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PROFILE

Associate Professor, IHE Delft

Honorary Professor, University of Exeter (UK)

Adjunct Professor, NCKU (Taiwan)

Visiting Professor, Technical University of Munich (Germany)

Visiting Professor, University of Belgrade (Serbia)

Visiting Faculty, Asian Institute of Technology (Thailand)

23 years of academic and consultancy experience

Grants and funding from European Commission, ADB, World Bank, UNDP

ADB Water Champion, Work concerning projects in Asia

Editor-in-Chief (2014-2016), Journal of Hydroinformatics (IWA)

Associate/Guest Editor, IWA, Taylor & Francis and MDPI Journals

Publications, 4 books (text books used in educational programmes at IHE Delft and other places) and over 100 papers and reports, Google Scholar, Scopus.

EDUCATION

Bachelor of Engineering, University of Belgrade (SRB), Graduated in 1993

Masters of Engineering, University of Auckland (NZ), Graduated in 1998

PhD, University of Auckland (NZ), Graduated in 2002

EXPERTISE

Water/Environmental Systems Modelling and Design

Risk Assessment and Climate Change Adaptation

Hydroinformatics

COUNTRIES OF EXPERIENCE

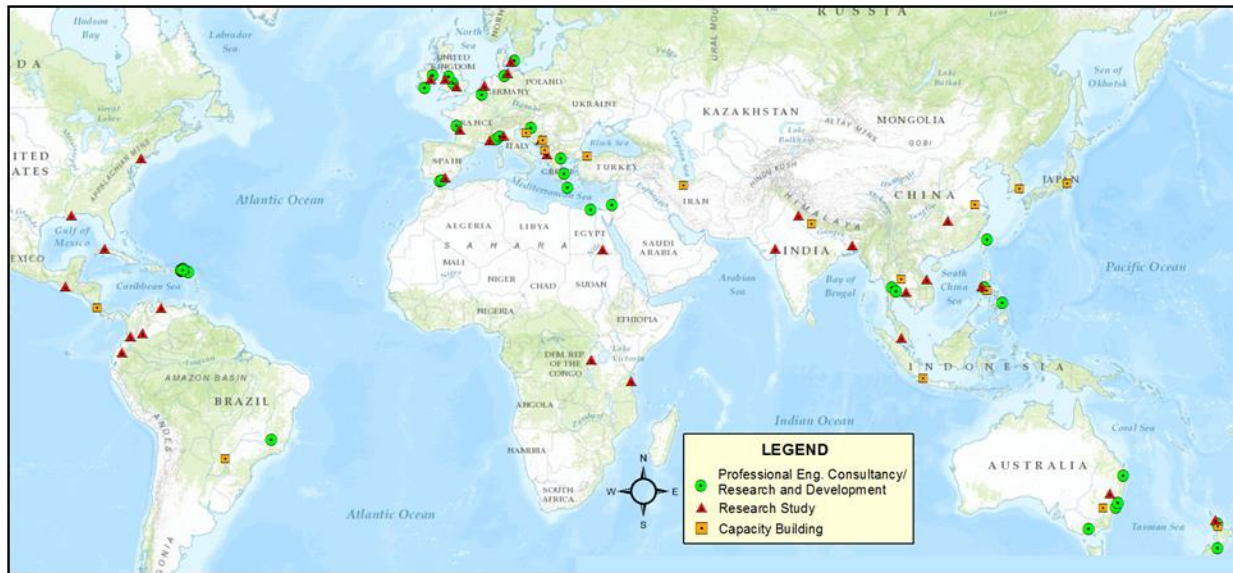


Figure 1: Geographic spread of research, capacity building and professional engineering consultancy experience.

CAREER

Associate Professor, IHE Delft, 2007 - present

Honorary Professor, University of Exeter (UK), 2014 - present

Visiting Professor, Technical University of Munich (Germany), 2018 - present

Adjunct Professor, NCKU (Taiwan), 2016 - present

Visiting Professor, University of Belgrade (Serbia), 2014 - present

Visiting Faculty, Asian Institute of Technology (Thailand), 2012 – present

Visiting Professor, Educons University, Novi Sad, Serbia, 2012 – present

Guest Lecturer, EIIL, Brussels, 2006 – 2009

Senior Lecturer of Hydroinformatics, IHE Delft, 2004 - 2007

Guest Lecturer, EIIL, Brussels, 2006 – 2009

Guest Lecturer, University of New South Wales, Australia, 2002 – 2004

Senior Engineer, PBP - Worley Parsons, Sydney, Australia, 2003 – 2004

Senior Professional, GHD Pty Ltd, Sydney, Australia, 2002 – 2003

Assistant Lecturer, University of Auckland, New Zealand, 1998 – 2002

Team Leader, Water Modelling Group, Metrowater, New Zealand, 1998 – 2002

Hydraulic Engineer, City Design, GHD, MWH, New Zealand, 1995 – 1998

AFFILIATIONS

Associate Editor (current) Journal of Hydroinformatics, IWA

Editor-in-Chief (2015-2016) Journal of Hydroinformatics, IWA

Associate Editor (current) Journal of Blue-Green Systems, IWA

Editorial board member: IWA Water Wiki (until 2016, nowadays known as IWA Connect),

Guest Editor: Urban Water Journal, Taylor & Francis - Special Edition on Urban Drainage in Developing Countries,

Guest Editor: Water Journal, Special Edition on Hydroinformatics and Urban Water Systems, MDPI:
http://www.mdpi.com/journal/water/special_issues/Hydroinformatics

Editor: Environments, MDPI:
<http://www.mdpi.com/journal/environments/editors>

Editorial board member: International Geoinformatics Research and Development: http://www.igrdg.com/Editorial_Board.php

COMMITTEES

Pan-European Symposium on Water and Sanitation Safety Planning and Extreme Weather Events, 2017, Amsterdam, Netherlands.

