

# *Curriculum Vitae*

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**Name:** AMGAD ELMAHDI

**Profession:** Unit Head: Water Balance

**Key expert:** Integrated Water Resource Management, IWRM

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## **Fields of Special Competence:**

Fourteen years experience in hydrology and water management. This experience has included research on various aspects of integrated water resource management: (1) modelling of surface water systems management, (2) Modelling of urban water distribution system; (3) Modelling of irrigation distribution networks; (4) Modelling of supply and demand management; (5) Forest management and catchment water yield (6) developing DSS (Decision Support System) for groundwater and surface water sustainable use and strategy and (7) water allocation between competing uses at the catchment level.; (8) Water banking and underground storage for irrigation and drainage management; (9) Multi-Agency management framework for sustainable management and land-use planning, (10) Geographical Information Systems (GIS) and water information database

Recently, I conducted research on developing DSS for the development of groundwater system sustainable strategies in Western Australia and improving recharge with changing land-use. This research focuses on the options for improving harmonisation of the groundwater systems within catchment landscape futures scenarios.

More recently, I appointed by the Foundation for Research Science and Technology in **New Zealand** as one of the international science expert members of Advisory Group of experts (in total five members) for integrated water resource management and water future scenarios to assess concepts (1<sup>st</sup> Stage) and full proposals (2<sup>nd</sup> Stage) over the next year (\$50m Investment Round).

## **Science/Professional Areas**

- Integrated water resources and river basin management
- Urban water systems balance
- Multi-Agency management frameworks for sustainable use and management
- Surface and groundwater decision support system
- Climate variability and climate change research linked with agricultural water management
- Hydrological economics and biophysical relationship

- Surface-groundwater interaction and water quality management and modelling.
- GIS and remote sensing applications in spatial hydrology
- Multi-criteria analysis

### Academic Qualifications

- Ph.D. Water Resource Management, University of Melbourne, Australia
- M.Sc. Land & Water Management, 2000, MAIB Mediterranean Agronomic Institute of Bari, Italy
- PG Diploma Environmental Conservation and Renewable Resources, 1998, DSPU, Mediterranean Agronomic Institute of Chania, Greece
- M.Sc. Water-Ecological studies, 1996, University of Mansoura, Egypt
- B.Sc. Bachelor of Science, 1993, University of Mansoura, Egypt

### Professional Affiliations

- Member in IGU International geographical union, Arlington, Va 22207-3805, USA.
- Member in IEAust
- Member in ISAust
- Member in EES (Environmental Engineering Society)
- Member of UMPA University of Melbourne Postgraduate Association
- Member of the (NBCBN-RE) Nile Basin capacity building Network- Regional research Cluster on GIS and Modelling: Applications in river Engineering-2002 till present ([http:// www.nbcbn.com](http://www.nbcbn.com)).

### Professional Awards, and Honours

- 2008: **The ICID (International Commission of Irrigation and Drainage) WatSave Award** in the Young Professional category.
- 2008: **Listed in the Inaugural Edition of Who's Who in South Australia.**
- 2007: **CSIRO Land and Water Division Strategic Excellence Award** for Partnership.
- 2007: **All of CSIRO Strategic Excellence Award** for Partnership.
- 2006: **Best paper and presentation** at ERE (Environmental Research Event) conference, Sydney Dec 2006.
- 2006: **Australian Harmony Hero awarded** from DIMIA and SBS (<http://www20.sbs.com.au/harmonyheroes/>).
- 2005: **Centre for Research and Development leadership scholarship** for the 2005 CRC Leadership and Career Development.
- 2004: **Best paper and presentation** at International Natural Resource Modelling Conference, Melbourne Dec 2004.
- 2004: **Top-Up** and Operating Cost Scholarships February 2005-February 2007. Cooperative Research Centre-for Irrigation Futures **CRC-IF**.
- 2003: **(MIRS)** Melbourne International Research Scholarship and (IPRS) International Postgraduate Research Scholarships (2003): Australian government granted scholarships allocated to The University of Melbourne.
- 2003: **Best Master Thesis** in Water Resources Management (July 2003). Awarded by the Ministry of Water Resources and Irrigation, Egypt.
- 1999: **MSc Scholarship awarded** by the International Centre for Advanced Mediterranean Agronomic Studies, Italy.
- 1997: **GD Graduate Diploma Scholarship awarded** by the International Centre for Advanced Mediterranean Agronomic Studies (CIHEAM), Greece.

### Extracurricular Expertise

- IRBM, Integrated River Basin Management organised by UNESCO-ISI (July-August 2009, Beijing-China).
- CRC-CH Toolkit School (IQQM) modelling River basin July 2005, Sydney- Australia.
- CRC Leadership and Career Development Course, August 2005, Melbourne- Australia.
- Environmental Impact Assessment Certificate. School of Planning and Biological & Molecular Sciences-Oxford Brookes University. (1998)

