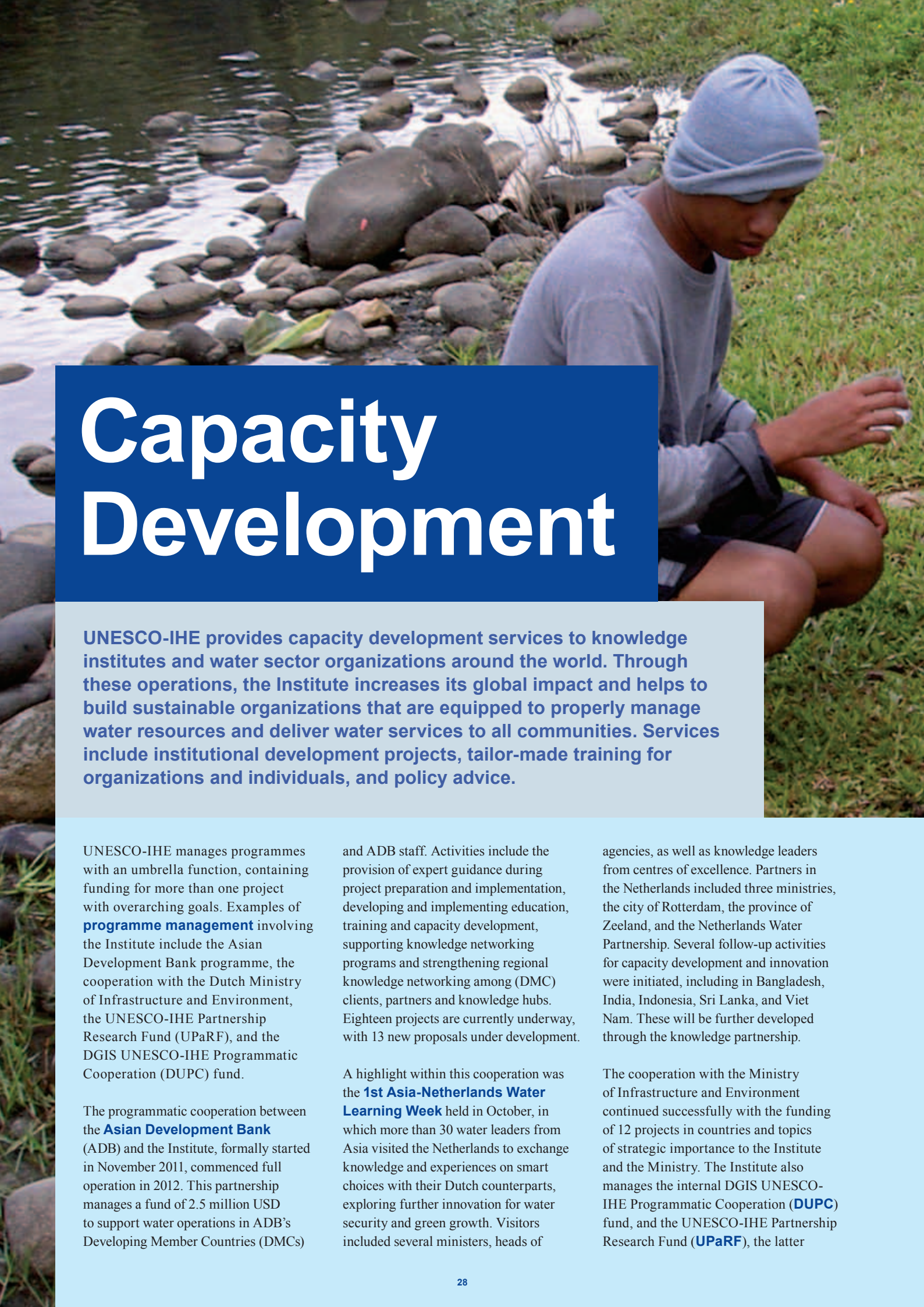
The Deltares-led project ‘**Improved Drought Early Warning and FORecasting to strengthen preparedness and adaptation to droughts in Africa**’ (DEWFORA) entered its second year. UNESCO-IHE’s main contribution is in the development of a hydrological model (coupled with meteorological forecasts by ECMWF) for drought forecasting in selected river basins in Africa. A comprehensive review was made of existing drought forecasting and warning capabilities in

Africa and gaps therein, and significant advances were made in hydrological drought forecasting models at the continental level. UNESCO-IHE invested in the use and validation of the new **DFlow-FM flexible mesh modelling system** developed at Deltares, in the framework of projects such as the USGS-sponsored CASCADE-2 on the San Francisco Bay and Delta, and on modelling of the Mekong delta at various scales funded by the US Office of Naval Research.

There is an increasing interest in the assessment of climate change effects on coasts. A new model allows researchers at UNESCO-IHE, Delft University of Technology and Deltares to much **more accurately predict coastline erosion** due to rising sea levels. It appears that the effects of coastline erosion as a result of rising sea-level in the vicinity of inlets, such as river estuaries, have been dramatically underestimated until now.

As part of an ambition to understand and model the **behaviour of estuaries and coasts around the world**, international collaboration was deepened on modelling the Yangtze estuary, the Western Scheldt, the Wadden Sea and the Meghna estuary and new research on the Amazon and the Mekong estuaries was initiated. The ultimate goal is to develop process-based methodologies to assess the large-scale and long-term impacts of human interference, local land subsidence and climate change.

In 2012, the **EXACT** project in Israel, West Bank and Jordan, running since 2002, had a budget-neutral DUPC extension up to the end of 2014. Local counterparts are the Israeli Water Commission, the Palestinian Water Authority and the Ministry of Water and Irrigation. Activities for the small-scale water treatment component of the project included effect monitoring, training and preparation for plant upgrading at Baqa (Jordan) and Aqbet Jabr (West Bank). Activities for the artificial recharge component included effect monitoring and reporting for the Madoneh (Jordan) retention structures and tender preparation for the structure in Wadi Fara (West Bank). Additional funding was secured for the upgrading at Aqbat Jabr and the civil engineering works in Wadi Fara.



Capacity Development

UNESCO-IHE provides capacity development services to knowledge institutes and water sector organizations around the world. Through these operations, the Institute increases its global impact and helps to build sustainable organizations that are equipped to properly manage water resources and deliver water services to all communities. Services include institutional development projects, tailor-made training for organizations and individuals, and policy advice.

UNESCO-IHE manages programmes with an umbrella function, containing funding for more than one project with overarching goals. Examples of **programme management** involving the Institute include the Asian Development Bank programme, the cooperation with the Dutch Ministry of Infrastructure and Environment, the UNESCO-IHE Partnership Research Fund (UPaRF), and the DGIS UNESCO-IHE Programmatic Cooperation (DUPC) fund.

The programmatic cooperation between the **Asian Development Bank** (ADB) and the Institute, formally started in November 2011, commenced full operation in 2012. This partnership manages a fund of 2.5 million USD to support water operations in ADB's Developing Member Countries (DMCs)

and ADB staff. Activities include the provision of expert guidance during project preparation and implementation, developing and implementing education, training and capacity development, supporting knowledge networking programs and strengthening regional knowledge networking among (DMC) clients, partners and knowledge hubs. Eighteen projects are currently underway, with 13 new proposals under development.

A highlight within this cooperation was the **1st Asia-Netherlands Water Learning Week** held in October, in which more than 30 water leaders from Asia visited the Netherlands to exchange knowledge and experiences on smart choices with their Dutch counterparts, exploring further innovation for water security and green growth. Visitors included several ministers, heads of

agencies, as well as knowledge leaders from centres of excellence. Partners in the Netherlands included three ministries, the city of Rotterdam, the province of Zeeland, and the Netherlands Water Partnership. Several follow-up activities for capacity development and innovation were initiated, including in Bangladesh, India, Indonesia, Sri Lanka, and Viet Nam. These will be further developed through the knowledge partnership.

The cooperation with the Ministry of Infrastructure and Environment continued successfully with the funding of 12 projects in countries and topics of strategic importance to the Institute and the Ministry. The Institute also manages the internal DGIS UNESCO-IHE Programmatic Cooperation (**DUPC**) fund, and the UNESCO-IHE Partnership Research Fund (**UPaRF**), the latter



established in 2008 to increase the output of development-relevant research on contemporary issues in the water sector and to combine the strengths of the different partner institutes.

The Institute continued advisory and capacity development support to the **HidroEX International Centre for Education, Capacity Building, and Applied Research in Water in Brazil**. Activities included advisory services for meetings with government officials, and the participation in IHP meetings in Mexico. Five short courses took place in Brazil, Colombia, and in Cape Verde. Two students with full fellowships commenced their MSc programme.

The **International Atomic Energy Agency** is undertaking the Water Availability Enhancement Project

(IWAVE) aimed at enhancing the availability and sustainability of freshwater (with an emphasis on groundwater) through science-based, comprehensive assessments of national water resources. A project in partnership with the US Geological Survey started in 2012 under the auspices of IWAVE. The project aims at capacity development of staff in water-related agencies in the Philippines & Oman. The first training course on groundwater modelling was delivered in Oman.

The **ENP Mediterranean Environment** programme started in 2010 as part of Horizon 2020, a project which aims at de-pollution of the Mediterranean Sea, and was successfully completed in 2012. The project built capacity in the sanitation sector of 14 Mediterranean countries where about

3000 professionals were trained through 150 national, sub-regional and regional courses in the project. UNESCO-IHE has delivered a total of 30 short courses in 14 countries, involving 20 staff members and 10 guest lecturers, training about 1000 professional in courses on urban waste-water treatment.

The **Bill and Melinda Gates Foundation** (BMGF) funded project ‘Stimulating Local Innovation on Sanitation for the Urban Poor in Sub-Saharan Africa and South-East Asia’, acquired in 2011, has a total budget of USD 11.1 million, part of which is output-based funding. It is the largest research and capacity building project for pro-poor sanitation ever conducted and includes a total of 5 post-doc researchers, 20 PhD fellows, 60 MSc students, 500 online course participants and 130

man-years of research. It is executed with eight partners from developing countries. In 2012, 5 post-doc researchers and 20 PhD fellows were active, 23 MSc students found co-funding and started in the academic year 2012-2014, and over 100 online course participants received certificates. In June, all PhD fellows and post-docs gathered in Delft for a one-week workshop during which the research agenda for all researchers was set. With BMGF funding, the new educational products Postgraduate Professional Diploma Programme in Sanitation and Sanitary Engineering and the Hybrid Master Specialization in Sanitation and Sanitary Engineering were developed. The Professional Diploma Programme will start in March 2013. The first financial and narrative progress report was approved by the BMGF, resulting in the release of the second output-based funding payment.

The project '**Strengthening IWRM in Mongolia**' was concluded. The project guided three Mongolian universities - National University of Mongolia, Mongolian University of Science and Technology and Mongolian State University of Agriculture - in developing a joint MSc programme on IWRM. This programme was held in 2011-2013 for the first time.

UNESCO-IHE took part in a groundbreaking first water **mission to Myanmar** after 20 years of isolation. During this mission, seminars were held at the Ministry of Agriculture and Irrigation and the Yangon Technical University. During the meetings that the Netherlands Embassy organized for alumni from the Netherlands, about 75% of the attending alumni had studied at the Institute. The mission explored of future cooperation possibilities, and resulting plans for developing new capacity building partnerships in Myanmar are in an advanced stage.

A **refresher course** on 'Challenges and Approaches in River Delta Planning - Sharing experiences from SE Asian Deltas and the Rhine-Meuse Delta' was held at the Centre of Water Management and Climate Change at Viet Nam National University in Ho Chi Minh City. The seminar, funded by the Dutch Ministry of Infrastructure and

the Environment, the Dutch Ministry of Economic Affairs, Agriculture and Innovation, DUPC and Viet Nam National University, attracted about 40 participants consisting of alumni from the Mekong, Ganges-Brahmaputra, Irrawady, Ciliwung and the Rhine-Meuse Deltas. The aim of the training workshop was South-South learning facilitated by Dutch experts, to bring together professionals who (will) play key roles in delta planning and familiarize them with different types of planning approaches, identify feasible approaches and methods given the local contexts and share experiences including those from the Netherlands.

The **Building on the Knowledge Networks for the Nile Basin**

project ended in 2010; an MoU was signed with the Nile Basin Capacity Building Network (NBCBN) and the Nile Basin Initiative (NBI). The strategic partnership confirms the mutual ambition of the organizations to further strengthen cooperation and to promote joint activities for building the capacity of the water sector in the Nile region. During a meeting in Entebbe, NBI and NBCBN agreed to focus on a number of priority areas, such as climate change research, groundwater exploration and development, and the further development of the *Nile Basin Decision Support System*, including the formation of a user community and training curriculum. Two issues of Nile Water Science & Engineering Journal were published by the Nile Basin Capacity Building Network Secretariat, offering reviewed articles from NBCBN members based on research output in the field of river engineering, groundwater, flood and drought management and modelling applications.

The Institute was involved with providing **advisory services for national governments**. Support to the Netherlands government included advice in defining programmes of water cooperation with Benin and South Sudan. The Institute aided the process of formulating a five-year bilateral programme for the Netherlands with the Ministry of Water Resources and Irrigation of South Sudan. Work in 2012 consisted of reconnaissance missions, scoping studies, and programme

formulation. The programme addresses the theme of water for productive use and integrated water resources management, and consists of two regional and one national programme: 'Water for Lakes State', 'Water for Eastern Equatorial States' and 'From Policy and Strategy to Governance and Knowledge'.

The preparation phase of the **Bangladesh Delta Plan** (BDP) was concluded, the implementation phase commenced. Recommendations include strong involvement of a wide range of stakeholders (government, knowledge institutes, NGOs and the private sector) in the development of the BDP, the development of a shared vision using socio-economic, water management and climate change scenarios, and a parallel implementation process in order to place starting implementation projects within the framework of the Bangladesh Delta Plan. The BDP will provide a complete strategy for the development of the Delta project for the next 50 to 100 years.

Upon request of UNDP Iraq, five **tailor-made courses** trained 50 professionals from the Water Resources Ministry of Iraq on hydraulic and hydrological modelling and GIS, three delivered in Turkey and two in Jordan. To aid ongoing development and implementation of the national strategy for water resources in Iraq, checks of specific Iraqi water models were done during special trainings sessions. A staff training and management course was held for the Hydraulic Research Institute in Egypt, focused on updating the Hydraulic Engineering in River Basins course, its modules and didactic aspects.

A two-week **tailor-made training** was given on Climate Change as a Powerful Trigger for Innovation in Thailand, and a two-day tailor-made theory and laboratory training on urine treatment was designed and delivered for Delft University of Technology participants in the BMGF Reinventing the Toilet challenge.

An **open access Special Issue** on 'Hydrology education in a changing world' was published in the Journal *Hydrology and Earth System Sciences*. The issue includes more than 25 papers, with eight coming from projects by UNESCO-IHE and its partners.

In 2012, UNESCO-IHE continued to expand its portfolio on NICHE capacity development projects. Seven new projects were awarded grants, of which UNESCO-IHE has a leading role in three.

The consortium proposal led by UNESCO-IHE for the project **'Set-up of the FIPAG Academy for Professional Development in Water and Sanitation'** in Mozambique was accepted. The four-year project, with a budget of 1.7 million euros, aims to help improve the management, services and infrastructure in the water, sanitation and hygiene (WASH) sector in Mozambique, and focuses on strengthening the capacity of FIPAG (Fundo de Investimento e Património do Abastecimento de Água) to implement investment programmes in (peri-) urban water and sanitation. Partners are Delft University of Technology, IRC Water and Sanitation Centre, Eduardo Mondlane University (Mozambique), Rand Water (South Africa) and HidroEX (Brazil).

The project proposal **Capacity Development in Integrated Water Resources Management (IWRM)** led by UNESCO-IHE was also successful. Beneficiary of the project is the Ministry of Public Works in Indonesia, and its training institution Pusat Pendidikan dan Pelatihan. Consortium members are IHE Indonesia, the Gender and Water Alliance, CK-Net INA and the American Language Center.

The UNESCO-IHE led project **Scenario development in Integrated Water Resources Management: Coping with future challenges in Bangladesh** was started in Bangladesh, with consortium members including the Bangladesh University of Engineering and Technology, Department of Water Resources Engineering, Department of Irrigation and Water Management, and Bangladesh Agricultural University.

The consortium consisting of Euroconsult Mott MacDonald, University of the Western Cape, MDF Training & Consultancy, ITC Faculty of Geo-Information Science and Earth Observation of the University of Twente and UNESCO-IHE **started two NICHE projects** in Kenya. The beneficiary of the project 'Strengthening polytechnics to enhance delivery of quality education programmes in integrated water management' is Kenya Polytechnic University College, and that of 'Capacity building to deliver competent technical graduates in integrated water management who can effectively apply latest technologies and contribute to the growing water sector in Kenya' is the Kenya Water Institute.

UNESCO-IHE is also in **the consortium of the successful NICHE projects** 'Mise en place d'un Institut de l'Eau pour une meilleure maîtrise des problèmes d'eau et d'assainissement au Bénin' for Université d'Abomey Calavi in Benin, and in 'Capacity building for skills and knowledge in water, sanitation and hygiene training courses and research' for the Amadi Rural Development Institute in South Sudan.

NICHE projects that continued running in 2012 include the UNESCO-IHE coordinated 'Consolidation and upgrading of education and research within Water Resources, Environment and Health Science and Engineering at the National University of Rwanda', 'Enhancing Institutional Capacity in Water and Waste Water Treatment' for the Tshwane University of Technology in South Africa, 'Strengthening education programmes in water management and climate change adaptation', which will enhance the capacity of Viet Nam National University and 'Improvement of Higher Education in Water Management in view of Climatic Change in Viet Nam' and the capacity building project developing an MSc programme on Water Resources Engineering and Management at Chittagong University of Engineering and Technology in Bangladesh.

Organizational Developments

Communication Office

In 2012, the Communication Office, formerly known as Marketing & Communications, has been restructured and professionalized, and was expanded with an Online Content Editor, in preparation for the development of a new UNESCO-IHE website in 2013.