Water Security and Climate Change: Challenges and Opportunities in Asia, 2016: <http://sea.exceed-swindon.org/water-security-conference/>.

Amsterdam International Water Week, 2015, Amsterdam, Netherlands.

IWA/IAHR Joint Specialist Group on Urban Drainage (JCUD) and International Working Group on Data and Models.

International Conference on Flood Resilience, Experiences in Asia and Europe, 5 - 7 September 2013, Exeter, UK.

34th IAHR World Congress, Brisbane, Australia.

9th International Conference on Hydroinformatics, Tianjin, China

10th International Conference on Hydroinformatics, Germany

11th International Conference on Hydroinformatics, US

ICFR, International Conference on Flood Resilience, UK

11th International Conference on Computing and Control for the Water Industry, 5-7 September 2011, Exeter, UK.

Urban Drainage Modelling Conference, 2012, Belgrade, Serbia.

7th International Conference on Urban Drainage Modelling and the 4th International Conference on Water Sensitive Urban Design, Melbourne, Australia, April.

5th International Conference on Sewer Processes and Networks, UNESCO-IHE, Delft, Netherlands, 28-31 August 2007.

RECENT KEYNOTES AND AWARDS

Keynote at the ARC Conference 2019 - Multi-scale Resilience Practices – November 2019: <http://asiaresilience.org/speaker.asp>

Keynote at the Nature Based Solutions for Climate Change Adaptation 2019, WRA Taipei Forum, Taiwan, October 2019:
<http://www.reconnect.eu/2019/10/14/forum-on-nbs-applications-in-taiwan/>

Keynote speaker: Understanding Risk Conference, World Bank, European Commission, GFDRR, 2018, Belgrade, Serbia: https://understandrisk.org/wp-content/uploads/UR_Balkans_Program_09142018_WEB.pdf.

Keynote speaker: SDHI-SDH 18: 2018, Nis, Serbia: Scientific conference for hydraulic research (SDHI) and Serbian Hydrological Society (SDH).

Pan-European Symposium Water and Sanitation Safety Planning and Extreme Weather Events, 2017, Bilthoven, Netherlands:
<http://www.iwconferences.com/wssp-and-extreme-weather/>

Keynote plenary speaker at Future Drainage and Stormwater Networks Conference 2016 - Abu Dhabi, UAE:
<http://www.drainageandstormwaterabudhabi.com/Speakers-558>

Keynote plenary speaker at HIC 2016 - Hydroinformatics Conference, Incheon, Korea: http://www.hic2016.org/html/plenary_speakers.php

Keynote plenary speaker at ICHE 2016 - International Conference on Hydrosience and Engineering, Tainan, Taiwan:
http://iche2016.hyd.ncku.edu.tw/index.php?action=program_schedule&pro=3

ADB water champion (<https://www.adb.org/news/features/series/water-champions>).

Best Paper Award – [Water Security and Climate Change: Challenges and Opportunities in Asia](#)

[Steven Hoogendijk Medal](#) after a jury selected the PhD thesis of Yared Abebe (complete under my supervision) as the best among 40 Cum Laude theses defended at TU Delft in the past two years.

MEMBERSHIPS IAHR

IWA

Institution of Professional Engineers New Zealand (MIPENZ)

Registered/Chartered Engineer: Registration No. 218646

IAHR Hydroinformatics Committee Leadership Team

New Zealand Coastal Society, IPENZ Technical Group

New Zealand Water Modelling Group, Special Interest Group of NZWWA

MAJOR GRANTS EC H2020 Regenerating ECOSystems with Nature-based solutions for hydro-meteorological risk rEduCTion - RECONNECT - (Proposal Initiator, Project Director / Principal Investigator): Overall value of works: 44,000,000 Euro and 14,000,000 Euro of EC contribution.

EC FP7 PEARL Coastal Flood Risk Assessment and Protection Project (Proposal Initiator, Project Coordinator / Principal Investigator): Overall budget: 6,000,000 Euro.

EC FP6 SWITCH Urban Water Systems Project (Input into the proposal, Work Package Leader with 500,000 Euro budget responsibility): Overall budget: 27,000,000 Euro.

HYDROPLAN-EU Urban Infrastructure Asset Planning Project (Project Advisor and QA with 150,000 Euro budget responsibility): Overall budget: 2,316,000 Euro.

UNDP R3i Flood Risk Assessment Project (Work Package Leader and Project Advisor with 200,000 Euro budget responsibility): Overall budget: 5,000,000 Euro.

ADB WAMEX Wastewater Technologies Project (Project Leader with full budget responsibility): Overall budget: 500,000 US.