- Intelligent Techniques for Spatial-Temporal Data Analysis in Environmental Applications “MACHINE LEARNING AND APPLICATIONS” Advanced Course on Artificial Intelligence 1999 Chania, Greece (13-16 July 1999)
- Alternative sources of water for irrigation: influence of technical, economic and environmental factors. Iamz, Ciheam, Span. Short Course (10 – 14 Dec 2001)
- Image Processing Technologies for Industrial Pollution Monitoring in the Mediterranean Coastal Areas ICS-UNIDO United nation Industrial development Organization-Trieste, Italy. (23/11/1998 - 27/11/1998)
- Decision Support System for Water Resources Planning Based on Environmental Balance (Workshop). Participant and member of the organising and technical committee, Port Said, (1998)
- First Regional Conference Geographical Information System Cairo 28-29 April 2002 (GIS and regional Integrated) Cairo-Egypt 2002.
- Short course on “Environmental Remote sensing” . Technical University of Crete- Greece. (10/1998 - 10/1998)
- Exploratory data analysis using J.M.P program. Workshop ran by Pr A. Mavroustakos, University of Arkansas, USA. (25-27 May 1999)
- Landscape Ecology; principles and Application in the Mediterranean Region . Beirut- Lebanon. (20/09-02/10/1999 )
- Workshop on Decision Support System for Water Resources Planning Based on Environmental Balance, participant and member of the organising and technical committee, Cairo, 2002.
- Workshop on (NBCBN-RE) Nile Basin Capacity Building Network for River Engineering- May 2002.
- Training on the use of the Global Positioning System (GPS), Cairo, 1999.
- First regional Workshop on Capacity Building in GIS and Modelling 26-29 January 2003 Flamenco Hotel Cairo-Egypt.
- Plant Sciences: Perspectives beyond 2000 Sponsors, Research Workshop American Society of plant physiologists –Greece (4-16 July 1999) .

### Computer Skills

- Programming: Stella, Vensim, Anylogic, Visual Basic 6
- GIS: ArcGIS 8.3 (ESRI), Arcview 3.2 (ESRI), Idrisi , Erdas Imagine GRASS
- Software development: (TIME)The invisible Modelling Environment
- Advanced Visual Systems (AVS)
- MS OFFICE : Word, Excel, Access, PowerPoint, MS Publisher, MS Photo Editor
- CAD: AutoCAD 2000 for Windows.
- Premier Adobe 5 and Adobe Photoshop 6.
- Computer networking systems, Local Area Network (LAN)
- Statistics: SPSS and Syntax (Quantitative Environmental Analysis Program), MCE Multi-Criteria Evaluation analysis.

### Other Experience

- Supervising 2 PhD students and 2 MSc students from Netherland, Iran, Egypt and Australia.
- Attracted international visitors (3 scientific visitors at CSIRO last year).
- Developed a multi-criteria evaluation technique on environmental balance and multi-variance analysis.
- Contributed to the development of the **Multilingual Multi script Plant Name Database MMPND** ([http://www.plantnames.unimelb.edu.au/Sorting/Arabic\\_index.html](http://www.plantnames.unimelb.edu.au/Sorting/Arabic_index.html)).
- Participated in preparations for several workshops and international conferences.
- Biological assessment of water quality.
- Hydro-biological assessment of water algae (e.g. Algae Classification – Bacteria – Physiology- Virology- Plant taxonomy).

- Physical and chemical analysis of soil and water quality.
- Plant water treatment station.

## **Employment Experience**

**2010 (Feb) – Present Unit Head: Water Balance**

### **Climate and Water Division- Bureau of Meteorology**

My role as a Manager for Urban Water Balance Unit and Supervising Hydrologist within Water Resources Assessment Section within Water Information Services Branch is :

- to help ensure the goals of the Water Resources Assessment Section and Water Information Services Branch are achieved by successfully leading and managing the Urban Water Balance Unit and its outputs;
- to build capacity among Urban Water Balance Unit staff to perform and conduct urban water balances and urban water resource assessments.
- to provide high quality urban water system analysis and reporting services by developing the concept of UrbanSAT (Urban system analysis template) in a timely manner and based on the best available science and data.
- to help enhance the processes, science and technology base of the Bureau's water information services in water resources assessment and urban water balance contexts.

**2007(Jan) - 2010 (Jan) Research Scientist (Water Systems Analyst)**

### **CSIRO land and water Adelaide-Australia**

#### **Project Completed**

#### **Project 1 : Helping landholders adapt to climate change and variable resource availability in Riverland-South Australia**

CSIRO's Water for a Healthy Country Flagship and Loxton LAP have been contracted by the federal Department of Agriculture, Fisheries and Forestry to work with local communities, growers, scientists, and natural resource managers to find out the most realistic management and adaptation strategies to deal with a drier future. This project aims to help scientists better understand ways to deal with what climate change and climate variability will mean for our farms, our district and our region. The work will take place in the Bookpurnong and Pyap to Kingston on Murray Land and Water Management Planning Regions in South Australia's Riverland. A number of options and scenarios will be developed based on local consultations with local irrigation groups, drawing on their specialised knowledge. Free computer-based decision tools to help evaluate the impact of local chosen scenarios will be developed and made available as part of the project.

My role as project leader in this project:

- Consult local communities through a series of workshops to identify a list of adaptation options of interest for further evaluation.
- Working with NRM managers and focus group to develop 2-3 local sensible future scenarios for further analysis.
- Development of two studies through the downscaling of the Lower Murray Landscape Futures Project (LMLF) triple bottom line analysis and evaluation.
- Developing a dynamic interactive learning and scenario analysis tool ILSA (Integrated biophysical-hydro-economic model) using the data collected in the first two phases and from Lower Murray Landscape Future project.

- initiate and conduct a series of interactive workshop sessions; to introduce the ‘what if scenarios’ and analyse and evaluate the triple bottom line impacts analysis to understand the consequences of adaptation strategies and individual decision making using ILSA.

## **Project 2: Informing MDB water policy with integrated modelling and policy analysis**

The CSIRO is about to release full results of new and comprehensive estimates of MDB water availability. The results are likely to show that in the future less water will be available in the MDB. There is an urgent need to systematically evaluate the triple bottom line (economic, environmental, and social) implication of options to manage the MDB with less water.