The 6th World Water Forum in March with the theme ‘Time for Solutions,’ gathered over 35,000 people in Marseilles, France. UNESCO-IHE was highly visible through various activities, including the coordination of the cluster “Conditions for Success - Enabling Environments”. The Institute also convened a multi-stakeholder panel on water governance and co-convened sessions on water education, water communications, water cooperation, food security and the science and water policy interface. UNESCO-IHE shared a booth with UNESCO Water Family members, where Cultural Ambassador Ap Verheggen presented his SunGlacier project. A special alumni evening was organized for those present at the forum or active in the region. Development started on the first Water Communications Short Course in collaboration with the Radio Netherlands Training Center with input from relevant (UN-Water) partners at UNESCO-IHE in the summer of 2013. The terms of reference were presented for dialogue and inputs at the World Water Forum.

The first of a new series of events called ‘UN Water Talks’ was held in collaboration with the City of Delft and the Delfland Water Board. Current and former dignitaries of the United Nations are invited as keynote speakers to reflect on a variety of current issues. UNESCO

Director-General Irina Bokova spoke at the first UN Water Talks about the current state of water diplomacy.

The Institute hosted a fundraising dinner that was organized by the Delft-Vrijhof Rotary club to raise money for a newly established Extracurricular Activities Fund for UNESCO-IHE students. Guest of honour was Rotary President Kalyan Banerjee. Citizens of Delft also visited the Institute during the Dutch Heritage Days and had the chance to see the photograph exhibition by Gil Garcetti, entitled ‘Women, Water and Wells’. Earlier in the year the Institute hosted the ‘Lost Steps’ exhibition by artist Judith Nem.

In September the first Alumni Day was launched, and included the announcement of the Alumni Prize initiative and the first ‘Water Sector meets Future Water Leaders’ event. This is a Public Private Partnership event creating bonds between (future) alumni and the Dutch water sector. Companies and organizations participated by presenting themselves to the senior students at a networking market. The event was webcast, and alumni worldwide participated online.

UNESCO-IHE participated in a number of major international events, including the Stockholm World Water Week, the international Rotary Convention in Bangkok, the BALWOIS Water, Climate and Environment Conference in Macedonia and The Hague International Day.

The results of a UNESCO-IHE Alumni Tracer Survey conducted by the CO team were published in 2012. This survey explored the benefits alumni received

from the academic programmes, the changes alumni experienced in the sector, job level and location, their further education and their professional network. Conclusions include an overall positive career development, increase in salary, improved personal and professional networks, and overall competences. 97% of all respondents coming from developing countries or countries in transition returned to their home country/region to continue working after graduating from UNESCO-IHE. Nearly all indicate that they are still active in their home country in a relevant job. Also, 87% of all respondents are or have been involved in development projects, a clear indicator of the impact of alumni on the development of their home countries. The results are used to improve the Institute’s services for future generations of water professionals.

Visits were frequently organized for high-level delegations, including Vice Minister Hoc from Viet Nam, Rotary President Tanaka and Rotary delegations, Minister of Water Resources of China, the UNESCO Category 1 Institute Abdus Salam International Centre for Theoretical Physics (ICTP), Nanjing Hydraulic Research Institute, Zambia Water and Sewerage Company, among many others.

In 2012 TheWaterChannel.tv reached a critical mass regarding videos (currently over 1,450 videos) and is becoming more well-known within the water sector. Whilst continuing existing activities, the challenge will be to become known to a wider non-water related audience and to expand the scope of activities beyond video sharing.

Facility Management

The position of Purchasing Officer was introduced to the Institute, and contracts, including those with regional hotels, a translation agency, as well as with a travel agency were (re)negotiated by the Purchasing Officer. The re-tendering of catering services started in December, and is due to be completed by March 2013.

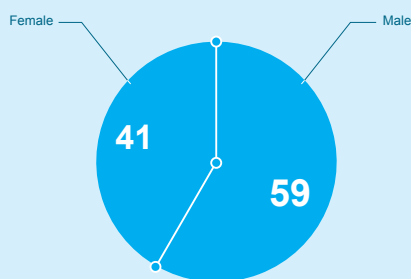
Logistics for larger internal events are now coordinated through a central

location, including hotel, transport and catering arrangements, as well as meeting rooms equipped with audiovisual systems and support.

The installation of an elevator in the monumental Oude Delft 95 building was completed successfully and meets the requirements of the organization as well as monumental building codes.

Human Resources Management

Male and Female Staff Members
Percentage



A new Performance and Development Policy, including remuneration and competence management, was developed and approved in 2012, ready for implementation in 2013. Additionally, competency profiles for academic positions were transformed into job descriptions. HRM contributed in applying accreditation of the Institute's own University Teaching Qualification (UTQ) programme. To subscribe the importance of UTQ, the possession of UTQ is integrated into career development policies.

The Staff Satisfaction Survey initiated for the accreditation process was expanded to assess general staff satisfaction and provide input for further policy development toward maintaining a healthy work environment for

staff. The questionnaire was sent to 181 employees, and had an overall response rate of 73%.

Other activities in 2012 included a transition of the Institute's general and leave administration from the Persmaster into the AFAS system, and the organization of an open pension workshop for all staff members. Also, a new Trainee Policy was developed, and the Sideline Activities Policy and Leave Policy were updated.

On 31 December 2012, UNESCO-IHE employed 159 full-time staff equivalents (FTE), of whom 53% were academic and 47% non-academic staff. 41% of the staff members are female and 59% are male. UNESCO-IHE employs 29% international staff and 71% Dutch staff.

Student Affairs

MSc student numbers, especially those in joint programmes, have grown vastly in 2012, adding up to a grand total of 261 incoming students in 2012. This is mainly due to extra NFP scholarships as well as new partial funding schemes such as Rotary, the Bill and Melinda Gates Foundation and DUPC.

An online application tool was developed, and became fully functional for almost all educational products. The full-fledged implementation is linked to the new student administration system, expected to be implemented in 2014.

The growth of the number of students

in joint programmes requires multiple introduction periods and an increase in administration such as accommodation, travel plans, insurance and other logistical matters supporting the students' arrival and stay.

The number of student housing units was drastically reduced to match the average number of rooms needed, to avoid periods of reduced occupation and the resulting high costs. Preliminary results show a reduction in related costs, and the present configuration of reserved student rooms in combination with additional (hotel) space was successful in 2012.

Alternative student accommodation are being investigated to offer a more flexible housing strategy in the future.

In view of the larger number of students, the annual Christmas dinner was celebrated outside the Institute's premises. A survey held amongst new students shows a satisfaction rate of more than 90% on the delivery of the introduction to the Netherlands, Delft and the Institute.

Liaison Office

The Liaison Office has taken over the overall portfolio of activities originally performed by the Project Office (scan of project opportunities, general support in project cycle management, advice and policy making on project and programme management) and has further expanded them. The change in the scope of the Liaison Office mainly concerns actively seeking funding opportunities for UNESCO-IHE activities. In addition, the Liaison Office started to support the Rectorate in strategically important activities like reporting to UNESCO and coordinating the institutional cooperation activities of the institute.

Main achievements of the Liaison Office in relation to project acquisition were related to capacity development and research projects.

In the capacity development category, UNESCO-IHE was able to secure seven additional projects funded by the Nuffic Netherlands Initiative for Capacity development in Higher Education (NICHE), three of them in a lead role, bringing the whole NICHE project portfolio to a total of 18 projects with a 90% success rate. These projects will strengthen the capacity of academic institutions and of water sector organizations in

Kenya, Indonesia, Mozambique, Benin, Bangladesh and Sudan.

In the research category, UNESCO-IHE continued to expand the portfolio of projects funded by the European Commission's FP7 programme. A total of four new projects were secured by the Institute in FP7, ranging from cooperation in the field of ICT solutions for water management and use of new technologies (three projects), to Marie Curie grants for talented individual researchers (one project). Two additional Marie Curie projects were granted in 2012 and will start in 2013.

The Liaison Office provided the coordination and policy advisory role in several institutional cooperation activities. Seven new institutional cooperations were finalized in 2013. Furthermore, the office provided substantial support to the DUPC programmatic cooperation and took ownership of the programmatic cooperations with the Asian Development Bank (ADB) and with the Ministry of Infrastructure and the Environment.

The cooperation with ADB started full operation in 2012 and the Liaison Office managed to start 18 new projects, with 13

new proposals being developed. Cooperation with the Ministry of Infrastructure and the Environment is fully managed by the Liaison Office. In this cooperation, several projects receive funding in countries and topics that are of strategic importance to both the Institute and the Ministry. It continued successfully with 12 projects funded, ranging from MSc and PhD research to short courses and special training programmes.

In 2012 the Institute implemented three Nuffic-supported refresher courses, while five new refresher course proposals were approved by Nuffic and will be implemented in 2013.

The Liaison Office advised and assisted staff with the formulation of 244 new projects, ranging from small tailor-made training to large capacity development and research projects, some of which are still under review. The Office organized three staff training courses and three information sessions on new programme opportunities for all staff.

IT

UNESCO-IHE requires state-of-the-art IT components, and the upgrading and reconfiguring of existing components of the infrastructure is a continuous process. In 2012, the servers were almost completely virtualized, allowing for increased flexibility, availability and reliability. This means that the Institute's staff, students and partners are not bound to physical infrastructure.

A Virtual Desktop Infrastructure was chosen to replace the computer

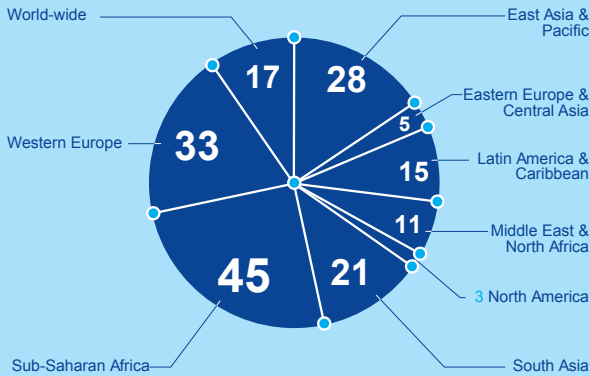
classrooms. These are predominantly used to access software for research and education purposes. This was an important improvement, allowing more flexibility and giving access to classroom facilities over the Internet, vital for distance learning.

The financial and HRM administrative systems were replaced by AFAS Profit. UNESCO-IHE chose TOPdesk Service Management software to support the help desk's processes, raising service levels

and increasing customer satisfaction. The fibreglass network to the dormitories provided via Delft University of Technology was replaced by a public internet service provider, allowing more transparency. UNESCO-IHE is now directly connected to the SURFnet network using a redundant access gateway via Westvest and Oude Delft.

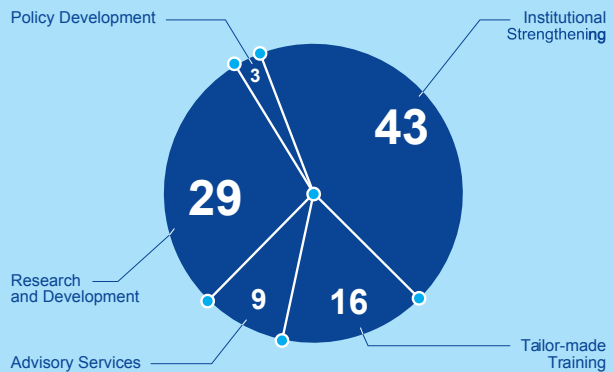
Projects per Region

Percentage



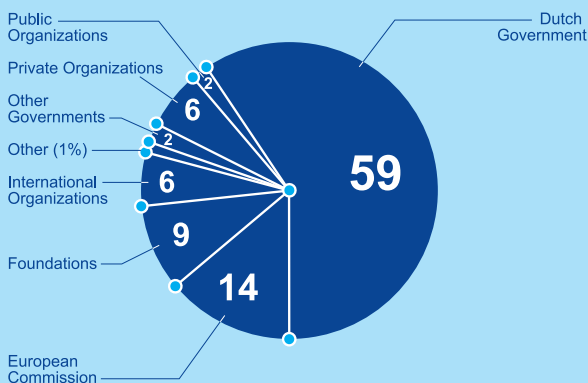
Projects per Type

Percentage



Distribution of Project Income by Donor Category

Percentage



As set out in the Business Plan 2013-2018, the Liaison Office will lead efforts in diversifying the Institute's funding sources. Historically, the Dutch government has been the Institute's main donor. UNESCO-IHE needs to expand its donor portfolio with the underlying objective of reaching out more member states and at the same increasing the flexibility and stability of its funding sources.

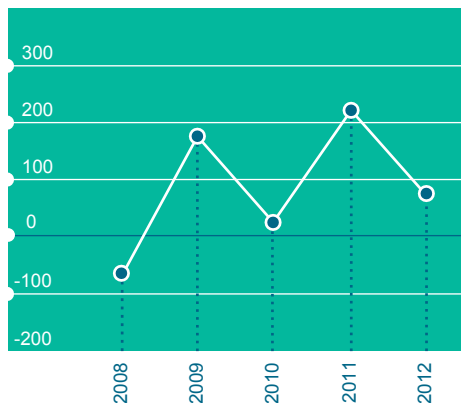
In 2013, the Liaison Office will start a strategy to increase the funding base from relatively untapped categories, such as foundations and private sector organizations, as well as increase the revenue coming from EC projects.

Financial Report

UNESCO-IHE financial operations in 2012 showed a significant increase in revenues and a modest increase in expenditures, as compared to 2011. The total turnover increased to just under €34 million. The overall result shows a surplus of €81,000. This corresponds to an operational result against turnover of 0.2%. The main challenges are still securing financing for fellowships and replenishing the general reserves to guarantee continuity of operations.

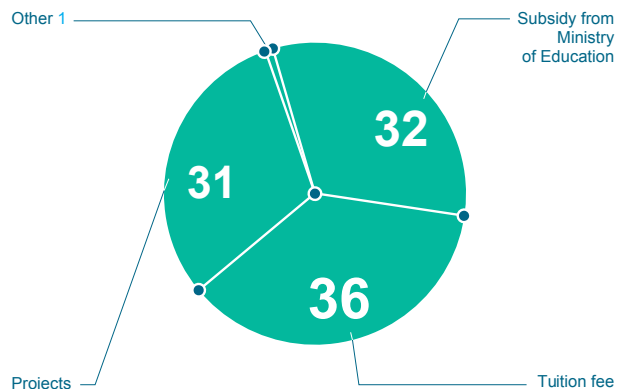
Overall Financial Results

Euro x 1,000 | Academic year



Sources of Income

Percentage



The **income** of the Institute originates from three main sources: the base subsidy of the Dutch Ministry of Education; the tuition fees of MSc students, short course participants and PhD fellows; and project revenues. Other income sources are minor and include the renting out of conference and laboratory facilities and student housing to third parties and PhD graduation grants received from Dutch universities for joint graduations.

The subsidy from the Ministry of Education was reduced by €250,000 in accordance with the decision of the Dutch Government. Including a small

indexation (0.2%), the overall decrease compared with 2011 was €227,277. This cut in base subsidy was partly foreseen in the operational budget and partly recovered through an addendum to the DGIS-UNESCO IHE programmatic corporation (DUPC) agreement.

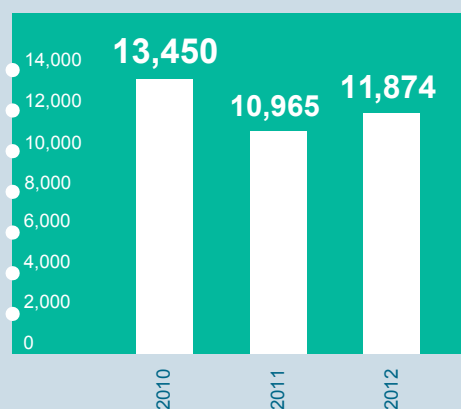
The tuition fee income increased considerably (40%), due to an increase in MSc student years (10%) and an increase in the intake of PhD fellows (14%). Education-related expenditures increased by 60% due to the increased number of MSc participants' intake (260 versus last year 201) and fellowship-related costs.

Project income from research, non-degree courses and capacity development projects was 5% higher in 2012; the direct project costs related to this income increased by 2%. This resulted in a net project fee income improvement of 10%. This is in line with the improvement of the average project rate with 9% and the increase in academic staff with 2%.

UNESCO-IHE makes a distinction between programme **expenditures** and non-programme expenditures. Programme expenditures relate to the direct outputs of the Institute's main activities, while non-programme

Project Turnover

Euro x 1,000 | Year



The total project turnover in 2012 was € 11,874 million, including the DUPC fund - DGIS UNESCO-IHE Programmatic Cooperation. Institutional capacity development and research again represent the majority of UNESCO-IHE's projects (respectively 43% and 29%). Advisory services projects showed an increase in turnover from € 691 thousand in 2011 to € 1,821 thousand in 2012.

The turnover of institutional capacity development projects increased from € 4.4 million in 2011 to € 5.1 million in 2012, and the turnover of research projects decreased from € 4.3 million in 2011 to € 3.4 million in 2012. The complete overview of projects in which UNESCO-IHE was involved in 2012 is presented in Annex 4.

expenditures concern general items such as staff costs and indirect or overhead costs. Programme expenditures are therefore directly linked to the revenue items (education, training, projects) mentioned in the income section.

Non-programme expenditures showed a modest increase (3%) in 2012 compared with 2011.

The staff and management costs increased 5%. Salary costs increased by 5% due to 2% more staff and the incremental raises (3%). The salaries did not rise in 2012, since no agreement on a new Collective Labor Agreement (CAO) for the Dutch Institutions for Higher Education has been reached by the negotiating parties. The total average number of staff throughout the year increased with 3.1 FTE of which 1.8 academic (billable). Overall, management expenditures increased by 5%, due to lower seconded staff costs and more staff studies, partly compensated by lower costs for staff missions and temporary employees.

The overall costs for operation and maintenance of the building increased by 6%, as a consequence of an increased reservation for major repairs and increase in depreciation charges due to the refurbishment investments. The costs of running the facilities increased with

1%. New IT systems and equipment, expenditures for our new corporate style and the expansion of the opening hours of the building (incl. Saturday) explain the differences with 2011.

Education-related costs decreased by 15% as a result of lower costs for the social programme (no international sports day organized by IHE), unfunded fellowships and reduced unoccupied student housing due to the increased number of participants. Acquisition and marketing costs were lower (5%) than in 2011, partly due to extra publication of two UPDATE Magazines in 2011. The general costs increased by 30%, due to two one-off changes in 2011 concerning long outstanding account payables and rate revaluations. The other general costs did not differ from 2011, except a lower expenditure in external consultancy costs due to the finalization of the refurbishment. Interest income increased by 14% due to the increased cash amount in deposits.

