Mohamed Rami Mahmoud

Research Professor in National Water Research Center National
National Water Research Center, Cairo, Egypt

CURRICULUM VITAE

SUMMARY

Prof. Mohamed Rami received his B.Sc. in Civil Engineering from Cairo University, Egypt (1987), followed by an M.Sc. in Computer Science from the National Computing Centre and British Computer Society, United Kingdom (1989). He earned a second M.Sc. in Water Resources Planning and Management from the Department of Civil Engineering, Colorado State University, USA (1993), where he also completed his Ph.D. in 1995. His academic journey includes advanced studies at Chalmers University of Technology, Sweden (1996), and Brussels University, Belgium (1998).

Prof. Rami specializes in developing state-of-the-art mathematical models for managing complex environmental, hydrologic, and agricultural systems. He has successfully integrated operations research, GIS, remote sensing, and IT techniques into water resources management, gaining recognition for his contributions to dynamic system planning. His expertise also extends to hydraulic, hydrologic, and remote sensing models, making him highly versatile in applying technology for innovative solutions.

Prof. Rami was instrumental in modernizing the IT infrastructure at Egypt's Ministry of Water Resources and Irrigation (MWRI), where he served as IT Director for over twelve years. Recognized for his leadership in research and technology, he was appointed "Assistant Minister for Research & Technology" at MWRI from 2013 to 2016. During this time, he played a key role in advancing the ministry's technological capabilities in water resources management. His efforts earned him the prestigious State Recognition Award for Engineering Sciences for 2008-2009 from the National Academy for Scientific Research and Technology. He has also received several academic awards from various organizations including the American Geophysical Union, the National Water Research Center, the International Commission on Irrigation and Drainage (ICID), and the Ministry of Higher Education and Scientific Research.

His groundbreaking projects include the development of artificial neural network models for rainfall-runoff processes within the Nile River watershed, a multi-criteria evaluation model for water resources planning, and decision support systems (DSS) for managing dams in the United States, Saudi Arabia, and Egypt. He also has significant expertise in renewable and nuclear energy for desalination, where he utilized DSS and GIS tools to optimize facility size and location.

From 2019 to 2024, Prof. Rami served as the "Director of the Environmental & Climate Changes Research Institute" at the National Water Research Center, Cairo, Egypt. In this role, he led crucial research on the impacts of climate change on water resources and the environment in the Nile Basin.

Prof. Rami has published 24 research articles in Nature, ASCE, and other top peer-reviewed journals, along with 35 scientific reports. He serves as "Associate Editor for the Water Science journal" and has collaborated with international organizations, including the UNDP, USAID, the World Bank, CIDA, and CEDARE, providing consultancy on critical water management projects. He is a certified engineer in irrigation and drainage, environmental impact assessments, and remote sensing. His recent research has focused on the effects of climate change on water resources, underscoring his commitment to solving national and global water challenges.

EDUCATION

Colorado State University, Fort Collins, Colorado, USA

- ***Ph.D.***, Water Resources Planning and Management, Civil Engineering (12/95)

Dissertation: "Multi-criteria Location and Sizing of Water Resources Projects by GIS and Dynamic Programming"

- ***M.Sc.***, Water Resources Planning and Management, Civil Engineering (3/93)

Thesis: "Decision Support System for Optimal Sizing and Siting of Desalination Facilities"

The National Computing Centre & the British Computer Society, United Kingdom

- ***M.Sc.***, (course work), Computer Science (3/1989)

Faculty of Engineering, Cairo University, Cairo, Egypt

- ***B.Sc.***, Civil Engineering (7/1987)

PROFESSIONAL INTERESTS

- Applications of Machine-Learning, Deep Learning, and Big Data in water resources problems
- Mathematical programming, simulation modeling, machine learning, multi-criteria evaluation and artificial neural network
- Reservoir operations
- Hydrology and climate change
- GIS and remote sensing

WORK EXPERIENCE

Research Professor in NWRC,
(10/2024 – present)
National Water Research Center, Ministry of Water Resources & Irrigation (MWRI), Cairo, Egypt

Responsibilities and duties:

- Serve as a member of the highest-ranking scientific committee at the National Water Research Center (NWRC), responsible for evaluating tenure-track faculty and promoting candidates to Associate Professor and Professor.
- Act as Associate Editor for Water Science, a peer-reviewed journal published by Taylor & Francis, contributing to the editorial process and maintaining high academic standards.
- Leverage advanced AI techniques and climate modeling to enhance water resources management strategies.
- Develop and refine simulation and optimization models for existing and proposed reservoirs on the Nile River.
- Establish a robust, data-driven framework to evaluate operational strategies under diverse hydrological and climatic scenarios.
- Conduct in-depth assessments of research proposals related to climate resilience and water resources modeling.
- Design and deliver training programs and coursework on state-of-the-art methodologies for water resources systems analysis at NWRC.
- Integrate climate change projections and AI-driven analytics into decision support tools for sustainable water resource management.