ADB Flood Risk Assessment at Historic Cultural Sites (Project Leader with full budget responsibility): Overall budget: 270,000 US.

ADB Flood Management Tool (Project Leader with full budget responsibility): Overall budget: 120,000 Euro.

Integrated Wastewater and Stormwater Catchment Studies, Auckland City / Metrowater funded R&D Project (Technical Leadership): Overall budget: 25,000,000 NZD.

Project Backbone, Wastewater, Auckland City / Metrowater funded R&D Project (Project Leader with full budget responsibility): Overall budget: 2,500,000 NZD.

TEACHING

Urban Water Systems (<https://www.unesco-ihe.org/urban-water-systems>);

Urban Flood Management and Disaster Risk Mitigation (<https://www.unesco-ihe.org/urban-flood-management-and-disaster-risk-mitigation>);

Urban Drainage and Sewerage (<https://www.unesco-ihe.org/urban-drainage-and-sewerage-4>);

GIS and Remote Sensing for the Water Sector (<https://www.unesco-ihe.org/gis-and-remote-sensing-applications-water-sector>).

TEACHING QUALIFICATION

University Teaching Qualification (UTQ) programme (https://www.vsnul.nl/en_GB/utq) which is a formal certification of the teaching skills of lecturers in academic education in the Netherlands.

PhD STUDENTS Ruangpan, L., Evaluations of Nature Based Solutions for Hydro-meteorological risk reduction, IHE Delft. Defence: 2023.

Tseng, K., Modelling Nature-Based Solutions for hydro-meteorological risk reduction, IHE Delft. Defence: 2023.

Zhong, L., Towards Multifunctional, Robust and Adaptive Design of Nature-Based Solutions for Hydro-meteorological Risk Reduction, IHE Delft. Defence: 2023.

Alves, A., Combining green-blue-grey infrastructure for flood mitigation and enhancement of co-benefits, UNESCO-IHE. Defence scheduled for 30 January 2020.

Abebe, Y., Modelling cities as evolving systems through complex adaptive systems - institutional behaviour and flood risk, UNESCO-IHE. Defence: 2020.

Martinez, C., Optimal Rehabilitation of Water/Wastewater Infrastructure, PhD Thesis, UNESCO-IHE. Defence: 2020.

Vorawit, M., Merging topographical data from multidimensional views for enhanced urban flood modelling: The Case of Thailand, PhD Thesis, UNESCO-IHE. Defended in 2017.

Sanchez, A.T., Modelling the Future Water/Wastewater Infrastructure of Cities, PhD Thesis, UNESCO-IHE. Defended in 2013.

Basupi, I., Adaptive Water Distribution System Design Under Uncertainty, University of Exeter, UK. Defended in 2013. Mentor: Prof Z. Kapelan, University of Exeter, UK.

Imani, M.A., Modelling the Performance of an Integrated Urban Wastewater System under Future Conditions, University of Exeter, UK. Defended in 2012. Mentor: Prof S. Djordjevic and Prof David Butler, University of Exeter, UK.

Barreto, W.,J., Urban flooding and model-based optimisation of mitigation measures, PhD Thesis, UNESCO-IHE. Defended in 2012.

Abdullah, A.F., LiDAR Filtering Algorithms for Urban Flood Modeling Applications, PhD Thesis, UNESCO-IHE. Defended in 2012.

Seyoum, S., D., Integrated Urban Water Systems Modelling, PhD Thesis, UNESCO-IHE. Defended in 2013.

S. Kumar. Urban Floodplain Modelling with 1D-2D models on Unstructured Meshes, IIT Roorkee, India. Defended in 2014.

Tumwesigye, E., Remote modelling of water infrastructure: Towards 5th Generation of Hydroinformatics, Mentor: Prof Philip O’Kane, National University of Ireland: University College Cork, Defended in 2009.

Evans, B., A multilayered approach to two-dimensional urban flood modelling, Mentor: Prof Slobodan Djordjevic, Defended in 2010, University of Exeter, UK.

MSc STUDENTS Zehnder, C., A Methodology for Selection of Optimal Sampling Locations in Sewer Networks for Rapid Track and Trace of Pathogens, IHE Delft (2019/21).

Aliaj, A., Assessment of the effectiveness of combined green, blue and grey measures for flood risk mitigation under changing climate, IHE Delft (2019/21).

Musoma, M, Performance evaluation of a retention pond for flood risk reduction: case study of Charco Azul wetland, Cali., IHE Delft (2019/21).

Yang, S., Assessment of trade-offs among the co-benefits of nature-based solutions for flood risk reduction, IHE Delft (2019/21).

Devanand, V. B., Supporting Decision Making in the Allocation of Nature-Based Solutions for Hydro-meteorological risk reduction, IHE Delft (2019/21).

Franco, V., Framework for assessment of replicability of large-scale Nature-Based Solutions: The Room for the River case, IHE Delft (2019/21).

Eunice, W.M., Enhancing Urban Water Supply System Performance under Demographic and Climate Change: A Case Study of Nairobi, Kenya, IHE Delft/AIT (2017/19).

Shrestha, P., Assessment of Nature-Based Solutions to Enhance Urban Drainage Performance, IHE Delft/AIT (2017/19).

Thin, T., Assessment of combined large and small scale nature-based solutions for flood mitigation in Ayutthaya Island, IHE Delft/AIT (2017/19).