The **balance sheet** shows a ratio of 9/91 between equity and borrowed capital, which corresponds to a solvency ratio of 9%. This ratio is still far from the target percentage (20%). The expected improvement of the ratio was challenged by the generic saving measures of the

Dutch Government. Efficiency measures in procedures and tools (e.g. new ERP administrative software), the purchase of the building (2013) and a more explicitly output-oriented (project-based) approach are expected to improve the ratio in the coming years.

The borrowed capital includes provisions and current liabilities. In the current liabilities, reservations have been made for leave hours and holiday bonuses. The provisions consist of a reservation for jubilee payments to staff and for long-term building. The current ratio is at a level of 0.92, compared to 0.89 in 2011. This means that the Institute remains creditworthy in the short term, although the ideal level of a ratio of 1 has still not been reached. For the long-term financial sustainability of the Institute, the focus will be on increasing the financial reserves, as foreseen in the business plan currently being implemented.

Statement of income and expenditures (amounts in euro x 1,000)

	2012	2011
Income		
Subsidy from the Ministry of Education	10,677	10,904
Tuition Fee	12,356	8,772
Projects	10,452	9,980
Others	430	351
Total income	33,915	30,007
Programme expenditures		
Tuition fees (stipends, guest lecture, etc.)	8,595	5,255
Projects	7,005	6,863
Total programme expenditures	15,600	12,118
Non-programme expenditures		
Staff and management	12,282	11,741
Buildings	2,882	2,719
Facilities	1,281	1,264
Education-related costs	1,158	1,372
Acquisition and marketing	349	369
General costs	433	332
Interest	-154	-135
Total non-programme expenditures	18,231	17,662
Operating result	84	227
Extraordinary charges/	-3	-7
Appropriations from Fellowship Trust Fund		
Overall result	81	220

Balance sheet (amounts in euro x 1,000)

	31 Dec 2012	31 Dec 2011
Assets		
Fixed assets	4,299	4,308
Accounts receivable	5,563	3,003
Cash and banks	14,203	13,563
Total	24,065	20,874
Equity and liabilities		
Equity	1,935	1,851
Fellowship Trust Fund	258	262
Provision	304	52
Current liabilities	21,568	18,704
Total	24,065	20,874

Fellowship Trust Fund

The UNESCO-IHE Fellowship Trust Fund (FTF) was created to raise funds from private and public organizations, companies, alumni and other (individual) benefactors for partial or full sponsorship of an individual's studies at UNESCO-IHE. This support enables water professionals who possess the intellectual stamina and ability, but lack the proper funding, to receive post-graduate education at UNESCO-IHE. Every contribution is directed towards its equivalent value in terms of output.

In 2012 the Fellowship Trust Fund provided financial support to five students. All students were enrolled in MSc studies and were able to finalize their studies in 2012 or continue their programme in the upcoming academic year. We thank the sponsors for their generous contributions to the Fund that will enable students to further or finalize their academic programme at the Institute.

Financial Statement Fellowship Trust fund (amounts in euros)

Fund on 1 January 2012	261,893
Gifts	
Witteveen en Bos, The Netherlands	18,245
Christmas contribution staff 2012 (31)	1,085
Yellow Research A'dam	150
Interest	4,454
Total	23,934

MSc Fellowships

Adecar Nugroho Tjindra, 2012-2014, Indonesia	18,245
Feven Tsehaye Zemichael, 2010-2012, Eritrea	3,821
Mario Erik Castro Gama, 2010-2012, Colombia	1,551
Paloma Vejarano Alvarez, 2010-2012, Colombia	2,883
Ibrahim Toure, 2010-2012, Senegal	541
Total	27,042

Fund on 31 December 2012	258,786
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Annex 1 Educational Statistics

585 Registered Degree Programme Participants for the Academic Year 2012-2013

	Source of funding			Region of Origin					Gender		Total
	Full NFP	Co-financed NFP	Other	Africa	Asia	Latin America	Middle East	Other	Female	Male	
MSc programmes 2011-2013	75	0	118	73	43	7	18	52	86	107	193
Water Science and Engineering	17	0	59	20	27	2	7	20	30	46	76
Water Management	13	0	11	9	3	1	4	7	12	12	24
Environmental Science	22	0	31	28	9	0	2	14	32	21	53
Municipal Water and Infrastructure	23	0	17	16	4	4	5	11	12	28	40
MSc programmes 2012-2014	95	0	166	118	77	27	8	31	112	149	261
Water Science and Engineering	36	0	68	38	44	6	1	14	32	72	104
Water Management	10	0	19	11	10	1	1	6	19	10	29
Environmental Science	33	0	39	34	17	9	3	10	44	27	71
Municipal Water and Infrastructure	16	0	40	35	6	11	3	1	17	40	57
PhD programmes 2012	32	1	98	54	32	18	4	23	49	82	131
Total	202	1	382	245	152	52	30	106	247	338	585
Percentage	34.5	0.2	65.3	41.9	26	8.9	5.1	18.1	42.2	57.8	

Annex 2 Short Courses

62 Regular Short Courses
359 Total Participants

course	date	participants	course	date	participants
Advanced Water Treatment Technology	02/Apr/12 20/Apr/12	7	Modelling Urban Drainage and Sewerage	02/Jul/12 20/Jul/12	0
Applied Groundwater Modelling	11/Jun/12 29/Jun/12	7	Modelling Wastewater Treatment	23/Apr/12 11/May/12	8
Aquatic Ecosystems: Processes and Applications	11/Jun/12 29/Jun/12	7	Processes and Plants		
Cleaner Production and the Water Cycle	23/Apr/12 11/May/12	0	Morphological Modeling Using Delft3D	10/Sep/12 14/Sep/12	3
Coastal and Port Structures I	13/Feb/12 02/Mar/12	3	Nanotechnology for Water and Wastewater Treatment	02/Apr/12 13/Apr/12	1
Coastal and Port Structures II	05/Mar/12 23/Mar/12	4	Negotiation and Mediation for Water Conflict Management I	13/Feb/12 02/Mar/12	2
Coastal Systems	16/Jan/12 03/Feb/12	1	Negotiation and Mediation for Water Conflict Management II	05/Mar/12 23/Mar/12	4
Constructed Wetlands for Wastewater Treatment	05/Mar/12 23/Mar/12	3	New Data Sources to Support Flood Modelling	24/Sep/12 28/Sep/12	0
Conventional Surface Water Treatment	13/Feb/12 02/Mar/12	0	Public-Private Partnerships in the Water Sector	02/Jul/12 20/Jul/12	5
Data Driven Modelling and Real Time Control of Water Systems	05/Mar/12 23/Mar/12	0	Remediation and Handling of Contaminated Sediments	10/Sep/12 14/Sep/12	0
Decentralised Water Supply and Sanitation	02/Jul/12 20/Jul/12	6	Resource Oriented Sanitation	02/Apr/12 20/Apr/12	0
Environment and Global Change: Uncertainty and Risk Assessment	01/May/12 11/May/12	3	River Basin Modelling	02/Apr/12 20/Apr/12	4
Environmental Engineering	05/Mar/12 23/Mar/12	2	River Basin Modelling using SWAT and PCRaster	17/Sep/12 21/Sep/12	1
Environmental Monitoring and Modelling	02/Apr/12 20/Apr/12	9	River Restoration and Rehabilitation	11/Jun/12 29/Jun/12	8
Environmental Planning and Implementation	02/Apr/12 20/Apr/12	9	Service Oriented Management of Irrigation Systems	02/Apr/12 20/Apr/12	1
Environmental System Modelling	11/Jun/12 29/Jun/12	5	Small Hydropower Development	10/Sep/12 21/Sep/12	23
Financial Management of Water Organisations	02/Apr/12 20/Apr/12	2	Solid Waste Management	02/Jul/12 20/Jul/12	14
Flood Risk Management	11/Jun/12 29/Jun/12	8	Spate Irrigation and Water Management under Drought and Water Scarcity	10/Sep/12 21/Sep/12	21
GIS and Hydrological Modelling	17/Sep/12 28/Sep/12	11	Tracer Hydrology and Flow System Analysis	23/Apr/12 11/May/12	2
GIS and Remote Sensing Applications for the Water Sector	29/Okt/12 09/Nov/12	29	Urban Flood Management and Disaster Risk Mitigation	23/Apr/12 11/May/12	0
Groundwater Exploration and Monitoring	02/Apr/12 20/Apr/12	6	Urban Water Systems	11/Jun/12 29/Jun/12	4
Groundwater Resources and Treatment	05/Mar/12 23/Mar/12	4	Water and Environmental Law	23/Apr/12 11/May/12	2
Hydrological Data Collection and Processing	02/Apr/12 20/Apr/12	5	Water and Environmental Policy Making	05/Mar/12 23/Mar/12	6
Hydrological Modelling	11/Jun/12 29/Jun/12	0	Water Quality Assessment	13/Feb/12 02/Mar/12	9
Industrial Effluent Treatment	11/Jun/12 29/Jun/12	11	Water Resilient Cities	02/Jul/12 20/Jul/12	0
Integrated Asset Management Systems	02/Apr/12 20/Apr/12	4	Water Resources Planning	02/Apr/12 20/Apr/12	3
Integrated Coastal Zone Management	23/Apr/12 04/May/12	2	Water Transport and Distribution I	23/Apr/12 11/May/12	3
International Port Seminar	23/Apr/12 11/May/12	16	Water Transport and Distribution II	02/Jul/12 20/Jul/12	2
Introduction to River Flood Modelling	23/Apr/12 11/May/12	8	Water Treatment Processes and Plants	11/Jun/12 29/Jun/12	11
IWRM as a Tool for Adaptation to Climate Change	02/Jul/12 20/Jul/12	16	Watershed and River Basin Management	02/Jul/12 20/Jul/12	16
Managing Water Organizations	11/Jun/12 29/Jun/12	7	World History of Water Management	17/Sep/12 21/Sep/12	3
Membrane Technology in Drinking and Industrial Water Treatment	08/Oct/12 12/Oct/12	8			
			Total		359

17 Online Courses 240 Total Participants

course	date	participants	course	date	participants
Biological Wastewater Treatment	01/Mar/12 05/Jul/12	27	IWRM as a Tool for Adaption to Climate Change	01/Sep/12 05/Jan/13	36
Cleaner Production and the Water Cycle	01/Sep/12 05/Jan/13	5	Modelling Sanitation Systems	01/Sep/12 05/Jan/13	5
Constructed Wetlands for Wastewater Treatment	01/Sep/12 05/Jan/13	10	Public and Private Partnerships	01/Sep/12 05/Jan/13	5
Decision Support Systems in River Basin Management	15/Sep/12 08/Dec/12	6	Solid Waste Management	01/Sep/12 05/Jan/13	22
Ecological Sanitation	01/Sep/12 05/Jan/13	14	Urban Drainage and Sewerage	01/Sep/12 05/Jan/13	11
Environmental Flows	01/Dec/12 05/Apr/13	31	Water and Environmental Law and Policy	01/Mar/12 21/Jun/12	14
Industrial Effluent Treatment	01/Mar/12 05/Jul/12	9	Water Quality Assessment	01/Mar/12 05/Jul/12	9
Integrated Coastal Zone Management	01/Mar/12 05/Jul/12	6	Water Transport and Distribution	21/Sep/12 21/Feb/13	19
Integrated River Basin Management	01/Mar/12 05/Jul/12	11	Total		240

4 Regional Refresher Seminars 103 Total Participants

course	country	date	total participants
Building flood disaster resilience of cities. Meeting internal and external challenges of the future	Nepal	01/Oct/12 11/Oct/12	26
Developments in water quality monitoring. Optimization and modernization of surface water quality monitoring programmes	Rwanda	22/Oct/12 26/Oct/12	24
Challenges and approaches in river delta planning.	Vietnam	22/Oct/12 26/Oct/12	37
Sharing experiences from the Mekong, Ganges-Brahmaputra, Ciliwung and the Rhine-Meuse Delta Linking ecological cities to (pro-poor governance in slums)	Zimbabwe	05/Nov/12 09/Nov/12	16
Total			103

Tailor-Made Courses

Tailor-made training is designed for clients whose staff require tuition on specific topics or seek to develop a common knowledge base to address future challenges. The focus of the courses may be technical, managerial, strategic or operational, depending on the client's priorities. All tailor-made courses implemented in 2012 are listed in Annex 4 - Projects.

Annex 3 PhD Fellows

16 Promotions in 2012

Promotion date
Name, Country
Promotor
Title thesis

11/May/12
Mr. Kuntiyawichai, Thailand
Schultz/ Uhlenbrook
Interactions between land use and flood management in the chi river basin

12/Jan/12
Mr. Lutterodt, Ghana
Uhlenbrook
Transport of multiple Escherichia Coli strains in saturated porous media

24/Jan/12
Ms. Azab, Egypt
Price
Integrating GIS, remote sensing and mathematical modeling for surface water quality management in irrigated watersheds

13/Feb/12
Mr. Trifunovic, Yugoslavia
Vairavamoorthy
Pattern recognition for reliability assessment of water distribution networks

21/Mar/12
Mr. Bin Abdullah, Malaysia
Price
A methodology for processing raw lidar data to support urban flood modelling framework

21/Mar/12
Mr. Barreto Cordereo, Venezuela
Price/ Solomatine
Multi-criteria optimisation in the rehabilitation of urban drainage networks

26/Apr/12
Ms. Kayoza, Tanzania
van Dijk
Integrated infrastructure for sustainable improvement of right-of-way safety in dynamic urban environments

22/May/12
Mr. Gersonius, Netherlands
Zevenbergen/Ashley
The resilience approach to climate adaptation applied for flood risk

04/Jun/12
Mr. Mutikanga, Uganda
Vairavamoorthy
Water loss management tools and methods for developing countries

05/Jun/12
Mr. Ye, China P.R.
Roelvink
An approach towards generic coastal geomorphological modeling with applications

06/Jun/12
Ms. Balica, Romania
Wright / Mynett
Applying the flood vulnerability index as a knowledge base for flood risk assessment

29/Jun/12
Mr. Sekomo, Rwanda
Lens/Rousseau
Development of a low-cost alternative for metal removal from textile wastewater

01/Oct/12
Mr. Velez Quintero, Colombia
Mynett
Optimization of urban wastewater systems using model based design and control

12/Nov/12
Mr. Dastgheib, Iran
Roelvink
Long-term process-based morphological modeling of large tidal basins

15/Nov/12
Mr. Baghoth, Uganda
Amy
Characterizing natural organic matter in drinking water treatment processes and trains

17/Dec/12
Mr. Hidalgo, Uganda
Mynett/Griensven
A decision framework for Integrated wetland-river basin management in a tropical

Name
Promotor
Working title thesis

Bangladesh

Ms. Ahmed
Zevenbergen
Resilient adaption to flood risks under urban growth and climate change dynamics

Brazil

Ms. Minikowski Achete
Roelvink
Long term morphodynamics modeling of San Francisco Bay

China

Mr. Guo Leicheng
Roelvink
Morphodynamic modeling of the river- and tide-dominated Yangtze Estuary, China: processes and mechanisms

Ms. Hu Yorong
Uhlenbrook
Assessment of climate change and its impacts on hydrological processes and water resources in the Yellow River source region, China

Mr. Wan Yuanyang
Roelvink
Dynamics of fluid mud and its influence on the backfilling at the North Passage of Yangtze Estuary, China

Mr. Wang
Mynett
Numerical Modelling of ice floods in the Ning-Meng reach of the Yellow River basin

Mr. Yan
Solomatine
Inundation modelling under uncertainty using global earth observation data

Mr. Yang
Uhlenbrook
Quantitative assessment of groundwater and surface water interactions in Erdos plateau, China

China P.R.

Mr. Li
Mynett
Multi-reservoir-based flood control and management software system

Ms. Lin Yuqing
Mynett
Unstructured cellular automata in ecohydraulics modelling

Mr. Zhou
Vairavamoorthy
Decision support system for managing underground water related assets(water distribution)

Ms. Zhu
Mynett
Web-based virtual environment for decision support in water based system

Colombia

Mr. Castro
Solomatine
Hydraulic model based simulation and optimization of water distribution networks for energy consumption and water losses reduction.