Director of Environment & Climate Changes Research Institute (ECRI),
(2/2019 – 9/2024)
National Water Research Center, Ministry of Water Resources & Irrigation (MWRI), Cairo, Egypt

Responsibilities and duties:

- Oversee the development and execution of ECRI's research agenda focusing on the impact of climate change and adaptation strategies related to water resources, agriculture, and the environment. This includes supervising the annual preparation of a comprehensive report detailing the achievements of the research plan.
- Lead the planning and implementation of the annual budget dedicated to the research initiatives at ECRI.

- Direct the formulation of technical and financial research proposals, ensuring effective scheduling and coordination of research activities across multidisciplinary team members.
- Manage the collection of environmental data through the ECRI network, overseeing both the process and the teams involved.
- Facilitate collaboration with both domestic and international organizations and experts in fields related to water resources, economics, agronomy, socio-economics, and environmental sciences. This role involves developing and implementing critical indicators and indices for policy analysis and evaluation concerning water resources.
- Supervise the review and approval of ECRI's technical reports and research publications to ensure quality and accuracy.
- Strategize and oversee capacity building initiatives for research staff, incorporating both external and internal training programs and studies to enhance skills and knowledge.
- Develop and execute human resources strategies within ECRI to foster professional growth and development.
- Manage all technical, financial, and administrative operations of ECRI, ensuring that departmental goals are aligned with the institute's strategic objectives.

Research Professor in NWRC
(9/2016 – 1/2019)
National Water Research Center, Ministry of Water Resources & Irrigation (MWRI), Cairo, Egypt
Responsibilities and duties:

- Reviewing and evaluation of the files of the researchers applying for Professor and Associate Professor degrees at National Water Research Center.
- Supervising teams of engineers and researchers responsible for development of a national information system for Smart Water Resources Management.
- Evaluation of research projects in the field of water resources submitted for funding from various funding agencies.
- Developing comparative simulation and optimization models for both existing and proposed reservoirs on the Nile River.
- Leading several research programs including:
  - use of renewable methods as well as biofuel and nuclear energy within the existing water supply,
  - developing mathematical models using remote sensing analytical techniques for water resources management,
  - use of desalination technology to fill the gap between water supply and demand in remote areas.

Assistant Minister for Research & Technology
(9/2013 – 9/2016)
National Water Research Center, Ministry of Water Resources & Irrigation (MWRI), Cairo, Egypt
Responsibilities and duties:

- Developed simulation and optimization models for existing and proposed reservoirs on the Nile River, supporting the analysis of operational strategies under varying hydrological scenarios.
- Implemented and revised various hydrologic models for water resource projects in the upper Nile, enhancing predictive accuracy and operational efficiency.
- Led multiple research programs aimed at integrating sustainable energy solutions—such as renewable, biofuel, and nuclear energy—into water resource management.
- Advanced the development of mathematical models utilizing remote sensing analytical techniques, significantly improving water resources management.
- Pioneered the use of desalination technology to address water supply-demand disparities in remote areas, ensuring sustainable water availability… Supervised a team of engineers and hydrologists in the development of a national information system for irrigation and drainage.
- Oversaw the analysis of satellite imagery for monitoring the Nile River system and the evaluation of water usage across the Nile Delta.
- Spearheaded several initiatives to reform water management policies, involving extensive stakeholder consultation and legislative review, which led to significant improvements in policy frameworks.

- Directed cross-functional teams to modernize water resource management practices, demonstrating effective leadership in managing complex, high-stakes projects.
- Collaborated with international bodies to align our water rights negotiation strategies with global standards, enhancing international compliance and operational effectiveness.