Mubeen, A., Supporting Decision Making in the Allocation of Nature-Based Solutions for Flood Risk Reduction, IHE Delft (2018/20).

Dutta, A., Evaluation of pollutants removal efficiency by different green infrastructures with different configurations, IHE Delft (2018/20).

Wu, BS., Environmental design features for large scale nature-based solutions: development of a framework that incorporates landscape dynamics into the design of nature-based solutions, IHE Delft (2018/20).

Mendeszoorn, N., A framework for the assessment of the applicability and effectiveness of Nature Based Solutions in River Basins, IHE Delft (2018/20).

Rajbhandari, S., Identifying potential measures to minimize cascading effects of urban flooding on road infrastructure, IHE Delft (2018/20).

Dobles, D.R., Evaluation framework for assessing the benefits of Grey- Green Infrastructures, IHE Delft/AIT (2017/19).

Chahe, G.T., Assessment of dynamic flood risk subjected to changing outlet boundary conditions of combined sewer system under influence of climate change and storm surges, IHE Delft/AIT (2017/19).

Mantilla, I., L., Room for Chao Phraya River: Framework for Risk Reduction by Increasing the Flood Conveyance Capacity using adaptive measures, IHE Delft/AIT (2017/19).

Watkin, L., J., Flood Mitigation Framework using Multi-Beneficial (or Impact/Benefits Analysis) Nature-Based Solutions, IHE Delft/AIT (2017/19).

Pokharel, P., Development of a Framework for assessing Public Health Risk due to pluvial flooding: A Case study of Sukhumvit area in Bangkok, IHE Delft/AIT (2017/19).

Bell, M., Bathing water quality: simulation and forecasting faecal bacteria from sewer systems in coastal waters, IHE Delft/AIT (2017/19).

Hilly, G., Holistic Risk Assessment Framework: Tracing the cascading effects of water related disasters, UNESCO-IHE/AIT (2016/17).

Gomez, J., Selection and Evaluation of Green Infrastructure Measures (i.e., nature-based solutions), UNESCO-IHE/AIT (2016/17).

Majidi, N., Combining heat stress and flood risk mitigation into design of multifunctional green infrastructure, UNESCO-IHE/AIT (2016/17).

Golub, D., Community Based Disaster Risk Management, UNESCO-IHE (2014).

Keerakamolchai, W., Merging Engineering and Natural Solutions for Enhanced Flood Resilience: The case of Ayutthaya, Thailand, AIT (2014).

Toloh, B., Assessment of Resilience of Urban Drainage Systems Through Multi-Objective Optimization, UNESCO-IHE (2014).

Weerema, C.G., Flood Hazard Assessment, and Associated Pollutants Dispersion: A Case Study of Msimbazi River in Dar Es Salaam City (Tanzania), AIT (2014).

Corea, A., The Effectiveness of Best Management Practices for Urban Flood Management, UNESCO-IHE (2013).

Manjavkar, S.V., Evaluation of Effectiveness of Urban River Rehabilitation Projects, UNESCO-IHE (2013).

Mitre, N., Simplified Sewerage Design Tool - Development and Application, UNESCO-IHE (2013).

Shrestha, A., Analysis of the Urban Drainage under Climate Change: IDF Generation and 1D/2D Modeling, UNESCO-IHE (2013).

Munoz, S., Towards the Methodology for Flood Risk Assessment at Cultural Heritage Sites, The Case of Ayutthaya World's Heritage Site, UNESCO-IHE (2013).

Paredes, D., Multi-objective rehabilitation of urban drainage systems within the flood risk framework, MSc Thesis, UNESCO-IHE (2013).

Sahlu, S.B., Robust optimization of urban drainage systems under uncertainties, MSc Thesis, UNESCO-IHE (2012).

Jani, R.N., Urban Flood Risk under Climate Change: A Case of Dhaka City, MSc Thesis, UNESCO-IHE (2012).

Medina, N., Optimal design of sewer network systems, under urbanisation and land use change, MSc Thesis, UNESCO-IHE (2012).

Hodzic, A., Model-based assessment of environmental impact from wastewater discharges, MSc Thesis, UNESCO-IHE (2011).

Abebe, Y.A., Comparison of Numerical Schemes for Modelling Supercritical and Transcritical Flows along Urban Floodplains, MSc Thesis, UNESCO-IHE (2011).

Hung, P.M., Attribution of flood risk in coastal urban area, MSc Thesis, UNESCO-IHE (2011).

Waly, M.M.A., Evolution of Urban Drainage Networks Using Agent Based Models, MSc Thesis, UNESCO-IHE (2011).

Chavez, K.R.R., A methodology for flood risk assessment: The Case of Quetzaltenango city, Guatemala, MSc Thesis, UNESCO-IHE (2011).

Anvarifar, F., A Methodology for Risk-based Optimization of Urban Drainage Systems, MSc Thesis, UNESCO-IHE (2011).

Lake, O., Integrated Water Quality Modelling, MSc Thesis, UNESCO-IHE (2010).

Ngandu, B., Operational optimization of water distribution networks using hybrid algorithms, MSc Thesis, UNESCO-IHE (2010).