Mr. Chacon Hurtado
Solomatine
Dynamic multi-objective optimisation of dynamic heterogeneous networks of physical and social sensors

Mr. Galvis Castano
Gijzen
Development of a technology selection model for pollution prevention and control in the municipal water cycle

Ms. Rogelis Prada
Wright
Operational flood forecasting, warning and response for multi-scale flood risks in developing cities

Mr. Sanchez Torres
Mynett
The use of agent-based models for integrated urban water management

Ms. Sanz Galindo
Gupta
Developing conflict resolution as a policy tool for small and medium enterprises

Mr. Silva Vinasco
Gijzen
Greenhouse gas emissions from ecotechnologies for sustainable domestic wastewater management in tropical regions

Ecuador

Ms. Alvarez Miele
Mynett
Ecological modelling in tropical rivers and wetlands

Ms. Minaya Maldonado
Mynett
Development of methodologies, environmental indexes, indicators and programs for integral environmental evaluation and restoration of degraded systems

Ms. Reyes Perez
Kennedy
Water demand management and small scale water supply systems in tropical islands

130 Registered PhD Fellows

- Egypt**
- Ms. Ahmed**
Uhlenbrook / Solomatine
Climate change and development impacts on groundwater resources in the Nile Delta, Egypt
- Ethiopia**
- Mr. Bayissa**
Solomatine
Drought assessment and forecasting for the Upper Blue Nile basin by assimilating remotely sensed data into a hydrological model
- Mr. Belachew**
Irvine
under construction
- Mr. Dejen**
Schultz
Hydraulic and operational performance of irrigation systems in view of interventions for water saving and sustainability. Sugar estates and community-managed schemes in Ethiopia
- Mr. Demessie**
Uhlenbrook
Past-present-future land use in the Blue Nile and impacts on hydrology
- Mr. Ebrahim**
Mynett
Modelling groundwater flow and reactive contaminant transport of chlorinated solvents for assessing risk in a fuzz-probabilistic approach
- Mr. Gebrekristos**
Uhlenbrook
Impact of improved land management practices on hydrology in Blue Nile River basin / up-scaling of hydrological model
- Ms. Kassa**
vd Zaag
Gender, environment and sustainable development-understanding the linkages. The case of Blue Nile river basin
- Ms. Mersha**
De Fraiture
under construction
- Mr. Seyoum**
Solomatine
Integrated urban water systems modelling
- Mr. Waktola**
Lens
In vitro Investigation on the antibacterial activities of Microcystis species from Koka reservoir against some human pathogenic bacteria
- Mr. Worku**
Wright / vd Zaag
Integrated management of water resources and optimal reservoir release for energy, irrigation and ecosystem services. A case study of the Omo-Ghibe basin
- Mr. Yalew**
Uhlenbrook / vd Zaag
Integrated assessment of land use and water resources management in the upper Blue Nile River basin
- Ms. Yihun**
Schultz
Agricultural water productivity optimization in a water scarce semi-arid region of Ethiopia
- Germany**
- Mr. Narrain**
Wright
Computer modelling for the optimisation of low-head hydropower schemes
- Ghana**
- Mr. Acheampong**
Lens
(Bio)sorption of copper and arsenic from gold mining wastewater using low cost (bio) sorbents
- Mr. Ansa**
Gijzen
The role of algae in the removal of faecal coliforms from domestic wastewater in pond systems
- Mr. Botwe**
Lens
Historical trends in chemical pollution and sedimentation in the Tema Harbour, Ghana
- Mr. Owusu-Ansah**
vd Zaag / vd Giesen
Near-real time monitoring of flows in the Volta basin using variational data assimilation
- Mr. Saifu**
Amy
Fluoride removal from drinking water
- India**
- Mr. Jain**
Lens
Biogenic production of selenium nanoparticles
- Mr. Verma**
vd Zaag
Groundwater recharge movement in India
- Indonesia**
- Mr. Hartanto**
Solomatine
Making integration work - merging earth observation, meteorological, in-situ monitoring, and numerical modelling information for reduced uncertainty in water management
- Mr. Junaidi**
Schultz
Optimisation of the urban drainage and flood protection of Padang City, Indonesia
- Mr. Sembiring**
Roelvink
Nearshore operational modeling for storm impact and swimmer safety
- Ms. Setyamukti**
Gijzen / Rotter (TU Berlin)
Processing organic kitchen waste in a low-tech box composting system
- Mr. Simanjuntak**
Mynett
Coupled stress-seepage numerical design of prestressed concrete-lined pressure tunnels
- Mr. Winaktoe**
Schultz
Urban polder development. Case study on the Province of Daerah Khusus Ibukota (DKI) Jakarta
- Ms. Yekti**
Schultz
Role of reservoir operation in sustainable water supply to Subak irrigation systems case study in the South of Bali
- Ms. Zakaria**
Brdjanovic
under construction
- Iran**
- Mr. Karimi**
Lens
Nitrogen removal from aquaculture wastewater in photobioreactors
- Ms. Tabatabai**
Kennedy
Low chemical consuming UF.RO for desalination
- Iraq**
- Mr. Abdullah**
vd Zaag
Integrated water resources management in the Shatt-al-Arab
- Italy**
- Ms. Liotta**
Lens
under construction
- Mr. Mazzoleni**
Solomatine
Optimal integration of heterogeneous uncertain data into water models
- Kenya**
- Ms. Etiegni**
Irvine
under construction
- Mr. Kilonzo
Lens / Bauwens
Assessing the impacts of climatic changes on hydrology and water resources of the Mara River basin, Kenya
- Mr. Kiptala**
vd Zaag
Managing basin interdependencies: understanding tradeoffs and synergies in the Pangani River basin, Tanzania
- Mr. Masese**
Irvine
Spatio-temporal dynamics in trophic resources and transfers among food webs in the Mara River.
- Mr. Mawioo**, Kenya
Brdjanovic
under construction
- Mr. Mburu**
Lens
Modelling studies for optimal design of horizontal subsurface flow constructed wetlands
- Mr. Mukolwe**
Solomatine
Flood inundation modelling under uncertainty: estimation, visualisation and communication
- Ms. Onencan**
Alaerts
Citizen observatories of water: social innovation and implications for water governance
- Ms. Riungu**
vanLier
Towards an environmentally sound high density slum sanitation solution: a probabilistic evaluation tool for slum sanitation selection-PETSSAS
- Ms. Rongoei**
Irvine
Wetland ecosystem integrity in relation to exploitation for livelihoods in Nyando wetlands, Kenya
- Korea**
- Mr. Chung**
Lens
Point-of-use drinking water disinfection methods for African peri-urban areas
- Latvia**
- Ms. Bremere**
Schippers
Saving energy and water by maximizing the conversion of membrane filtration systems
- Macedonia**
- Mr. Delipetrev**
Solomatine
Decision support system for water resources management in the Republic of Macedonia: case study of Bregalnica River basin
- Malaysia**
- Mr. Bin Ab Razak**
Roelvink
Modeling of headland sediment bypassing process & nearshore evolution of embayed beach
- Mr. Md. Ali**
Solomatine
Flood risk mapping under uncertainty: application to Sungai Johor basin, Malaysia
- Mr. Wong**
Uhlenbrook
Assessment and modelling of large-scale hydrological variability in Peninsular Malaysia
- Mali**
- Mr. Keita**
Schultz
Subsurface drainage of valley bottom rice irrigated schemes in the Sudanian climate. Case study of Tiéfara in Burkina Faso
- Mexico**
- Ms. Espinosa Ortiz**
Lens
Mycogenetic production of elemental selenium nanoparticles
- Mr. Marquez Calvo**
Solomatine
Multi-objective optimization applied to complex model-based water-related problems: robustness, efficiency, interactivity
- Ms. Villa Gomez**
Lens
Biogenic sulfide production in an inverse fluidized bed reactor for metal precipitation and recovery
- Moldova**
- Ms. Andreev**
Lens
Terra preta nova production for resource oriented management of human excreta
- Mozambique**
- Ms. Saraiva Okello**
Uhlenbrook / vd Zaag
Bridging the gaps between hydrology, land use and water management using tracers and water resources modelling in the Incomati basin
- Myanmar**
- Ms. Yin**
Lens
under construction
- Nepal**
- Mr. Bhatt**
Uhlenbrook
An integrated approach for adapting agriculture and water management to global change. Case study of a Himalayan River basin in Nepal

Mr. Dhakal

Kennedy
A novel method to predict antiscalant dose in membrane system: comparison and bench marking synthetic and bio-based antiscalant in BWRO & SWRO application

Mr. Kayastha

Solomatine
Dealing with uncertainties in remotely linked models

Mr. Khatri

Vairavamoorthy
Risk assessment of urban water systems for the city of the future.

Netherlands**Mr. Bruins**

Kennedy
Improved manganese removal from groundwater

Mr. Dam

Roelvink
Long-term process-based modelling of the morphology of estuaries

Mr. Welles

Brdjanovic
under construction

Nicaragua**Ms. Calderon Palama**

Uhlenbrook
Development of new tracer methods and groundwater and water resources development in Nicaragua

Nigeria**Mr. Adeboye**

Schultz
Productive and sustainable use of land and water under deficit irrigation in Ogun-Osun River basin, Nigeria

Ms. Mustapha

Lens
Treatment of petroleum-contaminated wastewater using constructed wetlands

Ms. Obani

Gupta
Environmental human rights and human development: case of sanitation

Panama**Ms. Donoso**

Roelvink
Analysis of the upper ocean thermal structure of the eastern tropical Pacific: establishing correlations with precipitation in Latin America

Mr. Sanchez Guillen

Brdjanovic / van Lier
Cost-Effective Municipal Wastewater Treatment by Coupling of UASB and ANAMMOX Reactors

Peru**Ms. Zapater Pereyra**

Lens
Design and development of a novel constructed wetland (CW) set-up: Duplex-CW

Philippines**Mr. Almoradie**

Solomatine
Virtual environments for stakeholder participation in river and flood management

Ms. Delos Reyes

Schultz
Modernization strategy for national irrigation systems in The Philippines: linking design, operation and water supply

Mr. Villacorte

Kennedy
Anti-(bio)fouling strategy for integrated membrane systems

Portugal**Ms. Cassidy**

Lens
Anaerobic oxidation of methane by sulfate reduction

Mr. Da Silva Duarte Duque

Roelvink
Design criteria for coastal cities

Rumania**Mr. Staicu**

Lens
Biorecovery of selenium from inorganic wastewaters

Rwanda**Mr. Hategekimana**

Irvine
Governance of wetlands in Africa with focus on Rwanda

Ms. Ingabire

Irvine
The importance of denitrification for nitrogen retention in a subtropical catchment

Mr. Munyaneza

Uhlenbrook
Space-time patterns of hydrological processes and water resources in Rwanda, with special focus on the meso-scale Migina catchment

Mr. Mvuirwenande

Alaerts
Beyond structuralism to explain the effectiveness of knowledge and capacity development in water supply. Towards an actor-interaction oriented perspective

Ms. Uwamariya

Amy
Adsorptive removal of heavy-metals from groundwater by iron (hydr) oxides based media

Mr. Uwimana

Irvine
Rehabilitation of sediment and nutrient retention functions in wetlands of Migina catchment, Rwanda

South Korea**Mr. Ha**

Amy
Optimization of the ceramic membrane filtration in surface water treatment applications

Spain**Ms. Pascual Sanz**

Alaerts
Partnerships between water operators as a vehicle for capacity development and change

Sudan**Mr. Abel**

Amy / Kennedy
Assessment of soil aquifer treatment (SAT) for multiple contaminant removal and its applicability in developing countries

Mr. Ali

Roelvink / Wright
Effects of erosion control practices in the upper Blue Nile basin on downstream sedimentation rates

Ms. Digna

Uhlenbrook / vd Zaag
Optimal operation of the multi-reservoir system in the Eastern Nile basin considering water and sediment fluxes

Ms. Elsheikh

Schultz
Crop water productivity of sunflower (*Helianthus annuus* L) under different irrigation regimes for Gezira clay condition

Ms. Fadul Bashir

Schultz
under construction

Mr. Hassaballah

Uhlenbrook
The hydrological impacts of land use/cover and climate changes on Dinder River morphology and eco-hydrology of the Dinder National Park (DNP)/Sudan

Ms. Osman

Schultz
Sediment and water management in large irrigation system, case study: Gezira scheme, Sudan

Thailand**Mr. Janyasuthiwong**

Lens
Biogenic sulfide production and selective metal precipitation at low Ph for semiconductor wastewater treatment

Ms. Kijjanapanich

Lens
Sulfate reduction for remediation of gypsiferous soils and wastes

Mr. Meesuk

Mynett
Icical data from multidimensional views for enhanced urban flood modelling

Uganda**Mr. Katukiza**

Lens
Sustainable technical sanitation solutions for urban slums

Mr. Komakech

vd Zaag
Agent-based modelling for collaborative catchment water resources management in the Pagani river basin, Tanzania

Mr. Natumanya

Uhlenbrook
Spatial-temporal dynamics of flow regime and water resources in the upper Mara basin, Kenya

Mr. Nyenje

Uhlenbrook
Hydrological aspects of alternative sanitation solutions in slum areas in african mega-cities

Uruguay**Ms. Trambauer**

Arechavaleta
Uhlenbrook
Hydrological drought forecasting in Africa at different spatial and temporal scales

Usa**Ms. Mussoline**

Lens
under construction

Viet Nam**Ms. Duong**

Roelvink / Ranasinghe
Climate change impacts on the stability of small tidal inlets (CC-STI)

Ms. Hoang

Mynett
The effectiveness of wetlands to remove water pollution at the river basin scale. Case study: Odense river, Denmark

Zambia**Ms. Mwelwa**

Wright
Flow, morphology and vegetation in the middle Zambezi: a study of spatial and temporal scales

Mr. Nabuyanda

Irvine
The fate of cobalt, copper and lead in two wetlands in Zambia

Zimbabwe**Mr. Love**

vd Zaag / Uhlenbrook
Land/water/livelihood strategies and water resources availability

Mr. Mabiza

Zimbabwe
vd Zaag / Gupta
IWRM, institutions and livelihoods: cases and perspectives from the Limpopo River basin

Annex 4 Projects

Institutional Strengthening

country	title	funding	partners	start	end
Bangladesh	Capacity Development of Water Sector Related Climate Change Induced Disaster Management and Adaptation	Nuffic - NICHE		01/Jul/11	31/Dec/13
	CD of Higher Education of Integrated Water Resources Management at CUET	Nuffic - NICHE	WU, Asian Institute of Technology	15/Aug/11	31/Dec/15
Benin (Dahomey)	Mise en Place d'un Institut de l'Eau Bénin	Nuffic - NICHE	Deltares, TUD	07/Jan/13	31/Dec/16
Brazil	HidroEx Capacity Building 2011-2014	Fundacao Renato Azeredo		01/Nov/11	30/Sep/12
	Capacity Building HidroEx phase 3	National Government		02/Oct/12	10/Apr/13
China	Research fund for sustainability of water resources and environment in China, P.R.			08/Jun/07	31/Dec/16
		DGIS - UNESCO-IHE Programmatic Cooperation		01/Dec/08	31/Dec/12
	Water Wuality Monitoring Taihoe lake	Dutch Ministry of Infrastructure and Environment		15/Oct/12	15/May/13
Colombia	Building with Nature - Solutions to coastal erosion in Colombia	Deltares		20/Nov/12	15/Dec/12
East Asia & Pacific	ADB - UNESCO-IHE Knowledge Partnership Agreement	Asian Development Bank		01/Dec/11	30/Sep/14
	MRC IWRM Competency Framework	Mekong River Commission		01/Jan/12	31/Dec/12
Egypt	Technology Management & Integrated Modeling in Natural Resources	European Commission	Ain Shams University, Assiut University, Sohag University, Martin-Luther-University, University of Exeter	15/Jan/09	15/Jan/12
	The National Water Resources Plan - Coordination Project	Government of Egypt	CBI	15/Mar/09	21/Dec/12
Ethiopia	Capacity building in Integrated River Basin Management for HEIs to support RBOs	Nuffic - NPT	WU, MetaMeta, IWMI, VU	01/Jan/10	31/Dec/12
Indonesia	Tailor Made Course on Integrated Lowland Development in Indonesia	Dutch Ministry of Infrastructure and Environment	Research Centre for Water Resources, Bandung, Indonesia	20/Feb/12	30/Mar/13
	NICHE IDN 142	Nuffic - NICHE	PT IHE, Gender and Water Alliance, CKNet-INA	01/Jul/12	30/Jun/16
	Double degree integrated lowland development group 4	DGIS - UNESCO-IHE Programmatic Cooperation		04/Sep/12	01/Mar/13
	Integrated Urban Flood Management	Dutch Ministry of Infrastructure and Environment		01/Dec/12	30/Jun/13
	Short Course on Integrated Lowland Urban Drainage Development in Indonesia	Dutch Ministry of Infrastructure and Environment		05/Jan/13	08/Aug/13
Kenya	Strengthening polytechnics to enhance delivery of quality edu programs in IWRM	Nuffic - NICHE		01/Jan/12	31/Dec/15
	Capacity Buildin in IWRM at graduate level in cooperation with KEWI	Nuffic - NICHE		01/Jul/12	30/Jun/16
Middle East & North Africa	ENPI (European Neighbourhood Policy Instrument) Mediterranean Environm. Prog.	European Commission		01/Nov/09	30/Dec/14

Annex 4 Projects

country	title	funding	partners	start	end
Mozambique	Introduction of Water & Sanitation curricula at the UEM	Nuffic - NICHE	International Water and Sanitation Centre	01/Jan/11	31/Dec/13
	University of Zambeze Capacity Building Project	Nuffic - NICHE	Rijksuniversiteit Groningen	01/Jan/11	31/Dec/13
	Set up of FIPAG Academy for Professional Development	Nuffic - NICHE	TUD, International Water and Sanitation Centre, Hydroex, Rand Water, EMU	01/Oct/12	1/Oct/16
	Low Cost Monitoring and Capacity Building for the Lower Zambezi	Dutch Ministry of Infrastructure and Environment		01/Dec/12	28/Feb/14
Rwanda	Consolidation & upgrading of education & research within Water Resources at NUR	Nuffic - NICHE	Univ of Zimbabwe, Dept of Civil Engineering	01/Jul/11	31/Dec/12
	Consolidation & upgrading of education & research within Water Resources at NUR	Nuffic - NICHE	Univ of Zimbabwe, Dept of Civil Engineering	01/Jan/12	31/Dec/12
South Africa	Enhancing institutional capacity in water and waste water treatment	Nuffic - NICHE		01/Jan/10	31/Dec/13
	Capacity Building for Integrated Water Resources Management in South Africa	Nuffic - NICHE		15/Sep/10	14/Sep/14
South Sudan	NICHE South Sudan	Nuffic - NICHE	CINOP (lead), Alterra/WUR	01/Jan/13	31/Dec/16
Sub-Saharan Africa	West Africa WASH program	United States Agency for International Development		01/Nov/11	01/Nov/15
		DGIS - UNESCO-IHE Programmatic Cooperation		31/Dec/11	31/Dec/12
	Waternet workplan 2012	WaterNet Trust		01/Jan/12	31/Dec/12
Thailand	Climate Change as a Powerful Trigger for Innovation	Nuffic - NFP		14/Aug/12	31/Dec/12
Vietnam	Institutional CB for the Centre of Water Management and Climate Change	Nuffic - NICHE	Deltares and Uni van Waterschappen	01/Oct/11	31/Dec/12
	Improvement of Higher Education in Water Management in view of Climatic Change	Nuffic - NICHE		01/Jan/12	03/Dec/12
	NICHE Vietnam National University	Nuffic - NICHE		01/Jan/12	31/Dec/15
	Improvement of Higher Education in Water Management in view of Climate Change in Vietnam	Nuffic - NICHE		01/Jan/12	31/Dec/15
Western Europe	EU Mundus Ecohydrology	European Commission		01/Sep/11	01/Oct/14
World-wide	Spate Irrigation for Climate Proofing, Rural Growth And Poverty Alleviation	International Fund for Agricultural Development	MetaMeta, Haramaya University, Sana'a University, HRS Min Irr and WR Sudan	01/Jan/11	31/Jan/15
	Stimulating Local Innovation On Sanitation Urban Poor In SS Africa & SE Asia	Bill and Melina Gates Foundation		11/Jun/11	31/May/15
	Small Scale Education Development Projects Partner Institutes	DGIS - UNESCO-IHE Programmatic Cooperation		01/Jan/13	01/Dec/13
Yemen	Strengthening Research Capacity in Yemen's water sector	Nuffic - NICHE	WaterWatch, CSIRO, Cairo University, Wageningen University	01/Jan/11	31/Dec/14