My role as research scientist in this project involves:

- Develop an integrated system model for MDB (44 catchments) including four main modules in each catchment (rainfall-runoff module, river flow and dam storage module, irrigation demand module and rainfed agricultural and vegetation module) to account for baseline or likely economic impacts on irrigated agriculture, and residual water available for the environment with no changes in water allocation policy and no further public investment; and to accounting for the current starting point with virtually no dam storage and five to ten year scenarios representing a range of plausible in-flow sequences, assumptions regarding climate, catchment runoff interception with farm dams and forestry.
- Test a range of basin scale policy. Two areas of emphasis: (1) policy to enhance value of limited water supply – markets, carry-over, changing security pools; (2) strategies for irrigation sector structural adjustment – buy water; on farm and conveyance infrastructure investments, compulsory water acquisitions.
- Engage with key stakeholders involved in the project to determine policy options and scenarios for future planning

## **Project 3 : Vegetation dynamics and water yield under chanign climate and management project- Western Australia**

The decline in both rainfall and recharge to the Gnamagara Groundwater Mound (GM) has put Western Australia’s water resources in a critical state. Modelling suggests that increased fire frequency in native vegetation could provide an additional 40GL per year, valued at \$400M as a water resource by priceless for the groundwater dependent ecosystems, including threatened wetlands on the Gnamagara Mound. This project will quantify the recharge under native woodland following fire and will contribute significant data to the GSS project “Quantitative Analysis and Integration of Land Use and Water Management Scenarios” led by CSIRO. This project goal is reducing uncertainty in determining available water resources by quantifying recharge under the major land use over Perth's major water supply, the Gnamagara Mound. It will provide the data to assess a proposal to increase recharge by increasing fire frequency in the area. There are no current measurements of recharge to the groundwater under the native bushland which is the major land use in the region. It will directly contribute to goals of the Forest Water Use Stream, through determination of the water use (interception) by the native forest and the changes to water use resulting from fire. Over the longer term it will help determine water resource availability under changed climate.

My role as research scientist in this project:

- Provide conceptual, modelling and reporting for forest management team.
- Develop a prototype system model for analysing the competing demands of forest wood yield, water yield and forest structure. This will involve integration of forest structure and growth with water use and catchment water yield. This system model will be used to provide quantitative assessments of tested climate change and land management options.

## **Project 4 : Quantitative analysis and integration of land use and water management scenarios Gnamagara mound groundwater system-Perth Australia**

This project seeks to develop a decision support system (DSS) or a suite of decision support tools (DSTs)

that will integrate physical, economic and social information to provide quantitative assessments of priority land and water management options at the local area level. It will also perform economic analyses to inform policy makers and add to the economic and behavioural modules of the decision support system. The economic analyses will include valuation studies to suggest best mitigation options, derive resiliency measures and elicit behavioural responses of concerned agents through experiments.

My role as research scientist in this project:

- Develop a decision support system (DSS) or a suite of decision support tools (DSTs) that will integrate physical, economic and social information to provide quantitative assessments of priority land and water management options at the local area level.
- Engage with stakeholders involved in the project (DOW, WC, DEC, FMLC, etc) in the process to define the best and suitable indicators, scenarios and options for sustainable strategy of groundwater system through DSS.
- Building capacity for decision maker at each organization to populate the DSS for decision processes.
- Perform economic analyses to inform policy makers and add to the economic and behavioural modules of the decision support system (DSS). The economic analyses will include valuation studies to suggest best mitigation options, derive resiliency measures and elicit behavioural responses of concerned agents through experiments.

### **Project 5 : Lower Murray landscap futures (LMLF)**

The Lower Murray Landscape Futures (LMLF) project is a collaborative and multi-regional endeavour that brings together a partnership of agencies concerned with natural resource management in the Lower Murray. It is a tri-state, multi-organisation, and multi-region research collaboration within the lower Murray-Darling Basin, Australia. The aims of the LMLF Project are to:

- Analyse the impact of existing regional natural resource management plans and investment strategies, with consideration given to community well-being (social, economic and environmental outcomes), and
- Explore future options and scenarios for the Lower Murray in partnership with stakeholders in the region.
- The motivation is to build capacity to enable regional communities to explore alternative social, economic and environmental landscapes interactions, leading to improved outcomes from investment by regional planning groups, communities, industry and government responsible for NRM in the region.

### **Project 6 : Targeting environmental flow sourcing for multiple benefits MBI**

This MBI proposal describes an on-ground feasibility assessment of cost effective environmental water procurement in partnership with CSIRO, Goulburn Murray Water, The Murray Darling Basin Commission and the Department of Sustainability and Environment. The objective of this MBI pilot is to develop an auction mechanism to facilitate efficient sourcing of complex packages of multiple benefits of value to multiple agencies. Based on sound science the pilot will develop a package suitable for consideration by the National Water Commission and MDBC to strategically invest in environmental water procurement with additional benefits of salinity reduction and reduced cost of irrigation system reconfiguration.

## **Before joining CSIRO**

**2003( Augst)- 2006 (Dec )**

**International Development Technologies Centre, Civil and Environmental Engineering Department, The University of Melbourne, Australia**

I was involved as PhD researcher in the following research projects:

**Project : Improved Seasonality of Flows through Irrigation Demand Management and System Harmonisation**

This project identifies opportunities to manipulate irrigation demand and supply in a way which optimizes the social, environmental and economic outputs from all available water resources within a catchment. This may involve cross seasonal cropping mix incentives, groundwater-surface water substitution, intra- and inter-seasonal water trading and harmonization of on- and off-farm storage, distribution, application and drainage infrastructure. Ultimately farm, scheme and catchment managers will be in a position to collectively optimize water resource management and investment decisions within a triple bottom line framework at both the short term tactical and long term strategic levels.