Salum, M.H., Towards The Methodology For Capturing Small-scale Urban Features into The Coarse Resolution 2D Models, MSc Thesis, UNESCO-IHE (2010).

Matungulu, H.M., Comparison of different urban flood modelling approaches within the context of optimization of rehabilitation measures, MSc Thesis, UNESCO-IHE (2010).

Teklesadik, A.D., Urban Flood Forecasting Using High Resolution Radar Data, MSc Thesis, UNESCO-IHE (2009).

Nsubuga, S., Optimizing the operation of water distribution networks, MSc Thesis, UNESCO-IHE (2009).

Mai, T.T.P., Integrated sustainability assessment of stormwater management strategies, MSc Thesis, UNESCO-IHE (2009).

Chen, Y., Integrated Urban Wastewater System Modelling with Conceptual Surrogate Models, MSc Thesis, UNESCO-IHE (2009).

Zhuo, X., Integrated Urban Water Management Under Climate Change: Modelling and Risk Assessment, MSc Thesis, UNESCO-IHE (2008).

Mwalwaka, M., Effects of Model Schematisation, Geometry and Parameter Values on Flood Wave Approximation in Urban Areas, MSc Thesis, UNESCO-IHE (2008).

Farhana, Model-based Urban Flood Disaster Management for Tropical Regions, MSc Thesis, UNESCO-IHE (2008).

Bayevuge, A., A GIS-based Multi-objective Management of Water Quality in Water Distribution Systems, MSc Thesis, UNESCO-IHE (2008).

Chen, P., Flood Hazard Analysis using GIS and Remote Sensing Data, MSc Thesis, UNESCO-IHE (2008).

Fabian, An Algorithmic Framework for Urban Flood Damage Estimation, MSc Thesis, UNESCO-IHE (2008).

Niyonzima, W., Identification and Characterisation of Wetlands in Nile Basin River Using GIS Data, Remote Sensing and Numerical Models, MSc Thesis, UNESCO-IHE (2008).

Chen, C., Urban Flood Risk Assessment with Remote Sensing Data from Satellites and Weather Radars, MSc Thesis, UNESCO-IHE (2008).

Sanchez, A., T., A Demonstrator of a Decision Support system for Integrated Urban Water Management, A Case of Cali, Colombia, MSc Thesis, UNESCO-IHE (2007).

Atekelt A.K., Development and Application of an Optimization Model to Upgrade Urban Stormwater Drainage Network, MSc Thesis, UNESCO-IHE (2007).

Ediriweera, J.C.W., A GIS - based Framework for Urban Flood Modelling and Disaster Management, MSc Thesis, UNESCO-IHE (2007).

Wei, J., Towards a Demonstrator of a Flash Flood Warning System, MSc Thesis, UNESCO-IHE (2007).

Tutulic, D., Flood plain modelling with 1D and 2D models, MSc Thesis, UNESCO-IHE (2007).

Nguyen, K.T.P., Flood Hazard Modeling in Thua Thien Hue Province, Vietnam, MSc Thesis, UNESCO-IHE (2007).

Chiang, P.K., Novel approaches in optimisation of wastewater systems rehabilitation, MSc Thesis, UNESCO-IHE (2006).

Aziz, N.A.B.A., 1D-2D Coupling urban flooding model using radar data in Bangkok City, MSc Thesis, UNESCO-IHE (2006).

Kaushik, C., Urban Flood Modelling: A comparative study of 1D and 2D models, MSc Thesis, UNESCO-IHE (2006).

Abdullah, A.F., WebGIS Flood Information System, MSc Thesis, UNESCO-IHE (2006).

Naz, N.N., Urban Flood Warning System with wireless technology: Case Study of Dhaka City – Bangladesh, MSc Thesis, UNESCO-IHE (2006).

Tumwesigye, E., Towards a New Business Model in Hydroinformatics: A Case of Urban Drainage Models, MSc Thesis, UNESCO-IHE (2005).

INDUSTRY

Prior to joining UNESCO-IHE I worked as a consultant for an international engineering consultancy (Patterson Britton and Partners, Worley Parsons) involved in areas such as: urban infrastructure, water, wastewater & environment, energy, coastal, rivers & estuaries, structural maritime, information & communication technology. My roles ranged from a specialist advisor to waterboards and governments to a multidisciplinary team leader and technical manager for projects which involved modelling and design of various complex water infrastructure systems, software development, hydrologic and hydraulic catchment studies, asset optimisation, data collection and database development and project management.

An overview of professional industry activities (i.e., on-the ground experience) for different categories (advisory, system design and implementation, asset management planning / master planning / catchment management planning / environmental impact assessment) is given in the following figure.