Tailor-Made Training

country	title	funding	partners	start	end
Bangladesh	Integrated Water Management Practices in Europe	Ministry of Water Resource		15/May/12	31/Dec/12
	Training Program Government of Bangladesh on River Systems Management			01/Jun/12	31/Dec/12
Bhutan	TMT-BTN-104 Mike 11	Nuffic - NFP		20/Feb/13	31/Dec/13
Brazil	Workshop on flood forecasting in Brasilia	Dutch Ministry of Infrastructure and Environment	Dutch Ministry of Infrastructure and Environment	01/Jun/12	31/Jul/12
China	TMT Huaihe River Commission Personnel	Dutch Ministry of Infrastructure and Environment	Deltares	01/Apr/12	30/Jul/12
	TMT course for Shanghai water resources managers	W&W Holding B.V. - WmE		01/Oct/12	31/Dec/12
Egypt	Adaptation of the Libra Simulation game for the Egyptian Situation	DGIS - UNESCO-IHE Programmatic Cooperation		01/Sep/11	28/Feb/12
	Upgrade Hydraulic Engineering Course RTC Cairo	Nuffic -NFP		04/Jul/12	01/Apr/13
Indonesia	Module Hydraulic Engineering Design,	DGIS - UNESCO-IHE Programmatic Cooperation		15/Aug/11	31/Dec/12
	Integrated Flood Management II Module Development	DGIS - UNESCO-IHE Programmatic Cooperation		01/Oct/11	01/Apr/13
Kenya	Module transfer of the Limnology program to Egerton Univeristy	DGIS - UNESCO-IHE Programmatic Cooperation		15/Nov/08	31/Dec/12
Mozambique	Study Tour for the Negotiating Team on the Pungwe Bilateral Agreement, and the PP2 Programme Management Committee to the Rhine River Basin	ARA- Centro		01/Jul/12	15/Nov/12
Nepal	Building Flood Disaster Resilience of Cities	Nuffic - NFP	Water Management and Climate Change, Tsinghua University, National Sun Yat-sen University and Kathmandu University	27/Jun/12	31/Jan/13
Netherlands	Water Utility Simulation Game: Further development	DGIS - UNESCO-IHE Programmatic Cooperation		18/Apr/11	30/Aug/12
Palestine	Study Tour on Wastewater Reuse an Stormwater Harvesting in the Barcelona Area	ALMADINA - ENFRA Consultants		21/Apr/12	24/May/12
Rwanda	Recent developments in Water quality monitoring: optimization and modernization of surface water quality monitoring programmes	Nuffic - NFP	National University of Rwanda	01/Jun/12	28/Dec/12
Vietnam	Refresher course on 'International challenges and approaches in integrated river	Dutch Ministry of Infrastructure and Environment	PoWER and Delta Alliance	14/Feb/12	30/Nov/12
Western Europe	Erasmus Mundus Masters Course in Ecohydrology	European Commission	University Lodz, Poland, University Kiel, Germany, University La Plata, Argentina	01/Sep/10	31/Aug/17
World-wide		Dutch Ministry of Infrastructure and Environment		19/Mar/12	30/Aug/12
	Module Benchmarking for Improved Water Utility performance	DGIS - UNESCO-IHE Programmatic Cooperation	USP, NWSC, CEPT, VEWIN	01/Jun/12	30/Jun/13
Zimbabwe	REF-2012-Zimbabwe	Nuffic - NFP	University of Zimbabwe	16/Apr/12	28/Dec/12

Policy Development

country	title	funding	partners	start	end
France	DUPC support to 6th World Water Forum	DGIS - UNESCO-IHE Programmatic Cooperation		22/Feb/12	30/Jun/12
Netherlands	ADB Water Learning Week	Asian Development Bank		01/Jul/12	30/Nov/12
Palestine	Supporting Better Interaction and Impact between Scientific Research, Policy Making, and Practice in the Palestinian Water Sector (PWF)	DGIS - UNESCO-IHE Programmatic Cooperation		01/Jun/12	31/Mar/13
Philippines	ADB Flood Risk Conference Rotterdam November 2012	Asian Development Bank		30/Oct/12	10/Dec/12
	ADB Urban Flood Tool	Asian Development Bank		30/Oct/12	31/May/13
South Africa	Documentary on contested water rights in post apartheid south africa	DGIS - UNESCO-IHE Programmatic Cooperation		01/Jun/11	31/May/12
Sub-Saharan Africa	Wetlands for Livelihoods	DGIS - UNESCO-IHE Programmatic Cooperation		23/May/12	30/Dec/13

Research and Development

country	title	funding	partners	start	end
Australia	Climate Change Adaptation Research Grants Program	National Government		01/May/11	31/Dec/13
	Social networks under pressure – social resilience during the Queensland floods	Stichting CURNET		15/Aug/11	31/Dec/12
Austria	Coupled stress-seepage numerical design of concrete lined pressure tunnels	Verbund Hydropower AG		15/Nov/10	15/Nov/14
Bangladesh	Morphological Modelling of Mehna Estuary	DGIS - UNESCO-IHE Programmatic Cooperation		01/Apr/11	01/Nov/12
Bonaire, Sint Eustatius, Saba	Environment and Health characterization	Dutch Ministry of Infrastructure and Environment		01/Aug/11	31/Jul/14
	Solid Waste Bonaire 1	Dutch Ministry of Infrastructure and Environment	TU Hamburg, Min of Infrastructure and Environment	26/Oct/12	31/Dec/12
China	Sediment Alluvial Process in Wave-current Boundary Layer	Netherlands Organization for Scientific Research		01/Dec/11	01/Dec/15
	Water Quality Monitoring of the Taihoe Lake in China	Dutch Ministry of Infrastructure and Environment		28/Mar/12	31/Dec/12
Colombia	Operational Flood Forecasting Warning and Response for Multi Scale Flood Risks	UNESCO-IHE Partnership Research Fund	DPAE, Cinara, Univalle, Deltares, NOAA	01/Oct/09	31/Dec/13
	Piloting Colombia's New IWRM Policy in Key Catchments	DGIS - UNESCO-IHE Programmatic Cooperation		15/May/11	30/Jun/15
Cuba	Adapting to CC and Mitigating Water Scarcity by Innovative UWM in Cuba	European Commission	CUJAE, INRH, IIIA	01/Feb/11	31/Dec/14
	Strengthening the Cuban Food Production and Aquaculture Sector	European Commission	ACPA, IIIA, CPAM, University Zagreb	01/Feb/11	31/Dec/15
East Asia & Pacific	Postdoctoral Research Programme on Adaptation to Climate Change	DGIS - UNESCO-IHE Programmatic Cooperation		01/Mar/09	31/Dec/12
	Post-Graduate Research Programme on Adaptation to Climate Change in the Mekong - Phase 2	DGIS - UNESCO-IHE Programmatic Cooperation		01/Nov/12	31/Dec/14

country	title	funding	partners	start	end
Georgia	Integrated Natural Resources Management in Watersheds of Georgia	United States Agency for International Development		01/Dec/10	30/Sep/14
Ghana	Africa Partnership Station: Coastal Processes			01/Oct/09	31/Dec/12
India	Natural water systems and treat technologies to cope w/water shortages, India	European Commission	UJS, NIH, IITR, AU, AJD, KWB, BRGM, CEMDS, HTWD, CSIRO, IWMI ,	10/Nov/11	11/Dec/14
Ivory Coast (Cote d'Ivoire)	Stabilité de l'embouchure de Grand Bassam	National Government		21/Mar/12	15/Oct/13
Latin America & Caribbean	Constructed wetlands with tropical plants for the treatment of landfill leachate	UNESCO-IHE Partnership Research Fund	Univeristy of Sao Paulo	01/Oct/10	01/Jul/12
Middle East & North Africa	Impact of Untreated Wastewater on natural Water Bodies: risk assessment	UNESCO-IHE Partnership Research Fund	Birzeit, WESI	01/May/10	30/Apr/14
Netherlands	Knowledge and Capacity Development, research under DUPC Policy Forum	DGIS - UNESCO-IHE Programmatic Cooperation		01/Jan/08	31/Dec/12
	Long term morphodynamic modeling of tidal basins using process-based models	Deltares		01/Jan/09	31/Dec/12
	Interne & externe leerprocessen Ruimte voor de Rivier	Dutch Ministry of Infrastructure and Environment		01/Oct/10	31/Dec/13
	Integratie van operationeel beheer bij het oplossen van de wateropgave part II	Hoogheemraadschap Rijnland		15/Jun/11	12/May/12
	Adaptation strategies in outer dike areas in the hotspot region of Rotterdam		UU, Arcadis, Deltares, VU, Cluster Stadsontwikkeling, Doepels Strijkers Architects	30/Oct/11	31/Dec/13
	Building UNESCO-IHE Spatial Data Infrastructure	DGIS - UNESCO-IHE Programmatic Cooperation		01/Mar/12	28/Feb/13
	Long term Westerschelde Morphodynamics	Deltares		23/Jul/12	01/Mar/13
	Development and Application of the Morphodynamic Model for the Ems Estuary	Christian-Albrechts-University of Kiel		01/Nov/12	01/Nov/13
Netherlands Antilles		National Government		20/Mar/12	01/Feb/13
Saudi-Arabia	Center for Soil, Water and Coastal Resources	Universiteit Utrecht	Many other partners	01/Jan/09	22/Mar/12
Serbia	Arsenic Removal from Drinking Water	SenterNovem	TUD, Vitens, Haskoning, 2 Serbia Water Supply companies	01/Aug/10	31/Jul/13
South Asia	Optimization of water allocation between off-stream and in-stream demands	UNESCO-IHE Partnership Research Fund	UNPAR	01/Aug/09	31/May/13
	Adaptation to Global change in Agricultural practices	UNESCO-IHE Partnership Research Fund	Asian Institute of Technology, DOI	21/Sep/09	30/Sep/13
	Tropical Constructed Wetlands for Wastewater Treatment	UNESCO-IHE Partnership Research Fund	Bangladesh University of Engineering & Technology	01/Oct/10	01/Jul/12
Sub-Saharan Africa	In Search of Sustainable Catchments and Basin-wide Solidarities: Blue Nile	Netherlands Organization for Scientific Research- WOTRO	International Water Management Institute	01/Jul/08	30/Jun/12
	Integrated approaches for sanitation in unsewered slum areas in Africa	UNESCO-IHE Partnership Research Fund	Makarere University, Kampala city council	21/Jul/08	21/Jul/12
	Upscaling small-scale land and water system innovations in dry agro-ecosystems	UNESCO-IHE Partnership Research Fund	USDAM, UKZN, IWMI, TUD, SEI, SU	01/Aug/08	31/Dec/12
	Low-cost drinking water treatment in developing countries	UNESCO-IHE Partnership Research Fund	Kwame Nkrumah University of Science and Technology, Makarere University	01/Nov/08	31/Dec/12
	The Ecology of Livelihoods in East African Wetlands	UNESCO-IHE Partnership Research Fund	UvA, University of Nairobi, Egerton University, VIRED	01/Dec/08	31/Dec/12
	Risk-based operational water management for the Incomati River Basin	UNESCO-IHE Partnership Research Fund	Mondlane University, KOBWA	01/Jan/09	31/Dec/13
	Environmental Flows for People and Ecosystems in the Mara River Basin	UNESCO-IHE Partnership Research Fund	UDSM, Egerton, SUA, JKUAT, FIU, WWF	01/Jan/10	31/Dec/14
	Integrating Social and Natural Systems in Enhancing Environmental Sust	UNESCO-IHE Partnership Research Fund	University of Cape Town, Polytechnic of Namibia	01/Oct/10	01/Jul/12
	Adaptive and integrative tools and strategies on natural resources management	European Commission		01/Mar/11	28/Feb/14

country	title	funding	partners	start	end
Tanzania	Development of Resilient Agro landscapes to Climate Change in Tanzania	UNESCO-IHE Partnership Research Fund	Sokoine University of Agriculture	01/Oct/10	19/Nov/12
The British Virgin Islands	Road Town Flood Risk Assessment - BVI	National Government		21/Mar/12	31/Jan/13
United States	Modeling hydrodynamics, sediments and ecology in San Francisco Bay	United States Geological Survey		01/Oct/11	01/Oct/14
	SWAN Sustainable Water Action, Building research links between EU and US	European Commission	University of the West of England, Politecnico Valencia, Spain,	01/Mar/12	28/Feb/16
	Electrosynthesis of biofuels from gaseous carbon dioxide catalyzed by Microbes	European Commission	University of Massachusetts, Amherst, USA	01/Jun/12	01/May/15
Uzbekistan	Assessment of applicability of an equitable and sustainable financing model	UNESCO-IHE Partnership Research Fund	Asian Institute of Technology	01/Oct/10	31/May/13
Western Europe	Flood Vulnerability Indices in Low Headed hydropower	European Commission		01/Apr/08	31/Mar/12
	River basin twinning initiatives as a tool to implement EU water initiatives	European Commission		01/Jun/08	31/May/12
	Localised environmental and health information services for all	European Commission	Instituto superior tecnico, project automation SPA, BICOCCA, Aria Technologies, Esaproject SP Zoo, hidromod modelacao em engenharia, noord-brabant provincie, comune di bari	01/Sep/08	04/Dec/12
	Rehabilitation tech for degraded waters & integration in waterbody mgmt	European Commission		15/Oct/08	30/Jun/13
	Collaborative Management System on Watershed Vulnerability (eWaterAbility)	European Commission	WMO, C3I, SWAT, EAWAG, JRC, IISD, UN-IIST, CERN, CRS4, University of Geneva	01/Apr/09	31/Mar/13
	Zero chemical UF/RO system for Desalination	SenterNovem	Evides, Membrane Technology Group, Vitens	01/May/09	01/May/12
	Improved Drought Early Warning and FoRecasting	European Commission		01/Jan/11	31/Dec/12
	Knowledge-based approach to develop a prevention culture of water Risk	European Commission	UniBs, ECMWF, UniLj, WSL, CORILA, KCL, JRC, AAWA, UniBris, Willis	01/Jan/11	31/Dec/13
	ICT Solutions for efficient Water Resources Management	European Commission	CRL, CMR, ITALDATA, METROPOLITANA MILANESE, IHE, AQUATIM, ICCS, K&S	01/Oct/12	30/Sep/15
	Community Based Earth Observatory of Water	European Commission	Sensor scope, disdrometics, advanticsys, AAWA, EPFL, Hydroresearch Delft, Middlesex University Sheffield Civil Protection	01/Oct/12	30/Sep/16
World-wide	Partnerships in the Water Supply and Sanitation Sector	UNESCO-IHE Partnership Research Fund	KNUST,SUEZ, VITENS, NWSC	01/Sep/08	31/May/12
	Sediment, sediment transport from reservoirs to estuaries	UNESCO-IHE Partnership Research Fund	NHRI, HRI, Deltares, SKLEC, Hohai	15/Oct/08	15/Oct/12
	Permeable reactive barrier for remediation of acid mine drainage	UNESCO-IHE Partnership Research Fund		01/Aug/09	31/Dec/12
	Benchmarking for Pro-poor Water Services Provision	UNESCO-IHE Partnership Research Fund		01/Sep/09	31/Dec/12
	Natural Systems for Wastewater treatment and reuse:	UNESCO-IHE Partnership Research Fund		01/Sep/09	01/Sep/13
	Salt and Brackish Water as Second Quality Water for Urban Environment	Internal Research Fund	Birzeit University, KWR, Hong Kong	01/Oct/09	13/Dec/13

country	title	funding	partners	start	end
World-wide	Step Chlorination for Improving Drinking Water Disinfection System	UNESCO-IHE Partnership Research Fund	Birzeit Univ, KNUST	01/Oct/10	01/Jul/12
	Earth Observation Data Driven Rainfall-Runoff Model - Volta Basin	UNESCO-IHE Partnership Research Fund	Birzeit University	01/Oct/10	30/Aug/12
	Merging Hydrologic models and EO data for reliable information on Water	European Commission	AUT, Hidromod, IST, CPTEC, JRC, Skysoft, UEM	01/Jan/11	31/Dec/15
	Communities & institutions for flood resilience in Bangladeshi & Dutch Deltas	Foundation for Scientific Research of the Tropics and Developing countries	IWFM, BUET, UCLA, NEAA,	01/Mar/12	01/Mar/16
Zimbabwe	Emerging Alternative Institutional Forms for Managing Domestic Water	UNESCO-IHE Partnership Research Fund	University of the Western Cape	01/Oct/10	01/Jul/12