**Role: Improving the Seasonality of Flows in the Murrumbidgee River through Better Irrigation Demand Management and Conjunctive Water Management at the irrigation areas level.**

The Aims of the project are:

- To establish new knowledge to link irrigation demand and conjunctive water use management with environmental outcomes at irrigation areas scale in the Murrumbidgee Catchment.
- To Help understand how to improve environmental quality of Murrumbidgee River through better irrigation demand management and water trading.
- Using System Dynamics approach with Multi objective optimization approach, Spatial data and modelling data to develop an integrated Hydrological Economic Model to help land and water managers take the decision and study the trade-off between the triple bottom lines (Environmental, Social and Economic).

Briefly, the major drive for understanding the link between irrigation demand, conjunctive water management and water bank with environmental outcomes is to measure and identify the change in economic output and environmental impacts of various allocations and demands from irrigation on improved seasonality of flows.

**Adjuncts and Fellow positions at university**

- 2007-present: Adjuncts researcher: The Institute for Land, Water and Society at Charles Sturt University, Australia.
- 2008-present Honorary Fellow: Department of Civil and Environmental Engineering- University of Melbourne, Australia

**1999 (Oct) – 2003 (July) Researcher (Hydrologist & GIS Specialist)**

**National Water Research Centre (Nwrc) - Strategic Research Unit (Sru) – Ministry Of Water Resources And Irrigation - Egypt**

Strategic Research Unit (SRU) is established research unit in collaboration with the Italian Cooperation Agency for Development, the Italian Ministry of Foreign Affairs, the Italian Embassy in Cairo, and the Egyptian Environmental Affairs Agency (EEAA).

**Project:: *Decision Support System for Water Resources Planning Based on Environmental Balance***

Under, the Egyptian-Italian Environmental Cooperation Program (EIECP) is carried out within the framework of donor initiatives aimed at assisting the Country in the implementation of the National Environmental Action Plan (NEAP). Decision Support System for Water Resources Management based on Environmental Balance (DSS): this component aims at designing an informatics model to support the relevant Egyptian institutions, EEAA and the Ministry for Water Resources and Irrigation (MWR&I), to make informed decisions on water management. This component stems from the growing awareness in Egyptian development thinking that the sustainable management of water resources is crucial to a lasting improvement of the Egyptian people's livelihoods. It has also been acknowledged that water is a limiting factor for economic growth and that uncertainty (hydrological stochastic pattern and future demand), environmental and socio-economic aspects, and political issues (strategies, restrictions) have to be taken into account and harmonized through more sophisticated decision support tools to be used by planners. In particular, actions that are designed to solve the problems of intercrossing relationships often fail to take into consideration their cumulative effects.

**MyRole:**

- Development of a computer-based tool for decision making that would allow the analyse , evaluation and the stimulation of a wider and more integrated perspective in the planning process, as well as fostering the multi-actor dialogue.
- Design and implementation of User Interface for water resources (surface and ground) management, Using AVENU language.
- Develops and tests surface and ground water models of the water environment using knowledge of ecology, mathematics, statistics and physical sciences.
- Contribution to the capacitybuilding of the researchers and decision-makers of the National Water Research Center (NWRC), the EEAA and the Planning Sector of the Ministry of Water Resources and Irrigation (MWRI-PS).
- Liaise with the Italian consultants and the potential expatriate agencies and governmental bodies for data dissemination and verification.
- Responsible for the GIS Lab established within Strategic Research unit.
- Assess the Environmental impacts of development policy and land use change using land information system.

**1998 – 1999 Research Associate, GIS and Remote sensing Modelling**

**Maich institute. Chania- crete- Greece.**

**My Role:**

- Assist in the Research for Environmental Conservation group (surface and ground water contamination) and build land use maps, climatic map, hydrological maps, etc.
- Extraction of spatial information data related to water and Environmental system from various databases.
- Write reports documenting results of different projects. Assist in Lecturing GIS courses

**1994 - 1997 Assistant Lecturer**

**Mansoura University, Faculty Of Science -Egypt**

**My Role:**

- Tutoring graduate and postgraduate Subjects.
- Supervise of the Water pollution lab (chemical and biological analysis).
- Preparation of research papers, reports and documentation of practical problems and activities conducted under the supervision of professors and senior research staff

## **International Projects Experience**

I was involved in working on different research projects with interdisciplinary teams in international organizations.

**2003- present (Researcher)**

**NBCBN PROJECT** ([http// www.nbcbn.com](http://www.nbcbn.com)) **Nile Basin Capacity Building Network- River Engineering (Funding Agency: Dutch Government and the World Bank (BNPP-funds) through the NBI-Secretariat- Under Nile Basin initiative.**

Researcher in Regional Research Cluster on **GIS and Modelling:**

This project aims are:

- To facilitate and regionalize joint research on River Engineering in the Nile basin countries.
- To connect specialized institutes and experts in the field of River and Hydraulic Engineering.
- To enhance communication between these experts and institutions.
- To improve the accessibility of water education and training in River Engineering in the region.
- To raise awareness among politicians and professionals active in this field.
- To set up a regional information centre and database that can be easily accessed by all users.

2002- 2003 Researcher

### NAWQAM Project - National Water Quality And Availability Management

Joint Canadian- Egyptian water quality programme project to improve water data storage, data retrieval and data analysis through greater management of GIS databases in order to improve implementation and dissemination of water information by the Egyptian National Water Research centre to / from stakeholder in a form suitable for influencing policy dialogue and policy formulation.