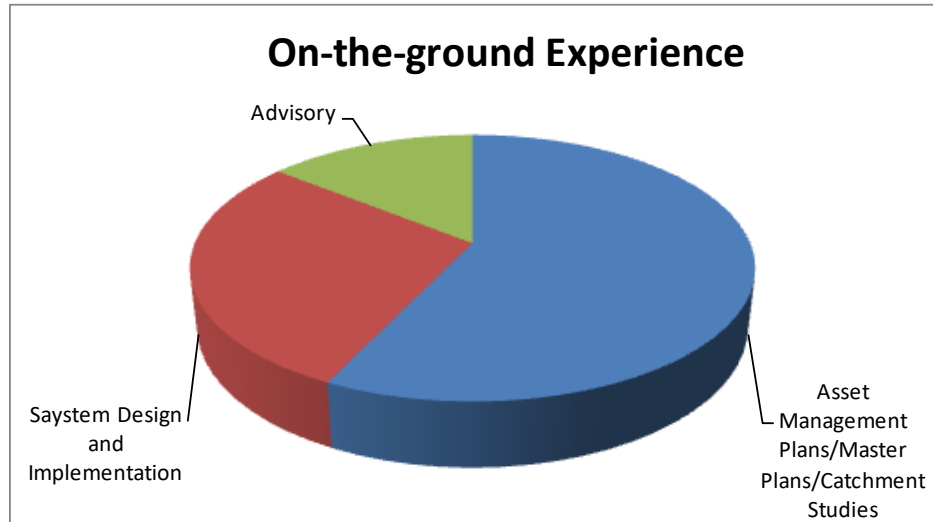


Figure 2: International engineering consultancy experience;

My international engineering consultancy work included the following:

1. Patterson Britton & Partners, Worley Parsons, Sydney, AU (selected activities):

- Technical input into the development of a customised GIS software for the 32 bit Windows environment with a graphical user interface. Applications include GIS system, pre and post processors for various hydrodynamic models, model calibration and verification tools, a flood animation package and a number of data readers and translators.
- Technical input into the 1D Hydrodynamic modelling concerning flood mitigation and development of a 2D framework for Upper Paramatta River, Upper Paramatta River Catchment Trust, Australia.
- Technical input into 2D modelling for Tomago Wetlands. 2D finite element modelling, data analysis and GIS presentation of potential tidal intrusion through tidegates into Tomago wetlands and impacts from Wastewater Treatment Plant effluent flushing in Terranora Creek.
- Technical input into 3D hydrodynamic and water quality modelling for Shell Cove Harbour Project using RMA suit of models and a customised GIS application.
- Technical input into the development of a Mudgee wastewater reticulation system drainage management plan. The project involved development of a comprehensive environmental and catchment management plan and customised GIS application.
- Technical Lead for Yawalpah Road, Pimpama, and Rifle Range Master Plans, Gold Coast City, Australia. The main aspects of these two projects were: development of hydraulic models for flood risk analysis and development of a customised GIS application. This work was undertaken in order to define

the stormwater flows along flow paths draining allotments, flood levels subject to inundation by stormwater under developed and undeveloped catchment conditions, the effectiveness of on-site and regional detention to maintain undeveloped flows, the relationship between the local and regional flood levels, land requirements to provide environmental benefits for the community, fauna movement corridors along the overland flowpaths and watercourses, infrastructure requirements, estimates of associated costs and land acquisition requirements.

2. GHD Pty Ltd, Sydney, AU (selected activities):

- Technical Lead for the development of Sydney Water Sewage Catchment Asset Management Plans (Seaforth, Epping, Rozelle, Sydney East / Sydney West and Edgecliff). These projects form a part of a larger program of wastewater investigation and rehabilitation work, which Sydney Water has negotiated with the New South Wales Environment Protection Agency as an early action program in advance of Wastewater Overflow Licenses. The program aims to develop and prove methodologies for long-term rollout of the Overflow Abatement Strategy. The analyses are performed through numerical modelling of the wastewater system to assess system performance, environmental assessment and comparing system's performance before and after inflow/infiltration rehabilitation works. The final catchment management plans presented within a customised GIS framework provides a comprehensive account of the structural, hydraulic, overflow and environmental analysis of existing wastewater systems.
- Technical Lead for the analysis of St Mary's, Penrith wastewater catchment which serves a total population in excess of 400,000EP. This project is also part of Sydney Water's wastewater overflow abatement program in relation to environmental impacts. The work involved comprehensive catchment analysis to assess if the system meets its environmental license requirements and presentation of results in a customised GIS framework.
- Technical Lead for Edgeworth Catchment Wastewater System Modelling - Investigation and Planning Study (Hunter Water, Australia). The project involved the development of the most optimal servicing strategy from a holistic point of view and to determine the most cost effective means to achieve EPA standards and services to all concerned present and future residents.

3. Metrowater, Auckland, NZ (selected activities):

- Urban Water Systems Modelling Team Leader - Leadership and guidance of four staff members and two consultants.
- Technical Lead for 25M NZ\$ Integrated Catchment Studies (ICS) – ICS was a joint initiative by Auckland City Council and Metrowater which integrated monitoring and modelling systems for stormwater, flooding, groundwater,

water quality, sewer overflows, inflow/infiltration, network performance and remedial works requirements, regional growth and environmental issues. This study has developed a blueprint for Auckland City's water, wastewater and stormwater infrastructure over the next 100 years. The models developed involve various hydrological/hydraulic deterministic, data mining and optimization algorithms and a specialised GIS framework. The results were presented in spatial maps and incorporated into the Information System.