Advisory Services

country	title	funding	partners	start	end
Belgium	Sand dynamics project Flanders coast	Intern. Marine & Dredging Con.	Waterloopkundig Lab.	01/Aug/10	01/Aug/12
Benin (Dahomey)	Netwerkplaats	Netherlands Water partnership		01/Jan/12	29/Sep/12
Brazil	Modeling Water and Sediment Outflow of the Amazon River	Office of Naval Research		01/Apr/12	30/Apr/13
China	EU-China DHV - Study Tours - Main Project	DHV BV		01/Jan/11	31/Dec/12
	ADB Capacity Building of Chao Lake Management Authority	Asian Development Bank	Haarlem Hydraulics	01/Jun/12	30/Oct/13
	Special seminar on capacity development for flood management at 5th Yellow River Forum	Dutch Ministry of Infrastructure and Environment		01/Sep/12	01/Oct/12
Colombia	Pilot Project Developing Forecasting Capabilities as a part of Integrated Risk Management in Colombia	Embassy of the Kingdom of the Netherlands	IDEAM	02/Jan/12	31/Jul/13
Croatia	Development And Application Of Models And Guidelines	World Bank		02/Aug/10	31/Dec/12
East Asia & Pacific	Developing a Sanitation Decision Support System for ADB	Asian Development Bank		01/Sep/11	01/Mar/12
Ethiopia	Flood based farming for food security in arid zone of Africa_Case: Ethiopia	Deutsche Gesellschaft fur Internationale Zusammenarbeit (GIZ) GmbH		01/Oct/12	15/Jan/13
India	ADB Tamil Nadu CC	Asian Development Bank		01/Jun/12	31/Dec/13
Italy	Testing the use of artificial DNA as a tracer for determining travel times in karst system in the Upper Bussento catchment, Cilento&Diano Geopark (Italy)	C.U.G.RI.		27/Mar/12	01/Jul/12
Nepal	ADB Groundwater Study Nepal	Asian Development Bank		29/Oct/12	01/Apr/13
Netherlands	Delft Spetterstad Fase 1	Gemeente Delft	Deltares, Hoogheemraadschap Haaglanden, RO2	01/Jan/10	31/Dec/12
	IWRM-NET IMPACT	Forschungsverbund Berlin e.V., Leibniz-Institut fur Gewasser- okologie und Binnenfischerei		15/Nov/10	31/Dec/12
	Water Channel Program 2012-2015	DGIS - UNESCO-IHE Programmatic Cooperation		06/Jan/12	31/Dec/13

country	title	funding	partners	start	end
	Calibrating the Meuse Alarm Model during low flow conditions using artificial DNA as a tracer	WML		12/Mar/12	01/Jul/12
	AgWater Solutions IWMI	IWMI		01/May/12	31/Dec/12
	DGIS Water Master Class	DGIS - UNESCO-IHE Programmatic Cooperation		21/Jun/12	13/Jul/12
	Establishment of the Secretariat of the National Committee of UNESCO-IHP-HWRP	Dutch Ministry of Infrastructure and Environment		15/Oct/12	31/Aug/16
Niger	Satellite Based Water Monitoring and Flow Forecasting System in the Niger Basin	EVD		01/Jan/12	31/Dec/12
Palestine	Redesign GPower Website	DGIS - UNESCO-IHE Programmatic Cooperation		09/Jul/12	31/Dec/12
Rwanda	Rwanda Integrated Water Security Program (RIWSP)	United States Agency for International Development	FIU, Winrock, Care, World Vision and Water Aid	01/Jun/11	30/Jun/16
	Development of National Water Resources Masterplan	Government of Rwanda		01/May/12	01/Dec/14
Sao Tome and Principe	Adaptation to Climate Change: Geomorphology and Coastal Adaptation Study	World Bank	Deltares	01/Dec/10	31/Dec/12
	Sao Tome Climate Change adaptation options study phase 2	World Bank		01/Jun/12	31/Dec/13
Singapore	Singapore Delft Water Alliance	Deltares		01/Jul/11	01/Apr/12
South Sudan	South Sudan Network Advisor	Netherlands Water partnership		02/Jan/12	01/Sep/12
	South Sudan Mission Lakes for Dutch Programme	Partners voor Water - Third Phase		02/Jan/12	20/Mar/12
Sri Lanka	IWMI reviewer science quality and relevance	IWMI		1/Sep/12	30/Jun/13
Sub-Saharan Africa	Capacity development for Performance Improvement of European Commission Water Utilities			01/Oct/11	31/Dec/16
Sweden	ADB Eye on Asia contribution	Asian Development Bank		06/Jun/12	06/Oct/12
Thailand	ADB Thailand Floods	Asian Development Bank	Deltares	01/Feb/12	30/Oct/12
Vietnam	Modeling the Mekong Delta at three different scales	Office of Naval Research		01/Mar/12	30/Sep/13
World-wide	ADB Groundwater Research	Asian Development Bank	Inst. Global Env. Strategies, Asian Institute of Technology, Coord Comm Geoscience Progr in East and SE Asia	06/Sep/12	31/Dec/14

Annex 5 Research Lines

5 Themes
49 Research Lines

theme	chair group	research line
Environmental Integrity	Aquatic Ecosystems	Nutrient and pollutant cycling Constructed wetlands Linking ecological processes with sustainable wetland use and livelihoods
	Pollution Prevention and Resource Recovery	Cleaner production and pollution prevention Solid waste management Resource recovery (water, nutrients, minerals, energy, new materials) Ecotechnologies (anaerobic digestion, natural treatment systems, photobioreactors)
Information and Communication Systems	Hydroinformatics	Modelling paradigms, uncertainty and risk Systems engineering and optimisation Collaborative decision making and Internet-based computing and learning
Urbanisation	Water Supply Engineering	Water transport and distribution Ground water treatment Natural treatment systems Conventional water treatment technology Desalination & membrane related technology
	Sanitary Engineering	Advanced nutrient removal processes Activated sludge modeling Anaerobic wastewater treatment processes Resources-oriented sanitation Membrane bio-reactors Water/wastewater infrastructure asset management Optimization of wastewater collection and treatment components Integrated urban water infrastructure management
Water Management and Governance	Knowledge and Capacity Development	Dynamics of professional knowledge dissemination Knowledge flows and water governance Economic and social value of knowledge and capacity development Measuring the effectiveness of knowledge and capacity development The dynamics of the learning, competence building and innovation systems for the water sector
	Water Management	Bio-physical and social dimensions of water systems Institutional and economic dimensions of water systems Integrative instruments and interventions
	Water Governance	Governance of river basins Informality and the water sector Large infrastructure and governance Pro-poor governance (equity, human rights, participation) Shifts in water governance and water resource configurations Socio-techno-ecological systems Urban water resilience in drought conditions Water diplomacy and conflict management Water policy making processes
Water Security	Hydraulic Engineering and River Basin Development	Hydraulic structures and hydraulic processes Environmental impact of water-related projects Management of floods and droughts Flood resilience of urban areas
	Coastal Systems and Engineering and Port Development	Integrated coastal modelling Performance and reliability of flood defence systems and coastal structures Integrated coastal zone management Port design
	Land and Water Development	Water and food security Modernization, design and management of irrigation & drainage systems Irrigation and ecosystems services (incl integrated lowland development) Non-conventional irrigation and drainage options
	Hydrology and Water Resources	Global change impacts on hydrology and water resources Physical and biogeochemical processes of groundwater systems Ecohydrology

Annex 6 Publications

13 Books

Di Baldassarre G
(2012) *Floods in a Changing Climate: Inundation Modelling*. Cambridge, UK, Cambridge University Press. ISBN: 9781107018754

Bogardi JJ, Leentvaar J, Nachtnebel H-P (eds.)
(2012) *River Basins and Change*. GWSP and UNESCO-IHE

Gupta J, van der Grijp N, Kuik O (eds.)
(2012) *Climate Change, Forests and REDD: Lessons for Institutional Design*. Routledge. ISBN: 978-0-415-52699-9

Kassahun S, Van Dijk MP, Bongwa A (eds.)
(2012) *Cities as engines of growth and transformation in Ethiopia*. Addis Ababa: Lesan Press. ISBN: 987-9994-834-8-8

Katko T, Juuti P, Schwartz K (eds.)
(2012) *Water Services Management and Governance: Past Lessons for a Sustainable Future*. London: IWA Publishing. ISBN: 9781780400228

Klemm W, Alaerts G
(2012) *West Balkan Flood and Drought Management Initiative – Drina river Basin – Rapid Regional Diagnostic and Investment Scan Study*. The World Bank, Washington, DC

Ligteringen H, Velsink H
(2012) *Ports and Terminals*. Delft, VSSD. ISBN: 978 90 6562 288 4

Meijer SCF, Brdjanovic D
(2012) *A Practical Guide to Activated Sludge Modeling*. UNESCO-IHE Lecture Notes. UNESCO-IHE. ISBN: 978-9-073-44528-0.

Nonner JC
(2012) *Introduction to Hydrogeology*. Taylor and Francis/CRC Press and Balkema. 2nd Edition/ Revised Print

Spitz G. m.m.v J. Leentvaar
Water, Bron van ontwikkeling, macht en conflict. NCDO, Amsterdam

van Dijk MP, Trienekens (eds.)
(2012) *Global value chains linking local producers from developing countries to international markets, Theoretical perspectives and empirical cases*. Amsterdam: University Press. ISBN: 9789089643605

Vojinovic Z, Abbott MB
(2012) *Flood Risk and Social Justice: From Quantitative to Qualitative Flood Risk Assessment and Mitigation*. London, IWA Publishing. ISBN: 9781843393870

Willems P, Olsson J, Arnbjerg-Nielsen K, Beecham S, Pathirana A, Bulow Gregersen I, Madsen H
(2012) *Practices and Impacts of Climate Change on Rainfall Extremes and Urban Drainage*. IWA publishing. ISBN: 9781780401263

40 Chapters in Books

Alaerts G, Sewilam H
(2012) *Developing Knowledge and Capacity*. In: The United Nations World Water Development Report 4: Managing Water under Uncertainty and Risk, World Water Assessment Programme/UNESCO, Paris. pp. 582-599

Alfonso L, Di Baldassarre G,
(2012) *State of the art of flood risk prevention in Europe: the KULTURisk project and its relevance for the Colombian case (in Spanish)*. In: Society and ecosystem services: Vision, limits, and applications of ecosystem services in a changing world

Bigot L, van der Grijp N, Gupta J, Phuong VT
(2012) *Case Study: Vietnam*. In: Gupta, J, van der Grijp N, Kuik O (eds). *Climate Change, Forests and REDD: Lessons for Institutional Design*. Routledge. pp. 99-120.

Blokland M, Schwartz K
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- van Herk S, Rijke J, Zevenbergen C, Ashley R** (2012) *Governance of integrated flood risk management to deliver large scale investment programmes: delivery focused social learning in the Netherlands*. Floodrisk 2012 - 2nd European Conference on flood risk management. Rotterdam, Netherlands.
- van Herk S, Rijke J, Zevenbergen C, Ashley R** (2012) *Transition in governance of River Basin Management in the Netherlands through social learning*. International Sustainability Transitions Conference. Copenhagen, Denmark.
- Veerbeek W, Ashley RM, Zevenbergen C, Rijke J, Gersonius B** (2012) *Building adaptive capacity for flood proofing in urban areas through synergistic interventions*. Melbourne, VIC.
- Veerbeek W, Ashley R, Zevenbergen C, Gersonius B, Rijke J** (2012) *Building adaptive capacity for flood proofing in urban areas through synergistic interventions*. 7th International Conference on Water Sensitive Urban Design. Melbourne, Australia
- Veerbeek W, Bachin T, Zevenbergen C** (2012) *Exploration and exploitation in urban growth models, Optimizing CA-based urban growth models using a memetic algorithm*. CAMUSS International Symposium on Cellular Automata Modeling for Urban and Spatial Systems, November 8-10. Porto, Portugal.
- Veerbeek W, Pathirana A, Zevenbergen C** (2012) *Natural Hazards Impact and Urban Growth, Legitimacy and urgency for connecting urban growth models to natural hazard impact assessment*. CAMUSS International Symposium on Cellular Automata Modeling for Urban and Spatial Systems, November 8-10. Porto, Portugal.
- Veerbeek W, Pathirana A, Mudenda SMH, Brdjanovic D** (2012) *Application of urban growth modelling to project slum development and its implications on water supply and sanitation planning*. 9th international conference on Urban Drainage Modelling. Belgrade Serbia.
- Vélez C, Alfonso L, Sánchez A** (2012) *Use of hydrodynamic models for optimum design of stabilization ponds: case study Rubiales, Colombia*. Hydroinformatics Conference 2012. Hamburg, Germany.
- Vélez C, Alfonso L, Sánchez A, Gálvis A, Sepúlveda G** (2012) *Centinelas: Early Warning System for the water quality of the Cauca River*. Hydroinformatics Conference 2012. Hamburg, Germany.
- Villacorte LO, Ekowati Y, Salinas Rodríguez SG, Winters H, Schippers JC, Amy G, Kennedy MD** (2012). *MF/UF rejection and membrane fouling potential of transparent exopolymer particles (TEP) produced by Red Tide algae*. EDS conference on Desalination and environment (22-26 Apr). Barcelona, Spain
- Vojinovic Z, Anvarifar F, Matungulu H, Torres AS, Seyoum SD, Barreto W, Price RK, Savic D** (2012) *Multi-criteria risk-based optimisation of urban drainage assets*. 10th International Conference on Hydroinformatics. Hamburg, Germany, July 2012.
- Vojinovic Z, Seyoum SD, Salum MH, Fikri AK, Abebe Y, Price RK** (2012) *Terrain data processing and treatment of different features for urban flood modeling*. 10th International Conference on Hydroinformatics. Hamburg, Germany, July 2012.
- Wainwright D, Callaghan D, Jongejan R, RANSINGHE R, Cowell P** (2012) *How to weigh coastal hazard against economic consequence*. Proceedings of the 33rd International Conference on Coastal Engineering (ICCE) 2012. Santander, Spain.
- Xiao F, Ligteringen H, Van Gulijk C, Ale B** (2012) *Artificial Force Fields for Multi-agent simulations of maritime traffic and risk estimation*. Proc. Int. Conf. on Probabilistic Safety Assessment. Helsinki, June 2012.
- Yalew S, Teferi E, van Griensven A, Uhlenbrook S, Mul M, van der Zaag P** (2012) *Land use change and suitability assessment in the Upper Blue Nile basin under water resources and socio-economic constraints: a drive towards a decision support system*. International Environmental Modelling and Software Society (iEMSS). 2012 International Congress on Environmental Modelling and Software. Managing Resources of a Limited Planet, Sixth Biennial Meeting, Leipzig, Germany. Seppelt R, Voinov AA, Lange S, Bankamp D (Eds.). <http://www.iemss.org/society/index.php/iemss-2012-proceedings>.
- Yekti MI, Schultz B, Hayde, L** (2012) *Challenge of runoff regulation to supply paddy terraces in Subak irrigation schemes*. In: Proceedings 7th Asian Regional Conference of International Commission on Irrigation and Drainage (ICID), 24-28 June 2012. Adelaide, Australia.
- Zevenbergen C** (2012) *Cost-effectiveness of non-structural measures*. Some considerations. Building Resilience Workshop III, held at the Naval Support Activity Eastbank Facility, held 5-17 March 2012. New Orleans, USA.
- Zevenbergen C** (2012) *Building flood resilience: From theory to practice*. EGU2012-14353. EGU General Assembly 2012, held 22-27 April 2012. Vienna, Austria.
- Zevenbergen C** (2012) *Room for the River. Lesson to be drawn*. (in Dutch) Tolhuysberaad, held 8 juli 2012. Hoorn, the Netherlands.
- Zevenbergen C** (2012) *Building upon the outcomes of FP7 flood management research*. Flood Resilience International Conference 2012. SmarTest Closing Conference held 27-28 September 2012. Athens, Greece.
- Zevenbergen C** (2012) *The economics of adaptation in urban flood risk management: some recent experiences*. TaiCCAT, 15 September, Teipei, Taiwan.
- Zevenbergen C** (2012) *Climate Adaptation: Rotterdam case*. IWA Conference. Busan September
- Zevenbergen C** (2012) *Introduction: International Relevance*. Room for the River Conference. Rotterdam, 19 November
- Zimmermann N, Mathys M, Delgado R, Trouw K, Roelvink D** (2012) *Hydrodynamics and sediment transport in the surf zone: a sen-*

sitivity study with different types of numerical models. Proceedings of the 33rd International Conference on Coastal Engineering (ICCE) 2012. Santander, Spain

Zwakhals JW, Taneja P, Ligteringen, H
(2012) *Quay wall design for an uncertain future*. In 8th international conference on Coastal and Port Engineering in Developing Countries, 20-24 February 2012. Chennai, India

16 PhD Theses

Azab AM
(2012) *Integrating GIS, remote sensing, and mathematical modeling for surface water quality management in irrigated watersheds*. CRC Press, Leiden

Arias Hidalgo ME
(2012) *A decision framework for integrated wetland-river basin management in a tropical and data scarce environment*. CRC Press, Leiden

Baghoth SA
(2012) *Characterizing natural organic matter in drinking water treatment processes and trains*. CRC Press, Leiden

Balica SF
(2012) *Applying the flood vulnerability index as a knowledge base for flood risk assessment*. CRC Press, Leiden

Barreto Cordero WJ
(2012) *Multi-objective optimization for urban drainage rehabilitation*. CRC Press, Leiden

Bin Abdullah AF
(2012) *A methodology for processing raw lidar data to support urban flood modelling framework*. CRC Press, Leiden

Dastgheib A
(2012) *Long-term process-based morphological modelling of large tidal basins*. CRC Press, Leiden

Gersonius B
(2012) *The resilience approach to climate adaptation applied for flood risk*. CRC Press, Leiden

Kayoza C
(2012) *Integrated Infrastructure for sustainable Improvement of movement and safety in urban road corridors – The case of Dar es Salaam, Tanzania*. CRC Press, Leiden

Kuntiyawichai K
(2012) *Interactions between Land use and Flood Management in the Chi River Basin*. CRC Press, Leiden

Lutterodt GS
(2012) *Transport of multiple Escherichia coli strains in saturated porous media*. CRC Press, Leiden

Mutikanga HE
(2012) *Water loss management : tools and methods for developing countries*. CRC Press, Leiden

Sekomo Birame C
(2012) *Development of a low-cost alternative for metal removal from textile wastewater*. CRC Press, Leiden

Trifunovic N
(2012) *Pattern recognition for reliability assessment of water distribution networks*. CRC Press Leiden

Vélez Quintero CA
(2012) *Optimization of urban wastewater systems using model based design and control*. CRC Press, Leiden

Ye Q
(2012) *An approach towards generic coastal geomorphological modelling, with applications*. CRC Press, Leiden

1 Technical Report

Keuls C
(2012) *Opinions and recommendations from Alumni (2007-2011) on the three Month Course on Hydraulic Engineering in River basins*, Regional Training Center, Hydraulic Research Institute, Cairo, Egypt. Report is part of the Nuffic 10-TMT-EGY Project

2 Others

Gupta J, Sanchez N
(2012) *Elaborating the Common But Differentiated Responsibilities Principle: Experiences in the WTO*, Legal Working Paper, International Developmental Law Organization. May 2012

Rosswall T, Colley M, Dickson B, Eckerberg K, Friis-Christensen E, Gupta J, McBean G, Mooney H, Sorvari S
(2012) *Norwegian Climate Research: An Evaluation*, The Research Council of Norway

Annex 7

External Memberships - Societal Impact

Abraham Mehari Haile

- Secretary of the ICID working group on Drought.
- Secretary of the Spate Irrigation Network.
- Member of ICID working group on On-farm.