My Role:

- Design of a Graphical user interface for Egyptian water quality index, water monitoring locations as point source and non point sources.
- Building a Nile River Water spatial database
- River Data Collection (e.g Water depth, River Depth profiling; heights, times of flow and water stages; and location of topographic features and fixed objects for survey and navigation purposes.

### RECENT PUBLICATIONS

Selected  
Publications

#### Peer-Refereed Scientific Journal Publications

1. **Elmahdi, A.**, and McFarlane, D. (2010) Integrated multi-agency framework MAF: sustainable water resource management. Accepted at Journal of Water Resources Planning and Management 2010.
2. Xiao-jun Wang, Jian-yun Zhang, Jiu-fu Liu, Guo-qing Wang, Rui-min He, **Amgad Elmahdi** and Sondoss Elsawah (2010) Water resources planning and management based on system dynamics: a case study of Yulin city. *Environment, Development and Sustainability*, 2010.
3. Doble, R., Stenson, M., **Elmahdi, A.**, Pickett, T., Jolly, I., Miles, M., Connor, J. and Walker, G. (2009). Integrating biophysical models to assess land and water management impacts on riverine quality of the lower River Murray. Submitted to *Environmental Modelling and Software* 2008.
4. **Elmahdi, A.**, Connor, J. Doble, R., Jolly, I., Stenson, M., Pickett, T., Miles, M., and Walker, G. (in review). Present and Future Frequency Increase in River Salinity of the lower River Murray, South Eastern Australia – A System Analysis Approach Submitted to *Environmental Modelling and Software* 2008.
5. **Elmahdi, A.**, Malano, H. and Etchells, T. (2008) Water Banking and Irrigation Demand Management Approach to Improve River Productivity and Environmental Performance *Water Resour Manage* (2008) **(accepted)**
6. **Amgad Elmahdi** "Water Banking –Landuse Approach to Improve River Productivity and Environmental Performance" *National Nile Basin Commission Journal* Vol1 (2008) (Invited paper).
7. **Elmahdi, A.**, Shahkarami, N., Morid, S<sup>2</sup> and Massah Bavani, A.R (2009) Atmospheric-Ocean General Circulation Models (AOGCMs)- Uncertainty and Risk Assessment Of Future Water Demand" *National Nile Basin Commission Journal* Vol2 (2009) (invited paper).
8. **Elmahdi, A.**, Afify, A. and Abdin, A. (2008) 'Development of a GIS-based decision support tool and assessment of Nile River water quality', *Int. J. Water*, Vol. 4, No. 1, pp.55-68.
9. **Elmahdi, A** (2007) Irrigation Research" is underground the new water-storage solution?" *Journal of Irrigation Australia* 2007 Vol 23 No. 03, pp 21-24.
10. **Elmahdi, A.**, Malano, H. and Etchells, T. (2007) System dynamics and Auto- calibration framework for NSM Model: Murrumbidgee River. *Int. J. Water*, Vol. 3, No. 4, pp.381–396.
11. **Elmahdi, A.**, H. Malano and T. Etchells (2007) Using System Dynamics to Model Water Reallocation, *Environmentalist journal* 2007, vol 27 , No. 1, pp 3-12 (<http://dx.doi.org/10.1007/s10669-007-9010-2>).
12. **Amgad Elmahdi** and Assem Afify (2007) Development of a GIS tool for Qualitative

Assessment of the Egyptian's Quality of Life, *Environmentalist journal* 2007 vol 27 , No. 1, pp183-194 (<http://dx.doi.org/10.1007/s10669-007-9028-5>).

13. **Elmahdi, A.**, Malano, H. and Etchells, T. (2007) System dynamics and Auto- calibration framework for NSM Model: Murrumbidgee River. *Int. J. Water*, Vol. 3, No. 4, pp.381–396.
14. **Elmahdi, A.** Malano H, and Khan, S. (2006).Using A System Dynamics Approach to Model Sustainability Indicator for the Irrigation system-Australia, *Natural Resource Modelling Journal* Vol 19.no.4, winter 2006. <http://rmmc.asu.edu/abstracts/nrm/vol19-4/elmapag1.pdf>
15. **Elmahdi, A.**, Kheireldin, K.and Hamdy,A (2006) GIS and Multi-Criteria Evaluation: Robust Tools for Integrated Water Resources Management.2006 *International Water Resources Association IWR4*, Vol 31. No. 4 Dec 2006.
16. Afify A, Alaa E. Abdin and **Elmahdi, A** (2004), Development of a GIS-based Decision Support Tool For the Assessment of Nile River Water Quality, *NWRC journal*, 2004,Vol 2.
17. **Elmahdi A.**, Kheireldin K., Hamdy A. (2003), *Integration of GIS and multicriteria techniques for water resources management in Egypt*, Camarda D. and Grassini L. (eds.), Local Resources and Global Trades: Environments and Agriculture in the Mediterranean Region, Bari, CIHEAM *Option Mediterraneennes*, n.57, pp. 399-408
18. **Elmahdi, A** et al (2001), *Amalgamation of GIS and Multi-Criteria Evaluation Techniques to Manage the Water Resources on an Integrated Level*, .  
[http://www.iamb.it/incosusw/abstract\\_Rabat.htm](http://www.iamb.it/incosusw/abstract_Rabat.htm)