- Technical Lead and primary responsibility for 2.5M NZ\$ Project Backbone – This project involved the development of a wastewater system model and its interaction with stormwater systems, coastal hydrodynamics, environmental impacts and development of a GIS-based framework for presentation of model results.
- Technical input and advisor for Auckland City Council and Metrowater's resource consent application for the continued operation of Auckland City's stormwater, wastewater and combined wastewater and stormwater systems. The input work involved the preparation of a comprehensive Assessment of Environmental Effects ("AEE"). It described the systems and their interrelations, the philosophy behind the management of the systems, an assessment of the environmental effects of the operation of the systems, and outlined plans for future initiatives (March 2001).
- Technical Lead for the development of annual Stormwater and Wastewater Asset Management Plans for several consecutive years.

4. City Design, GHD, MWH, Auckland, NZ (selected activities):

- Modelling and design of Mayers Park Detention Pond.
- Technical design of urban drainage and sewerage networks in numerous catchment areas around Auckland (e.g., Seascape/Waiatarua Catchment Stormwater Separation Project, etc.).
- Technical input into Hydrological / hydraulic analysis and design of the stormwater pipe network system as part of the Forth Street/Customs Street Stormwater Upgrade Project, Auckland, New Zealand.
- Technical input into the Central Business District (CBD) Drainage Management Studies. These studies were carried out to investigate the existing hydraulic conditions in CBD area for designing the upgrading requirements of the existing stormwater and wastewater systems.
- Technical Lead for Freemans Bay Combined Sewer Catchment Study. The purpose for setting up the hydrological/hydraulic model of the Freemans Bay Catchment in Auckland City was to evaluate the capacity of existing combined stormwater/wastewater system for its use as a stormwater drainage system after separation. This project was a part of the Auckland City's America's Cup separation programme.

- Technical input into the Strategic Stormwater Separation Study: The Freemans Bay Catchment. A joint venture study between City Design and Montgomery Watson Harza (MWH) to address the main strategic issues which relate to the City's stormwater separation policy. The results were presented in a Mapinfo GIS environment.
- Technical input into the design of the wastewater pipe network system for the Freemans Bay Catchment Separation Project.
- Technical input into Oakley Creek bank protection study, Auckland, New Zealand.
- Technical input into the America's Cup Viaduct Basin Modelling and Drainage System Design. The purpose of this project was to determine primary and secondary flow capacities for the proposed stormwater diversion pipe system. The hydrodynamic model of this area has been developed and incorporated into the Freemans Bay stormwater model to determine the effects of surcharging and overland flow analysis for 1% and 10% AEP. The outcome from this work was used for design purposes of the stormwater diversion project.
- Technical input into Mt Wellington South Catchment Drainage Management Plan. Comprehensive hydrological/hydraulic catchment analysis was carried out in order to investigate existing wastewater and stormwater systems for future development and to identify possible problem areas and suggest remedial options.
- Technical input into Motions Catchment Drainage Management Plan. Extensive hydrological/hydraulic catchment analysis was carried out to analyze the behavioral operation of combined wastewater overflows under different design storm durations. The results from this project were used for sizing treatment facilities like swirl separators.
- Technical input into Opanuku Stream Flood Plain Mapping Study, Waitakere City, New Zealand. The flood risk maps produced were incorporated within the Waitakere City's Intranet/Information System.
- Technical input into Carbine Rd Wastewater Catchment Study. Study involved flow monitoring of critical pipes and hydrological/hydraulic modelling to examine the effects of wet weather flow and maximum probable development.
- Technical input into Mt Eden East Wastewater Catchment Study. The purpose of undertaking comprehensive hydrological/hydraulic analysis was to provide a catchment management strategy for upgrading and asset renewal of the Mt Eden East wastewater drainage network.
- Technical input into the design and upgrade of Endeavour and Webber wastewater pumping stations, Auckland, New Zealand.
- Technical input into various investigation and design activities of the Auckland City's stormwater and wastewater systems (primary and

secondary stormwater systems, detention ponds, wastewater pipe network systems, pumping stations, etc.).

5. Advisory Projects at UNESCO-IHE (selected activities):

- Provision of technical advice in relation to flood crisis which occurred in Bangkok in October-November 2011. In October 2011, I was invited to give a key note speech concerning flood risk mitigation at the PNC2011 conference in Thailand. While participating at the conference, I was asked to assist the Thai government in dealings with the flood crisis. In this occasion I was working closely with Hydro and Agro Informatics Institute (which are part of the Ministry of Science and Technology) and discussing potential disaster management measures. Further to this, I was invited by the UNESCO Bangkok office and Thai government to join the group of international experts for post-flood fact-finding mission organized in November 2011. That mission involved extensive field visits to most of the sites which were affected by floods in the Ayutthaya/Bangkok region and assessment of flood impacts. At the end of the mission, I presented the findings concerning water resources and flood mitigation issues to the government officials. This led to the full scale flood risk assessment project (see the following bullet point). <http://www.unesco-ihe.org/About/News/Project-launch-Flood-Risk-Mitigation-Plan-Ayutthaya-World-Heritage-Site>.
- Flood Risk Assessment and Development of a Disaster Risk Mitigation Plan for the Historic City of Ayutthaya (Thailand) Project. Following the post-flood fact-finding mission in November 2011 in Thailand I managed to obtain the funds for this project started which in 2013. It aims to develop a preliminary plan for disaster risk reduction at the Historic City of Ayutthaya World Heritage. The work ranges from the technical analysis of drainage and river networks to environmental impact assessment and dealings with stakeholders through risk perception and qualitative risk analysis. The risk assessment is approached as a product of climate induced hazard and four-dimensional vulnerability analysis (physical, economic, social and cultural). One of the unique features of this project is the framework which encompasses cultural and environmental dimension of vulnerability which is an intangible feature of the overall site vulnerability. The plan that will be developed will be the first ever flood disaster risk management plan for World Heritage sites.
- Adviser to ADB's Green Cities Initiative Working Group on the development and implementation of holistic flood management. The Green Cities Initiative promotes measures which are not only capable of bringing the 'green' context to a city but also which are capable of improving planning, transport, energy efficiency, industrial metabolism including water supply and distribution as well as drainage and sewerage services (i.e., measures that aim to maximise ecosystem services, minimise environmental footprint