Alessandra Crosato

- Member of Programme committee of the Netherlands Centre for Riverstudies (NCR).
- Member of Morphological Triangle (Dutch leading group on River Morphodynamics and related engineering).
- Member of scientific committee RCEM International Conference on River Coastal and Estuary Morphology.
- Member of IAHR.
- Member of European Mechanics Society.
- Member of editorial Board of the international journal Water Management.
- Reviewer for many international journals, among which: Journal of Geophysical Research -Earth Surface- and Water Resources Research (AGU); Advances in Water Resources and Geomorphology (Elsevier); Earth Surface Processes and Landforms (Wiley); Journal of Hydraulic Engineering (ASCE); Water Management (ICE); Sedimentology (IAS).
- Organization NCR Days 2013 (venue UNESCO-IHE 3-4 October 2013)

Ann van Griensven

- Served on the editorial board of the Hydrology and Earth System Sciences, HESS (since 2012).
- Served on the editorial board of the Environmental Modelling and Software (since 201).
- Guest editor of the journal wires-water.
- Editor of special issues of the Journal of Water Resources Management and for Phys. Chem. Earth.
- Board member of the international Environmental Modelling and Software Society (since 2012).
- Board member of Soil and Water Assessment (SWAT) foundation (since 2012).
- Board member of the Belgian committee for UNESCO-IHP (since 2013).
- Board member of the OpenMI executive committee (since 2010).
- Member of technical committee for the ASABE Water Quality Conference Planning Committee, Bari (2012).
- Chaired and convened a session at EGU.
- Representative of Belgium in EurAqua (the European Network of Freshwater Research Organisations (since 2012).
- PhD examiner for Laurie Biothias, April 2012, PhD thesis, Institut National Polytechnique de Toulouse (INP Toulouse), France.
- PhD examiner for Jiri Nossent, Vrije Universiteit Brussel, Belgium.
- PhD examiner for Juliette Dujardin, Vrije Universiteit Brussel, Belgium.
- PhD examiner for Haddush Goitom Aforki, Vrije Universiteit Brussel, Belgium.
- PhD examiner for Prabin Kayastha, Vrije Universiteit Brussel, Belgium.
- PhD examiner for Mariela Yevenes Burgos, University of Twente, Netherlands.
- PhD examiner for Rasolomanana Santatriniana Denise, Université Laval, Canada.

- PhD examiner for Yihun Dile, Mid-term evaluation, Mid-term PhD defense, Stockholm Resilience Centre (SRC) Stockholm Environment Institute (SEI), Sweden.

Anne van Dam

- Member of Editorial Board of Aquaculture.
- Volume Editor, Wetlands Encyclopedia (Springer).
- Guest Editor Special Issue in papyrus wetlands for Wetland Ecology and Management.
- Refereed ten peer reviewed articles.
- Observer on the Ramsar Scientific and Technical Review Panel

Arthur Mynett

- Several contributions to World Water Forum WWF6 (France) and Yellow River Forum (China).
- Participation in Expert Panel on Room for the River Conference (Netherlands).
- Member of KIVI (NL), IAHR, IAHS, IWA, ICE (UK), ASCE-EWRI (US).
- Elected Council Member of International Association for Hydro-environment Engineering and Research (IAHR).
- Chairman Local Organizing Committee for the IAHR2015 World Congress (June 2015).
- Member of Editorial Boards ENMO (Environmental Modelling and Assessment), HYP (Hydrological Processes), JHI (Hydroinformatics), ISP (Ship Building Progress), Journal of Hydraulic Research (IAHR), Journal of Hydraulic Engineering (ASCE), Water Management (ICE).
- Member of the Governing Board Netherlands Centre for River Research (NCR).
- Member of the Governing Board Netherlands Centre for Coastal Research (NCK).

Assela Pathirana

- Editor of Hydrological Research Letters, Journal of Japan Society of Hydrology and Water Resources.
- Member of International Working Group of the IWA/IAHR Joint Committee on Urban Drainage.
- Member of International Scientific committee of 13th international conference on Urban Drainage.

Bart Schultz

- Member of the Scientific Committee of water and water management of the polder Horstermeer and its surrounding.
- Chairman ICID Task Force on the 6th World Water Forum, March 2012, Marseille France.
- Chairman of the Technical Committee and member of the Steering Committee of the First World Irrigation Forum.
- Chairman of the Task Force on Inter Basin Water Transfers of the International Commission on Irrigation and Drainage (ICID).
- Co-coordinator Core Group of Thematic Priority area 2.2 Contribute to food security by optimal use of water and coordinator of Target III: Increase sustainable productivity and lower costs of water management of the 6th World Water Forum.
- Chairman of the Editorial Board of the ISI listed Journal Irrigation and Drainage.
- Member of the Editorial Board of the international Journal on Lowland Technology.

Branislav Petruševski

- Member of the scientific committee of 4th International Congress of Arsenic in the Environment (22-27 July 2012).

Carel Keuls

- Editor UNESCO-IHE experience based recommendations to NPT/NICHE/NFP conference 'Shaping the future', NUFFIC, Min BuZa (2012).
- Editor UNESCO-IHE project experiences and results for book IWRM in Central Asia (to be published in 2013, in English and Russian).

Carlos Lopez-Vazquez

- Reviewer of the 2013 WEF/IWA Nutrient Removal and Recovery Conference (Vancouver, Canada, July 2013).
- Reviewer of Water Research.
- Reviewer of Water Science and Technology.
- Reviewer of Environmental Technology
- Reviewer of the Journal of Water, Sanitation and Hygiene for Development.
- Reviewer of Journal of Desalination and Water Treatment.
- Associated Editor of Water Science and Technology (since 2011).
- Member of the International Water Association.
- Member of the Water Environment Federation.

Charlotte de Fraiture

- Member of Steering Committee of the Water Land & Ecosystems (WLE) research program under the CGIAR umbrella.
- Member of jury for the Delta Alliance Young Professional Award.
- Member of international jury for the Stockholm Junior Water Prize.
- Editor of the Water Resources and Rural Development (new Elsevier journal).
- Guest editor of special issue of the journal Agricultural Water Management.

Chris Zevenbergen

- Served in a number of international science steering committees e.g. EPSRC, CTD, RCP, DLR FutureMegaCities programme).
- Served in several Scientific Committee of International conferences e.g. HIC Hamburg, FloodRisk 2012, Water and the Cities, TuDelft, Building Resilience Workshop New Orleans.
- Member of the editorial board of the Journal of Flood Risk Management.

Damir Brdjanovic

- Key-note speech at Sanitation for All Big and Small by Aqua 4 All.
- Supported development and establishment of Delft Urban Water.

Dano Roelvink

- Member of Deltares Science Council.
- Keynote lecturer at ICEC conference in Hanoi.
- Keynote lecturer at ECSA conference at East China Normal University, Shanghai.
- Keynote lecturer at seminars at Nanjing Hydraulics Res. Inst, Hohai University and IRTCES, Beijing.

Dimitri Solomatine

- Editor of Hydrology and Earth System Science journal (since 2006).
- Associate Editor of the Journal of Hydroinformatics (since 2010).
- Co-editor of the Springer Book Series Earth Systems, Data & Models.
- Chairman of the EGU Subdivision on Hydroinformatics, convener of sessions at EGU General Assembly.
- Member of IAHR, IWA, EGU.
- Invited to give a keynote presentation at the 10th International Conference

on Hydroinformatics, Russian State Hydrometeorological University and University of Nebraska.

Erik de Ruyter van Steveninck

- Board member of CapNet.
- Member of AcroporaNet.
- Reviewer for Journal of Water and Climate.

Erwin Ploeger

- Board member of the Platform International Education (PIE).
- Member of the coordinating committee of Delft Blue Technology / Technologisch Innovatie Campus Delft - Water Tafel.

Frank van der Meulen

- Member of the advisory committee of two large Management Authorities that manage the dunes of South- and North Holland Provinces.

Giuliano Di Baldassarre

- Editor of Hydrology and Earth System Science journal
- Member of the Editorial Board of the International Journal of Hydr. Science and Technology.
- Member of the International Scientific Organizing Committee of the International Conference on Flood Management (ICFM6).
- Member of the Scientific Organizing Committee of the EGU Leonardo Conference.
- Convened and chaired sessions of sessions at EGU General Assembly.
- Keynote speaker at the Vienna Catchment Symposium on Socio-hydrology.
- Reviewed papers for many international journals, including Water Resources Research, Journal of Hydrology, and Water Policy.

Greet Vink

- Stichting Institutes for Postgraduate International Education in the Netherlands.
- Technologische Innovatie Campus Delft.
- Delft Blue Technology.
- Delft International Advisory Board
- Stuurgroep Valorisatieprogramma Deltatechnologie en Water (VPdelta).
- Stichting Onderwijs Civiel-Ingénieur voor Bedrijfsleven en Overheid.
- International Community Platform (ICP).
- Klankbordgroep-Horizon 2020 Climate Action, Resource Efficiency and Raw Materials.
- Klankbordgroep-Horizon 2020 Bioeconomy.
- Klankbordgroep-Horizon 2020 People.
- Acting member European Innovation Platform Water.
- UNESCO focal point gender.

Guy Alaerts

- Member of the organizing committee of the 5th Delft Symposium on Water Sector Capacity Development (6-7 May 2013).

Han Ligteringen

- Member of the Dutch Committee of EIA
- Member of the International Organisation on Waterborne Transport (PIANC)
- Member of the Board of the Dutch Section of PIANC
- Member of the Board of Sohar Industrial Port Complex, Oman
- Visiting Professor at the University of Stellenbosch, South Africa
- Visiting Professor at Wuhan University of Technology, Wuhan, China
- Course leader and lecturer for PAO Course on Ports and Terminals
- Lecturer on port development at a Seminar by Port of Rotterdam.

Ioana Popescu

- Invited keynote presentation at the Ecolmpulse Water2012 conferences in Romania.

Jan Leentvaar

- Member of the European Commission.

Jan Luijendijk

- Member of the organizing committee of the 5th Delft Symposium on Water Sector Capacity Development (6-7 May 2013).

Jan Willem Foppen

- Served on the editorial board of the Journal of Environmental Quality.

Jochen Wenninger

- Member of the American Geophysical Union (AGU).
- Member of the International Association of Hydrological Sciences (IAHS).
- Member of the European Geosciences Union (EGU).
- Reviewed ten papers for Journal of Hydrology, Hydrology and Earth System Sciences, Hydrological Sciences Journal, and Agricultural Water Management.

Joop de Schutter

- Chairman of the Board of the IGRAC Foundation; Member of the UNESCO-IGRAC Governing Board.
- Chairman of the Supervisory Council of the Water Footprint Network.

Joyeeta Gupta

- Member of Climate Change Committee, International Law Association.
- Member of IHDP Earth System Governance Project.
- Member of the Global Water Systems Project.
- Member of the Committee on the International Law on Sustainable Development, International Law Association (ILA).
- Member of Adviesraad Internationale Vraagstukken (AIV).
- Member of Council of Advice of the Centre for International Cooperation, Vrije Universiteit.
- Member of Raad van Toezicht, OXFAM NOVIB.
- Vice-president, Commissie Ontwikkelingssamenwerking (COS).
- Editor in Chief (since 2004) and Associate Editor (since 1999) of International Environmental Agreements: Politics, Law and Economics (ISI 1.129), Kluwer Academic Publishers (since 2004), Springer.
- Member of Editorial Board of Review of European Community and International Environmental Law (RECIEL).
- Member of Editorial Board of International Journal of Water Governance, Baltzer Science Publishers.
- Member of Editorial Board of Catalan Environmental Law Journal, Revista Catalana de Dret Ambiental.
- Member of Editorial Board of Current Opinion in Environmental Sustainability, Elsevier.
- Member of Editorial Board of Carbon and Climate Law Review, Lexion.
- Member of Editorial Board of Environmental Science and Policy, (ISI 2.128) Elsevier Science.
- Member of Editorial Board of International Journal of Sustainable Development, Inderscience Enterprise Ltd.

Jules van Lier

- Key note speaker and external resource person to the Energy Use Minimization & Energy Recovery in Waste Water Treatment workshop at

the Asiawater2012 Conference, March 29, Kuala Lumpur, Malaysia.

- Associated Editor of Water Science and Technology (since 2008).
- Member of International Advisory Committee IWA Journal of Water, Sanitation and Hygiene for Development (since 2011).
- Support development and establishment of Delft Urban Water.

Ken Irvine

- Member of Editorial Board of Aquatic Conservation: Marine and Freshwater Sciences.
- Volume Editor, Wetlands Encyclopedia (Springer).
- Guest Editor Special Issue in papyrus wetlands for Wetland Ecology and Management
- Advice to River Basin Shannon to Dublin transfer scheme, Ireland.
- Advice to the Sustainable Water Network (SWAN) on changes to the EU Common Agricultural Policy.
- External examiner in three PhD defences (Netherlands, South Africa and Ireland).
- Referee of ca ten peer reviewed articles.

Krishna Prasad

- Member of International Network for Participatory Irrigation Management - Nepal (INPIM).
- Member of Nepal Engineers' Association.
- Member of Nepal Engineering Council, Nepal.
- Member of Academic Development Committee, Open University Nepal.

László Hayde

- Vice-president, International Commission on Irrigation and Drainage (ICID).
- Chairman of European Regional Working Group of ICID.
- Member of the Working Group on History of Irrigation, Drainage and Flood Control of ICID.
- Member of the Permanent Committee on Strategy Planning and Organizational Affairs of ICID.
- Member of the International Water History Association (IWHA).
- Member of the Deutsche Wasserhistorische Gesellschaft (DWhG).
- Invited speaker at the International Workshop/Seminar of the Estonian Ministry of Agriculture, Tallinn - Tartu, Estonia.
- Invited speaker and session chair at the International Conference on Traditional Knowledge for Water Resources Management, Yazd, Iran.
- Invited speaker at Sari Agricultural Sciences & Natural Resources University, Iran.

Leonardo Alfonso

- Member of the European Geosciences Union (EGU).
- Member of Latinaqua (Latin-American network of Water Researchers).
- Member of LaRedC (Colombian Network of Qualified professionals), leader of the Water Network Group.
- Reviewer of Water Resources Research (AGU), Journal of Hydrologic Engineering (ASCE), Journal of Hydroinformatics (IWA), Hydrology and Earth System Sciences (EGU).
- Project reviewer for CEDIA (Academic and Research Network of Ecuador).

Luigia Brandimarte

- Member of the IAHR.
- Member of the IAHS.
- Reviewed six papers for HESS, Hydrological Sciences Journal, Proceeding of ICE Water Management, Hydrological Processes,

Geophysical Research Letters.

Maarten Siebel

- Member International Association of Solid Waste.
- Opponent in PhD-defense of Xingqiang Song Royal Institute of Technology, Stockholm, Sweden.
- Guest speaker at The Hague Academy for Local Government on Waste Management (October 2012).
- Guest speaker at Wageningen University Research Center in Masters Course on Urban Environmental Management.

Maria Kennedy

- Member of the Editorial board of Desalination and Water treatment.
- Member of the editorial board of Desalination.
- Member of the editorial board of Applied Water Science.
- Member of the organization/scientific committee for three international conferences.

Mariska Ronteltap

- Secretary of the IWA Specialist Group on Resource Oriented Sanitation.
- Online guest lecture of Wetsus' Global water Cycle module.
- Guest lecture to primary school students on the topic of sanitation and wastewater treatment.
- Representative in the Dutch Nutrient Platform meetings.

Marloes Mul

- Guest editor of the Journal of Physics and Chemistry of the Earth
- Member of the curriculum review and quality control committee of the WaterNet Trust.
- Member of the curriculum finance committee of the WaterNet Trust.

Meine Pieter van Dijk

- Associate member National Advisory Council for the Environment & Infrastructure.
- Member of the research school CERES (since 1994).
- Member of the research school SENSE (since 2007).
- Member of the Academic Advisory Board Postgraduate program on Env. & Urban studies Semarang, Indonesia.
- Member of the board of Academisch China Overleg (ACO).
- Member of the board of CEPT Master Programme at University Ahmedabad, India.
- Member of the Board of the Foundation for the Institute for Development Planning, Yaounde.
- Member of Netherland Association of Economists (since 1980).
- Member of Dutch Association of Compliance Officers (since 2002).
- Member of the editorial board of Journal of Town & City Management, Henry Stewart (since 2009).
- Member of the editorial board of European Journal of Development Research (since 2000).
- Member of Erasmus University Knowledge Club (since 2008).
- Member Society for a Democratic Europe VDE (since 2007).
- Member of the European Institute for Comparative Urban Research, Euricur, Rotterdam (since 1994).
- Coordinator of the working group European Association of Development and Training Institutes.
- Member of Nederlandse Vereniging voor Afrika Studies (since 2000).
- Member of International Institute for Asian Studies in Leiden (since 2002).

- Regional editor of the International Journal of Water (since 2007).
- Reviewed journals including the Journal for Civil Engineering, Small Business Economics, etc.
- Guest Professor Environmental Management Institute in Qinhuangdao, China (since 2011).
- Curatorium Dutch Chapter Society for International Development Board (since 1983).

Micha Werner

- Member of Scientific committee of the 13th Waternet Conference, Johannesburg, South Africa.
- Member of EGU & AGU.
- Member of the WMO External Panel of Experts (OPACHE) on forecasting.
- Member of delegation at ministerial meeting in the Colombia Netherlands Water Partnership (including Vice-Minister Ben Knapen from the Netherlands, and Ministers of Environment and of Planning in Colombia).
- Member of Editorial board of the Hydrology and Earth System Science Journal.
- External referee, PhD defence committee, Katherina Liechti, University of Zürich, Switzerland.
- Convened and chaired session at EGU General Assembly.
- Peer reviewer for several manuscripts (Hydrology and Earth System Sciences, Hydrological Processes).

Michael McClain

- Served on the editorial board of the journal Ecohydrology and Hydrobiology.
- Served on the steering committee of the Freshwater Program of Diversitas.
- Served on the steering committee of the Global Environmental Flows Network.