## Peer-Reviewed Conference Papers

1. **Elmahdi, A.**, and McFarlane, D. (2010) DSS and MAF (Multi-agencies framework) for sustainable water management .International Environmental Modelling and Software Society (iEMSS,) 2010 International Congress on Environmental Modelling and Software Modelling for Environment's Sake, Fifth Biennial Meeting, Ottawa, Canada David A. Swayne, Wanhong Yang, A. A. Voinov, A. Rizzoli, T. Filatova (Eds.)  
<http://www.iemss.org/iemss2010/index.php?n=Main.Proceedings>
2. **Elmahdi, A.**, and McFarlane, D. (2009) A decision support system for a groundwater system Case Study: Gngara Sustainability Strategy -Western Australia MODSIM09International Congress on Modelling and Simulation. Modelling and Simulation Society of Australia and New Zealand, July 2009.
3. **Elmahdi, A.**, M. Mainuddin, and M. Kirby, D. (2009) Water Balance Dynamic Simulation Model-WBDSim for Water Policy options Analysis. Case Study: Murray Darling Basin – Australia MODSIM09International Congress on Modelling and Simulation. Modelling and Simulation Society of Australia and New Zealand, July 2009.
4. **Elmahdi, A** (2009) Modelling the Trade-offs Between Irrigation and Environmental Flows. Case Study: Murrumbidgee River Catchment - Australia MODSIM09International Congress on Modelling and Simulation. Modelling and Simulation Society of Australia and New Zealand, July 2009.
5. **Elmahdi, A.**, and **McFarlane, D.** (2009) A decision support system for Sustainable Groundwater Management Case Study: Gngara Sustainability Strategy -Western Australia **WRM-2009 Water Resource Management Malta Sep 2009.**
6. **Elmahdi, A.**, J.Connor, M. Mainuddin, and M. Kirby, D. (2009) Water Balance Dynamic Simulation Model- for Water Policy Analysis. Case Study: Murray Darling Basin - Australia **WRM-2009 Water Resource Management Malta Sep 2009.**
7. **Elmahdi, A.**, **ElGafy, I.**, and kheireldin, K., " Global Warming-Water Shortage and Food Security future planning interaction: System Analysis Approach (WBFSM)" **WRM-2009 Water Resource Management Malta Sep 2009.**
8. **Elmahdi, A** (2009) Underground Storage: Managing Surface and Groundwater system as one single system Case Study: Murrumbidgee River Catchment - Australia **WRM-2009 Water Resource Management Malta Sep 2009.**
9. **Elmahdi, A.**,Shahkarami, N., Morid, S. and Massah Bavani, A.R (1009) Assessing the impact of AOGCMs uncertainty on the risk of agricultural water demand caused by climate change. Case study: Zayandeh Rud irrigation networks (Iran). MODSIM09International Congress on Modelling and Simulation. Modelling and Simulation Society of Australia and New Zealand, July 2009.
10. **Elmahdi, A.** and Badawi, H. "Biomimicry of termite engineering as solution for water and soil conservation" *ICE 2008, XXIII International Congress of Entomology, Durban July 2008* (2008): <http://www.ice2008.org.za/>.