and increase the cities' adaptive capacity to changing climate, demographic and socio-economic conditions).

- Technical Lead for the Development of Wastewater Management Expert System (WAMEX) for ADB. ADB, together with UNESCO-IHE, is developing WAMEX as a freeware that aims to help decision-makers and planners to develop options for addressing various scenarios related to wastewater management. This software is useful for the planning of new systems, upgrading of existing systems and preparing budgets and cost assessment. It also allows users to build their own “what-if” scenarios, enabling them to explore many different schemes and options. The freeware includes a list of conventional and emerging technologies consistent with ADB's thrust of promoting innovations in wastewater. It also has an intuitive built-in GIS functionality that enables users to set up and assess different wastewater reticulation options and find their optimal solutions in relation to environmental impacts. I have given numerous presentations and trainings sessions about this development and participants find the tool very helpful in making informed decisions about wastewater investments and requested ADB and UNESCO-IHE to consider doing a follow-up training at the country level to allow more people to participate. The two Metro Manila private concessionaires have already included this tool in their current work practices. Also, many planners, engineers and middle managers from Bangladesh, Bhutan, Indonesia, Mongolia, Myanmar, Philippines, Sri Lanka and Viet Nam have started using WAMEX tool.
- Provision of Technical Advice to UNDP/EU's on Flood Risk Assessment for Eleven Caribbean Islands. The project addresses risks from various kinds of floods: inland, fluvial, coastal, storm surges and tsunamis. It also concerns development of infrastructure mitigation measures including an early warning system and production of disaster risk management plans.
- Development of On-line Learning Modules. The modules cover urban water systems and development of case study material from cities around the world (e.g., EU, Thailand, Bangladesh, Brazil, Caribbean, etc.). The work involves development of web-based learning facilities and formulation of real-life case studies.
- Coordinator and Technical Research Leader for SWITCH Project. This involves work package concerning modelling and development of a decision support system, Work Package 1.2 of the EU funded research project SWITCH. The work involved development of modelling and GIS-based DSS for urban water systems management for 10 demonstration cities: Hamburg, Birmingham, Lodz, Zaragoza, Tel Aviv, Alexandria, Accra, Beijing, Chongqing and Belo Horizonte. <http://www.switchurbanwater.eu/>
- Technical Lead for St Maarten's Flood Mitigation Project. This project attempts to define a blueprint for stormwater/flooding/environmental management on St Maarten. More specifically, it involves the development of a 1D hydrodynamic model of the entire stormwater system and 2D GIS

framework to analyse various scenarios and hazards related to the management of stormwater on the island territory of St. Maarten. It also involves the assessment of various environmental aspects as well as structural and non-structural flood mitigation options and development of an early warning system. Outputs are: identification of optimal structural/non-structural flood management measures, flood risk maps, integration of flood risk maps within the Island wide information system, a pilot early warning system, dissemination of results and local capacity building. The latest work involves the assessment of deep sea sewerage outfall. Technical lead for the UNESCO-IHE Internal Research Project: This involves the Dynamic Least-Cost Global Optimisation of Wastewater Systems Remedial Works Requirements.

- QA Research Methodology Advisor and Contributor to the EU-funded Hydroplan Urban Infrastructure Asset Planning. This involves development of novel tools and sharing of information, knowledge and experiences of practitioners in infrastructure asset management in: Leuven, Belgium; Meath, Ireland; Imperia, Italy; and Thessaloniki and Athens, Greece. The main aspects of the project are: development of sustainable measures, strategic impact analysis, field survey of critical assets, and structural, hydraulic and environmental risk assessment for these five cities. In addition, the project involved the development of Internet-based collaborative working platform, BSCW (Basic Support for Collaborative Working) and model-based decision support systems for water distribution and drainage networks.
- Technical lead for the development of OPTimal REhabilitation of Sewer Systems software (OPTRESS). OPTRESS® is a decision support system which demonstrates the new approach for rehabilitation of drainage infrastructure assets. The methodology embedded within the algorithms of OPTRESS® can be used to derive optimal sets of either wastewater or stormwater rehabilitation measures with respect to environmental standards, total life cycle cost of new assets and the existing asset condition.
- Advisor and Member of the Steering Team for GIS Implementation for the River Sava Basin Project, EU Water Framework Directive. The responsibility of UNESCO-IHE in this project was in relation to capacity building of beneficiary organisations with regard to EC-CS guidelines for implementing the EC Water Framework Directive, coordinating activities related to the testing of the EC guidelines in three pilot river basins by the beneficiaries' experts and training.

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