Miroslav Marenc

- Member of Editorial Board of the international journal ICE- Water Management.
- Member of International Society of Rock Mechanics.
- Member of International Tunnelling Association.
- Member of Croatian Geotechnical Society.
- Member of Hydropower Sustainability Assessment Protocol Chamber.
- Member of Editorial Board of the Nile Water Science & Engineering Journal.

Paolo Paron

- Member of EGU & AGU, IAHS .
- Member of IAG (International Association of Geomorphologists).
- Member of the KenWeb, Kenya Wetland Conservation.
- Leader of a Working Group on Applied Geomorphological Mapping for the IAG.
- Fellow of the Royal Geographical Society - FRGS.
- External referee for PhD proposals at Wageningen University.
- External member for MSc review at the University of Nairobi (Department of Environmental and Biosystem Engineering).
- Associate editor of the Journal of Maps.
- Editor of a book on Natural Resources, risk and management of Kenya, for Elsevier.
- Invited Editor of a book on Hydro-meteorological hazards, for Elsevier.
- Reviewed eight papers for the following journals: Remote Sensing of the Environment; Int J. Environmental Management; HESS; Earth Surface Processes and Landforms; Water International; Proceeding of ICE Water Management; Journal of Maps.

Peter Kelderman

- Member of IWA Specialist Group on Watershed and River Basin Management.
- Member of the Management Committee of IWA Specialist Group on Watershed and River Basin Management.
- Member Scientific Committee of four IWA Conferences of the Specialist Group on Watershed and River Basin Management.
- Reviewer of about eight papers for Water Research; Aquatic Sciences; Water, Air and Soil Pollution, etc.

Peter van der Steen

- Member of International Advisory Board of SANIPATH project, Emory University, Atlanta, USA.
- PhD thesis reviewer, University of Capetown, South Africa; K.J. Carden, A measure of sustainability in the context of urban water management in South Africa.

Raymond Venneker

- Member of the IAHS Working Group on Education in the Hydrological Sciences.

Rosh Ranasinghe

- Expert advisor on the development of Sea level rise scenarios for Tamil Nadu, India – Asian Development Bank, Manila, Philippines.
- Expert advisor (coasts) on the development of the Thematic Research programme on Climate change – National Science Foundation, Sri Lanka.
- Co-chair of steering committee on European research council project NEMO: (since 2011).
- Delivered invited presentation on Assessment of 21st century Climate Change impacts in Sri Lanka at National Science Foundation, Colombo, Sri Lanka.
- Member of National Committee of Coastal and Ocean Engineering Australia.
- Appointed visiting Professor at The Australian National University, Canberra, Australia.

Shreedhar Sharma

- Editor of the Journal of Water SRT: Aqua (IWA journal).

Shreedhar Maskey

- Member of the Scientific Committee of the 8th International Conference of EWRA on Water Resources Management in an Interdisciplinary and Changing Context (26-29 June 2013, Porto, Portugal).
- Member of the International Scientific and Advisory Committee of the International Conference on "Climate Change, Water Resources and Disasters in Mountainous Regions: Building Resilience to Changing Climate" (27-29 Nov 2013, Kathmandu, Nepal).
- Member of European Geosciences Union (EGU).
- Member of International Association of Hydrological Sciences (IAHS).
- Member of the Editorial Board of the Nile Basin Water Science and Engineering Journal.
- Served on the Editorial Board of the Nile Basin Water Science and Engineering Journal.
- Invited speaker at the Boussinesq Lecture, Boussinesq Centre for Hydrology, Amsterdam, Netherlands.
- Invited speaker at the International Conference HydroPredict 2008, Prague, Czech Republic.
- Reviewer for several international journals: Climatic Change, HESS, Hydrological Sciences J., Hydrological Processes, J. Am. Water Resour. Asso. (JAWRA), J Flood Risk Mgmt., J. Hydrology, J. Hydroinformatics, J. Hydrologic Engg. (ASCE), J. Water Resour. Mgmt., J.

Water Resour. Pl. Mgmt. (ASCE), Theor. Appl. Climatology, etc.

Stefan Uhlenbrook

- Member of the editorial board Hydrology and Earth System Sciences (since 2004).
- Member of the editorial board Hydrological Sciences Journal (since 2006).
- Member of the editorial board Hydrologie und Wasserbewirtschaftung (Hydrology and Water Management, in German (since 2008).
- Member of the editorial board Nile Basin Water Science and Engineering Journal (since 2010).
- Involved in the organization of several sessions related to education and capacity building at the World Water Forum (March, Marseille, France).
- Member of review team of the IWMI research programme, at International Water Management Institute (IWMI), Colombo, Sri Lanka.
- Co-convenor of two sessions at IAHS-PUB symposium, Delft University of Technology, The Netherlands.
- Chair of the annual Boussinesq Center for Hydrology meeting, Royal Netherlands Academy of Sciences, Amsterdam, The Netherlands.
- Invited participant of the task force for preparing the programme of the European Innovation Platform on Water, Brussels, Belgium.
- Invited presentation and member of a discussion panel at EU Green Economy conference, Brussels, Belgium.
- Invited speaker at the Bonn Water Colloquium, ZEF and University of Bonn, Germany.
- Member of the audit team of the joint LWE programme, giving an invited seminar, Egerton University, Kenya.
- Invited speaker at Challenge the Best, University of St. Gallen, Switzerland.
- Meeting with many high-level decision makers including the Minister for Water and Energy and the State Minister for Higher Education in relation to the University Water Sector Partnership in Ethiopia.

Thom Bogaard

- Guest editor of a HP special issue (published 2012).
- Guest editor of Engineering Geology special issue (published 2012).
- Guest editor of HESS special issue started in 2012 (expected publication 2013).
- Treasurer of the Treub Maatschappij (Organization for supporting research in the tropical regions).
- Member of the board of the CERG (Centre European des Risques Geomorphologique - Specialized Centre of Council of Europe EUR-OPA Major Hazard Agreement).

Tineke Hooijmans

- Representative in the Dutch Nutrient Platform meetings.

Uta Wehn de Montalvo

- Member of the Programme Committee IWA (International Water Association) Development Congress & Exhibition 2013, Kenya.
- Member of the Programme Committee ICT4S (ICT for Sustainability) Conference 2013, Switzerland.
- Member of the IWA reference group for the human resource capacity gaps work.
- Member of the IWA reference group for the Human Resource capacity gaps study.
- Member of the organizing committee of the 5th Delft Symposium on Water Sector Capacity Development (6-7 May 2013).
- Invited to attend the workshop for policy makers and researchers on 'Green ICT for growth?' (May 2012), University of Economics and Business, Vienna.

- Participated in the EU Green Week.
- Contribution to joint session for targets CS3.1 and EU10 "The Science and Water Policy Interface: When Science and Innovation Meet Water Policy" of the 6th World Water Forum.

Zoran Vojinovic

- Associate Editor of the Journal of Hydroinformatics.

Annex 8 Committees

UNESCO-IHE Governing Board

Fritz Holzwarth, Chair
Abdel Afouda
Abdin Mohamed Ali Salih
Claudio Caponi
John Verbakel
Louis de Quelerij
Maria Pilar Cornejo de Grunauer
Ognejen Bonacci
Richard Jose Lino
Tineke Huizinga-Heeringa
Tomoharu Hori
Wim Kuijken
Avinash Tyagi, *per 01/Jun/12*
Blanca Jimenez Cisneros, *per 01/Sep/12*

IHE Delft Foundation Board

Wim Deetman, Chair
Annemieke Nijhof
Louis de Quelerij
Wim Kuijken

Rectorate

András Szöllösi-Nagy, Chair
Joop de Schutter, *until 01/Apr/12*
Stefan Uhlenbrook
Greet Vink, *per 01/Apr/12*

Academic Board

András Szöllösi-Nagy, Chair
Arthur Mynett
Bart Schultz
Charlotte de Fraiture, *per 01/Jan/12*
Chris Zevenbergen
Damir Brdjanovic
Dano Roelvink
Dimitri Solomatine
Gary Amy
Guy Alaerts
Han Ligteringen
Huub Gijzen
Jan Leentvaar
Joyeeta Gupta
Jules van Lier
Kala Vairavamoorthy
Maria Kennedy
Meine-Pieter van Dijk
Nigel Wright
Piet Lens
Pieter van der Zaag
Stefan Uhlenbrook
Kenneth Irvine
Michael McClain, *per 01/Mar/12*

Operational Management Group

Joop de Schutter, Chair, *until 01/Apr/12*
Greet Vink, Chair, *per 01/Apr/12*
Arno Heins
Erik de Ruyter van Steveninck
Erwin Ploeger
Ioana Popescu
Juliëtte Terlaak
Robert de Bruijn
Saroj Sharma
Wilmar Ceton

Examination Board

Arthur Mynett, Chair
Dimitri Solomatine
Erick de Jong
Jan Nonner
Maarten Blokland
Nemanja Trifunovic
Peter Kelderman

Educational Programme Executive Committee

Erwin Ploeger, Chair
Arno Heins
Edwin Hes, *per 17/Oct/12*
Erik de Ruyter
Henk Lubberding, *until 17/Oct/12*
Jan Herman Koster
Jeltsje Kemerink
Tineke Hooijmans

Education Development Committee

Stefan Uhlenbrook
Dano Roelvink
Maria Kennedy
Piet Lens
Pieter van der Zaag
Erwin Ploeger
Jan Herman Koster

Works Council

Abraham Mehari Haile, Chair
Guy Beaujot
Mariska Ronteltap
Nemanja Trifunović
Wim Glas

Student Association Board

Bipin Dangol, Chair
Brenda Vimbayi Chomombe, Vice-Chair
Gaston Rubert Ntulo, Treasurer
Maruddin Fernandus Marpaung, Secretary

PhD Association Board

Assiyeh Tabatabai, Chair, *until 01/Sep/12*
Patricia Trambauer, Chair, *per 01/Sep/12*
Denys Villa Gómez, *until 01/Sep/12*
Aline Saraiva-Okello, *per 01/Sep/12*
Fernanda Minikowski Achete, *per 01/Sep/12*
Fiona Zakaria, *per 01/Oct/12*
Joana Cassidy, *per 01/Nov/12*
Mário Paulo da Silva Duarte Duque, *per 01/Nov/12*
Pedi Obani, *per 01/Oct/12*
Peter Mawioo, *per 01/Nov/12*
Silas Mvulirwenande, *per 01/Nov/12*

Cultural Ambassadors

Artists, events and cultural institutions appointed as Cultural Ambassadors of UNESCO-IHE to call for good water management and advocate the urgent need for well-trained water managers throughout the world.

Catherine Massin performance/visual art/writing
DeSingel International Arts Centre
Festival van Vlaanderen - OdeGand
Gastprogrammering Het Muziektheater
Handelsbeurs Concertzaal Gent
Les Ballets C de la B
Lucien den Arend sculptor
Marjorie Ryerson photographer and orchestrator
Rotterdam Philharmonisch Orkest
Slagerij van Jampen
Troubelyn | Jan Fabre performing arts
Ap Verheggen sculptor
Gil Garcetti photographer

Honorary Fellows

The UNESCO-IHE Honorary Fellowship award is bestowed in recognition of persons of distinction who have either made major contributions to the work of IHE or earned distinction for activities associated more widely with the context of IHE's mission.

2012 Prof. J.A. Cunge
2011 Prof. J.P. O'Kane, PhD
2010 Prof. D.P. Loucks
2004 W.J. Cosgrove
1999 Prof. M. Abu Zeid, PhD
1998 Prof. W.A. Segeren, MSc
1998 R. Moochtar, MSc
1996 Prof. J.W.M. la Rivière, PhD, MSc
1993 M.F. Strong, PhD
1992 Prof. J.C.I. Dooge
1990 Prof. L. Huisman, PhD, MSc
1985 Prof. L.J. Mostertman, MSc
1976 Prof. W.F.J.M. Krul
1968 Prof. J.Th. Thijssen, MSc

Annex 9

Institutional Agreements & Joint MSc Programme Partners

NORTH AMERICA

Army Corps of Engineers, USA
Florida Earth Foundation, USA
Instituto Mexicano de Tecnología del Agua, Mexico
Nebraska University, USA
Rotary International, USA

SOUTH AMERICA

Agencia Nacional de Investigación e Innovación (ANII), Uruguay
IDEAM, Colombia
Public Water and Sewage Utility, Costa Rica
Technological University of Panama, Panama
The Ecuadorian National Water Secretariat (SENAGUA), Ecuador
UNESCO-HydroEx, Brazil
Universidad del Valle, Colombia
University of Peace, Costa Rica
University of São Paulo, Brazil

ASIA

Abbaspour Power and Water University of Technology (PWUT), Iran
Asian Institute of Technology, Thailand
Beijing Normal University, China
Birzeit University/Palestinian Water Authority, Palestine
China University of Geosciences, China
Egyptian Ministry of Water Resources and Irrigation, Egypt
Georgian State Agricultural University, Georgia
Huaihe River Commission, China
Hydro and Agro Informatics Institute, Thailand
International Centre for Water Hazard and Risk Management
Iran Ministry of Energy / Regional Centre on Urban Water Management, Iran
K-Water, Republic of Korea
Mekong River Commission, Mekong Region
Sam Ratulangi University, Indonesia
Sejong University, Korea
State Agrarian University of Armenia, Armenia
The Honor Power Foundation, China

EUROPE

Boussinesq Centre for Hydrology, the Netherlands
Center for New Water Technologies, Spain
Delft University of Technology, the Netherlands
Deltares, the Netherlands
Deutsche Wasserhistorische Gesellschaft, Germany
Maastricht School of Management, the Netherlands
Netherlands Ministry of Infrastructure and Environment, the Netherlands
Suez Environment, France
The International Institute of Social Sciences, the Netherlands
Vrije Universiteit Amsterdam, the Netherlands
Women for Water Partnership, the Netherlands

AFRICA

National University of Rwanda, Rwanda
National Water and Sewerage Corporation, Uganda
Spate Irrigation Network
University of Khartoum, Sudan
Water Research Institute of Mozambique, Mozambique
WATERNET Trust, Botswana

JOINT PROGRAMME PARTNERS (MSc LEVEL) IN 2012

Ain Shams University, Egypt
Asian Institute of Technology, Thailand
Austrian Academy of Sciences, Austria
BOKU: University of Natural Resources and Life Sciences, Austria
Dundee University, Scotland
Egerton University, Kenya
Ghent University, Belgium*
Haramaya University, Ethiopia
Hohai University, China
Institute of Chemical Technology Prague, Czech Republic*
Kwame Nkrumah University of Science and Technology, Ghana
Sriwijaya University, Indonesia
Technical University of Catalonia, Spain*
Technical University of Dresden, Germany*
The Christian Albrecht University of Kiel, Germany*
The National University of La Plata, Argentina*
Universidad del Valle, Colombia
University of Algarve, Portugal*
University of Ljubljana, Slovenia*
University of Lodz, Poland*

* Consortium member for Erasmus Mundus programme

Annex 10 Alumni Associations

UNESCO-IHE alumni perform a vital role as 'ambassadors' to the world. The establishment and strengthening of the UNESCO-IHE Alumni Network is essential to promoting and facilitating knowledge dissemination, including the exchange of professional expertise and personal experience between alumni and the alma mater as well as amongst Alumni. These independent Associations organize various activities in their country.

ARGENTINA

Asociación Cultural Argentino - Neerlandesa de Ex-Becarios (ACANEB)
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Former Director General, Water Resources Planning Organization, Government of Bangladesh
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UNESCO-IHE Alumni Network
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THE FORMER YUGOSLAV REPUBLIC OF MACEDONIA

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MALAYSIA

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RUSSIAN FEDERATION

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NRMTMP Alumni Association; Netherlands-Russian
Management Training Programme
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Dutch/193815563978714

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SYRIAN ARAB REPUBLIC

Association of Syrian Alumni from the Netherlands Universities and institutions
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UNITED REPUBLIC OF TANZANIA

Netherlands Alumni Association of Tanzania
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TURKEY

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UGANDA

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VIET NAM

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ZAMBIA

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Annex 11

List of Abbreviations

AIT	Asian Institute of Technology (Bangkok, Thailand)
DGIS	Directorate General of International Cooperation, Netherlands Ministry of Foreign Affairs
DUPC	DGIS - UNESCO-IHE Programmatic Cooperation
DUT	Delft University of Technology, The Netherlands
DUWO	Housing Corporation in Delft
EC	European Commission
FP6 / FP7	6 th/7th Framework Programme (EC research programme)
Fte	Full-time equivalent
ICT	Information and Communication Technology
IHP	International Hydrology Programme (UNESCO)
IWRM	Integrated Water Resources Management
JJWBGSP	Joint Japan-World Bank Graduate Fellowship Programme
KNUST	Kwame N'Kruma University of Technology (Kumasi, Ghana)
KOS	Knowledge Innovation and Research Strategy (DGIS policy document)
MDGs	Millennium Development Goals
MoU	Memorandum of Understanding
MSc	Master of Science
MT	Management Team (of UNESCO-IHE)
NBCBN-RE	Nile Basin Capacity Building Network for River Engineering
NFP	Netherlands Fellowship Programme
NICHE	Netherlands Institutional Cooperation in Higher Education programme (NUFFIC)
NUFFIC	Netherlands Federation for International Cooperation in Higher Education
NVAO	Netherlands / Flemish Accreditation Organisation
NWO	Netherlands Organisation for Scientific Research
NWP	Netherlands Water Partnership
OCW	Netherlands Ministry of Education, Culture and Science
PCCP	From Potential Conflict to Cooperation Potential (UNESCO-IHP programme)
PhD	Doctor of Philosophy
PoWER	Partnership for Water Education and Research
SENSE	Socio-Economic and Natural Sciences of the Environment (Research School)
SWITCH	Sustainable Water Management Improves Tomorrow's Cities Health (EC-sponsored project)
TTIW	Technological Top Institute – Water technology (Netherlands' Government funded initiative)
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNESCO-IHE	UNESCO-IHE Institute for Water Education
UniValle	Universidad del Valle (Cali, Colombia)
UPaRF	UNESCO-IHE Partnership Research Fund
UTQ	University Teaching Qualification (agreed standard for Dutch university teaching staff)
VAT	Value Added Tax
V&W	Dutch Ministry of Transport, Public Works and Water Management
WaterNet	Capacity Building Network for IWRM (Southern and Eastern African Region)
WOTRO	Science Division within NWO

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