11. **Elmahdi, A** and Barton, A.. "Modelling of a groundwater system to assess links between reduced rainfall and groundwater levels" *2008 Western Pacific Geophysics Meeting Cairns, Australia, 29 July - 1 August 2008* (2008).
12. **Elmahdi, A** and Badawi, H. "Multidiscipline Approach for Studying the Climate and Molecular Phylogeographic Analysis of Termites" *ICE 2008, XXIII International Congress of Entomology, Durban July 2008* (2008): <http://www.ice2008.org.za/>.
13. **Elmahdi,A.**, ElGafy, I., and kheireldin, K.,. "WBFS Model: Strategic Water and Food Security Planning on National Wide Level" IGU-2008 Water sustainability commission. Tunis. July. 2008.
14. **Elmahdi,A.**, and McFarlane, D. (2008) A decision support system for a groundwater system affected by climate change, landuse and extraction. World Water week, Stockholme, August 2008.
15. Connor, J., Doble, R., and **Elmahdi, A.** (2008), Economics of source control versus infrastructure investment salinity control in the Lower River Murray, Australia. Singapore International Water Week, Singapore 23 -27 June 2008
16. Connor, J., Doble, R., **Elmahdi, A.**, Kirby, M., Jolly, I. and Stenson, M. (2008) Integrated systems evaluation of climate change and future adaptation strategies for the Lower River Murray, Australia. World Water Congress, Vienna, Austria.
17. **Elmahdi,A.**, and McFarlane, D. (2008) Gngangara Decision Support System: Landuse Changes Approach Analysis for Sustainable Groundwater Management. IGU, 31st International Geographical Congress-Commission of Water Sustianbility Tunisia 2008.
18. Doble, RC, Connor, J, Stenson, M, **Elmahdi, A**, Jolly, ID, Miles, M, and Walker, GR, Future landscape scenarios in the lower River Murray, south-eastern Australia and their implications for river salinity and floodplain health, for International Salinity Form, 2 April, 2008, Adelaide,
19. **Elmahdi,A.**, Connor, J., Doble, R., Stenson, M., Kirby, M. and Walker, G. (2008) Forecasting Lower Murray River Salinity under Climatic Uncertainty and Reduced Dilution Flow.International Salinity Forum, Adelaide 31 March-3 April (2008) .
20. Connor, J., Doble, R., and **Elmahdi, A.**, (2008) Integrated systems evaluation of climate change and future adaptation strategies for the Lower River Murray, Australia. International Salinity Forum, Adelaide 31 March-3 April (2008).
21. **Elmahdi, A.**, and H. Malano (2008) Water Banking –Crop Mixes Approach to Improve River Productivity and Environmental Performance. Water down under Adelaide 15-17 April 2008conference, 31st Hydrology and Water Resources Symposium.
22. **Elmahdi,A.**, and Malano, H. (2007) Water banking-conjunctive water management approach to improve river environmental performance. E-CREW (environmental and Resource Economics conference November 2007 <http://www.ecrew.org.au/contact.html> , Bathurst , NSW, Australia.
23. **Elmahdi,A.**, H. Malano,T. Etchells and S. Khan (2005) System Dynamics Optimisation Approach to Irrigation Demand Management. In Zerger, A. and Argent, R.M. (eds) MODSIM 2005 International Congress on Modelling and Simulation. Modelling and Simulation Society of Australia and New Zealand, December 2005, pp. 196-202. ISBN: 0-9758400-2-9. <http://www.mssanz.org.au/modsim05/proceedings/papers/elmahdi.pdf>
24. **Elmahdi,A.**, H. Malano and T. Etchells (2006) System dynamics and two ways calibration methods for NSM model-Murrumbidgee River. ERE 2006 Environmental Research Event, December 2006 Sydney-Macquari University, CD.ISBN:0-86459-386-4. <http://www.ere.org.au>
25. Beddek R., **A. Elmahdi**, B. Barnett and T. Kennedy (2005) Integration of Groundwater Models within an Economical Decision Support System Framework. In Zerger, A. and Argent, R.M. (eds) MODSIM 2005 International Congress on Modelling and Simulation. Modelling and Simulation Society of Australia and New Zealand, December 2005, pp. 608-614.ISBN:0-9758400-2-9. <http://www.mssanz.org.au/modsim05/proceedings/papers/Beddek.pdf>
26. **Amgad Elmahdi** (2005) A System Dynamics approach and Economical Water use Reallocation. In Khanna,N, Barton D., Beale, D. Cornforth, R., Elmahdi, A., McRae, J., Seelsaen, N., and Shalav, A. (eds) ERE 2005 Environmental Research Event, December 2005 Hobart-Tasmania University, CD.ISBN:0-86459-386-4. <http://www.ere.org.au>
27. Assem Afify and **Amgad Elmahdi** (2005) Integrated Assessment of the Egyptian's Quality of Life – II Development of A GIS Tool for Qualitative Assessment. In Khanna,N, Barton D., Beale, D. Cornforth, R., Elmahdi, A., McRae, J., Seelsaen, N., and Shalav, A. (eds) ERE 2005 Environmental Research Event, December 2005 Hobart-Tasmania University, CD.ISBN:0-86459-386-4. <http://www.ere.org.au>
28. **Elmahdi, A.** Malano H, and Khan, S. (2004). A System Dynamic Approach And Irrigation Demand Management Modelling. Environmental Engineering Research Event 2004

- conference 6-9 December 2004. Published by University of Wollongong Press ISBN: 1 74128 080 X.
29. **Elmahdi, A** (2004). GIS and Multi-Criteria Evaluation Application for Integrated Water Resources Management, L.Nghiem, L.Scott, M. Dennis and K.Murphy (editors). Environmental Engineering Research Event 2004 conference 6-9 December 2004 Published by University of Wollongong Press ISBN: 1 74128 080 X.
  30. **Elmahdi, A.** Malano H, and Khan, S. (2004). A System Dynamic Approach And Sustainability Indicator modelling for the Coleambally Irrigation system, 2004 World Conference on Natural Resource modelling Melbourne 12-15 December.
  31. **Elmahdi A.** (2004), GIS with monitoring and assessment of water resources case study-Nile river. 30th Congress of the International Geographical Union IGU – Glasgow, UK
  32. **Elmahdi A.**, Kheireldin K (2004), GIS and Multi-Criteria Evaluation for integrated Water Resources. 13 th international Soil Conservation Organization Conference ISCO, 2004.
  33. **Elmahdi A**, Malano H, and Khan, S. (2004). Sustainability indicator for the Coleambally irrigation system, Australi.: Susan (editor). 18<sup>th</sup> Victorian universities Earth and Environmental Conference, September 2004,, Geological Society of Australia Abstract NO.75, P 27.

### Peer-Reviewed Science and Client Reports

1. Elmahdi, A. (2009). Gngara Decision Support Tool (GDST) “Quick Start Guide”. CSIRO: Water for a Healthy Country National Research Flagship, Western Australia.
2. Connor, J., **Elmahdi, A.**, Doble., R., Stenson, M., Walker, G., Jolly, I., Ferris, M., Morrison, J., Rowan, T., Kaczan, D., King, D., Pickett, T. and Petit, C. (2007) *Lower Murray Landscape Futures River Corridor Component*. Final Report, Vol. 4, River Corridor Futures Modelling Methods. CSIRO: Water for a Healthy Country National Research Flagship, Canberra (<http://www.clw.csiro.au/publications>).
3. Tapsuwan, S., Elmahdi, A., Ranjan, R., and McFarlane, D. (2008) *Economic and Social Values of Land and Water Uses on the Gngara Mound*. CSIRO: Water for a Healthy Country National Research Flagship, Canberra
4. Ranjan, R., Elmahdi, A., Tapsuwan, S., and McFarlane, D. (2009) *Scenario Analysis of Land and Water Uses on the Gngara Mound*. CSIRO: Water for a Healthy Country National Research Flagship, Canberra
5. Elmahdi, A., Ranjan, R., Tapsuwan, S., and McFarlane, D Connor, J., (2009) *Decision Support system Tool for Land and Water Uses on the Gngara Mound*. CSIRO: Water for a Healthy Country National Research Flagship, Canberra
6. Connor, J., **Elmahdi, A.**, Doble., R., Stenson, M., Walker, G., Jolly, I., Ferris, M., Morrison, J., Rowan, T., Kaczan, D., King, D., Pickett, T. and Petit, C. (2008) *Lower Murray Landscape Futures River Corridor Component*. Executive Report, Vol. 5, River Corridor Futures Modelling Methods. CSIRO: Water for a Healthy Country National Research Flagship, Canberra (<http://www.clw.csiro.au/publications>).
7. Bryan, B.A., Connor, J., Meyer, W., **Elmahdi, A.**, Doble, R., Stenson, M., Crossman, N.D., King, D., McNeill, J., Wang, E., Barrett, G., Ferris, M.M., Morrison, J.B., Pettit, C., Freudenberger, D., O’Leary, G.J., Fawcett, J., Walker, G., Jolly, ID., Pickett, T., and Dalby, P.R. (2007) *lower Murray landscape futures Volume I Executive Summary Report* [http://www.landscapefutures.com.au/reports/LMLF\\_Volume1\\_Executive\\_Summary.pdf](http://www.landscapefutures.com.au/reports/LMLF_Volume1_Executive_Summary.pdf)
8. **2005 work** on Scoping Study. Report to the National Program for Sustainable Irrigation. **Durack M, Malano H, Schmidt E, Khan S, Thompson C, Steele A & Standen A** (2005). “*Smart Systems and System Harmonization – Scoping Study*”. Report to the National Program for Sustainable Irrigation. Cooperative Research Centre for Irrigation Futures, Toowoomba
9. Tarek S, **Elmahdi A**, and Azab A. (2004) “*Literature Review on Water Quantity and Quality Management Tools (Stage A)*”. Report to Nile Basin Capacity Building Network for River Engineering project. Egypt. GIS and Modeling Research Cluster, Report on Water Quantity and Quality Management Tools.
10. Motelb M, **Elmahdi A**, and Azab A. (2003) “*Decision Support System For Water Resources Planning Based On Environmental Balance (Phase 2)*”. Report to Egyptian Italian environmental Cooperation program - phase ii

## Professional Media

- <http://www.irrigation.org.au/download/journal/Irrigation%20Spring%202007.pdf>
- [http://uninews.unimelb.edu.au/articleid\\_3738.html](http://uninews.unimelb.edu.au/articleid_3738.html)
- <http://www.civenv.unimelb.edu.au/>(read:Underground dams - the new water-storage solution? )
- <http://www.dreamlarge.edu.au/>

## INVITED Talks

- 2009: Human Complex Systems Dynamics Workshop-Brisbane, Australia
- 2008: Adelaide University, Department of Civil Engineering, South Australia
- 2007: Flinders University, South Australia
- 2007: Melbourne University, Department of Civil and Environmental Engineering, Victoria
- 2007 and 2008:Gnangara Coordinator Committee, Western Australia
- 2008: Gnangara Taskforce Group, Western Australia
- 2008: Natural Resource Management Board, South Australia
- 2008:Irrigation and Drainage Institute, Egypt
- 2008:International Geographical Union, Tunisia
- 2008: Irrigation Australia annual meeting, Sydney

## INVITED REVIEWER OF PAPERS FOR

- Water Resource Management journal
- Environmental Modelling and Software journal
- International Journal of Water
- Land Use Policy journal
- **Modsim 05** 2005. MODSIM05 is the 16th in a series of congresses organised by the Modelling and Simulation Society of Australia and New Zealand, and held every two years.(  
<http://www.cse.csiro.au/modsim05/about.html>)
- **Modsim 07** 2007. MODSIM07 is the 17th in a series of congresses organised by the Modelling and Simulation Society of Australia and New Zealand, and held every two years.(  
<http://www.cse.csiro.au/modsim07/about.html>)
- **Modsim 09** 2009. MODSIM09 is the 19th in a series of congresses organised by the Modelling and Simulation Society of Australia and New Zealand, and held every two years.(  
<http://www.cse.csiro.au/modsim09/about.html>)
- **ERE** Environmental Research Event conference Hobart-Tasmania 2005. The 9<sup>th</sup> Annual Environmental Postgraduate Conference, Examining Environmental Sustainability Through Multidisciplinary Integration ([www.ere.org.au](http://www.ere.org.au)).
- **ERE** Environmental Research Event conference 2007. The 11<sup>th</sup> Annual Environmental Postgraduate Conference, Examining Environmental Sustainability Through Multidisciplinary Integration ([www.ere.org.au](http://www.ere.org.au)).

## Countries of work experience:

1. Egypt
2. Italy
3. Greece
4. Australia

## Conference and workshop organize

- 2006: Organizing committee of civil and environmental engineering conference at Melbourne University, Melbourne, Australia, Oct 2006.
- 2005: Organizing committee of International Environmental research event conference, Hobart, Australia, Nov-Dec 2005.
- 2002: Workshop on Decision Support System for Water Resources Planning Based on Environmental Balance, participant and member of the organizing and technical committee, Cairo, 2002.
- 2002: First Regional Conference Geographical Information System Cairo 28-29 April 2002 (GIS and regional Integrated) Cairo-Egypt 2002.

## **LANGUAGE SKILLS**

- English : Reading, Writing, Speaking
- Italian : Reading, Writing, Speaking
- Arabic : Reading, Writing, Speaking (mother tongue)

## **First Aid**

- Certificate of Australian First Aid level A
- Certificate of Australian Advanced First Aid level B