Research Professor in NWRC
(4/2013 – 9/2013)
National Water Research Center, Ministry of Water Resources & Irrigation (MWRI), Cairo, Egypt
Responsibilities and duties:

- Developed decision-making procedures, tools, and long-term plans to support water resource policy at various levels.
- Designed, implemented, and reviewed simulation and optimization models for Upper Nile water resource projects.
- Conducted applied research on remote sensing techniques, water resource planning, hydraulics, and hydrology.
- Evaluated research proposals, identified consultants, and outlined training requirements for NWRC initiatives.
- Prepared technical reports, research papers, and work plans adhering to international standards.
- Negotiated research proposals and effectively communicated findings with sponsors and stakeholders.

Regional Water Resources Monitoring & Evaluation Specialist
(11/2011- 04/2013)
Centre for Environment & Development for the Arab Region & Europe (CEDARE), Millennium Development Goals Monitoring & Evaluation for Water In North Africa Project, Cairo, Egypt
Responsibilities and duties:

- Developed regional standards, indicators, and frameworks for monitoring and evaluating water resources and environmental conditions across North Africa.
- Conducted assessments of monitoring systems in Egypt, Libya, Tunisia, Algeria, Morocco, and Mauritania, identifying and addressing areas for improvement.
- Designed and implemented regional action plans and capacity-building programs, enhancing expertise in water resource monitoring and evaluation.
- Established GIS-integrated databases for water resources, usage, and sanitation, and improved data collection and reporting systems.
- Strengthened partnerships with the North African Ministers' Council on Water (NAMCOW) and supported national evaluation capacities.
- Authored technical reports, baseline studies, and proposals for integrated water management initiatives.
- Led public awareness campaigns promoting sustainable water use and leveraged technology to enhance data accuracy and accessibility for regional offices.

Research Professor in NWRC
(2/2011- 4/2012)
National Water Research Center, Ministry of Water Resources & Irrigation (MWRI), Cairo, Egypt
Responsibilities and duties:

- Develop decision-making procedures, tools, guidelines and long-term plans that help the decision makers at different levels for developing water resources policies.
- Develop, implement and review different simulation and optimization models for water resources project located on the upper Nile.
- Conduct and develop research in the area of applying remote sensing analysis techniques in water resources management field.
- Evaluate research proposals and identify consultants and training requirements for NWRC.
- Prepare technical reports, research papers, progress reports, work plans according to NWRC and international scientific and technical standards.
- Conduct applied research in the area of Water Resources Planning and Management, Hydraulics, and Hydrology.

- Negotiate research proposals and communicating research findings and results with sponsors.

Water Resource Management Consultant
(2/2010 - 2/2011)
United Nations Development Programme (UNDP), Integrated Water Resource Management Project SAU 10/ 39149, Riyadh, Saudi Arabia
Responsibilities and duties:

- Conducted comprehensive reviews of relevant documentation under the supervision of the Ministry of Water and Electricity (MOWE) and in collaboration with the UNDP Resident Representative. Regularly prepared detailed reports and executive summaries highlighting key findings and conclusions, ensuring stakeholders were well-informed of project progress and outcomes.
- Verified research studies and reports conducted by MOWE, providing expert opinions and strategic advice on various water management studies received both from within and outside the Kingdom, enhancing decision-making processes.
- Developed terms of reference for new studies and research projects intended by MOWE, focusing on diverse aspects of water resource management, to guide and standardize research efforts.
- Monitored and followed up on office and field activities carried out by consulting firms and research centers, ensuring compliance with project objectives and quality standards.
- Designed and executed workshops and training programs aimed at building the capacities of MOWE's national staff, fostering a knowledgeable and skilled workforce equipped to handle the challenges of water resource management.

Research Professor in NWRC, Undersecretary, Head of Central Directorate for Water Resources and Uses, Director of Information & Decision Support Department, Minster's Office
(5/2006 - 1/2010)
National Water Research Center, Ministry of Water Resources & Irrigation (MWRI), Cairo, Egypt
Responsibilities and duties:

- Developed and implemented cutting-edge methodologies and multi-dimensional optimization techniques tailored to complex water resource challenges.
- Created and refined simulation models for water resource projects along the upper Nile, enhancing project planning and management effectiveness.
- Led the implementation of DSS and IS for Integrated Water Management Districts, significantly improving the management of irrigation and drainage systems across the region.
- Conducted advanced research in the application of remote sensing analysis to water resources management, pioneering new techniques that improved resource monitoring and management.
- Developed and implemented Geographic Information Systems (GIS) and DSS for comprehensive hydrological analysis of the Nile Basin and operational policy planning for the Aswan High Dam.
- Supervised teams responsible for developing a national information system for irrigation and drainage, ensuring accurate and efficient data management.
- Directed the analysis of satellite imagery for monitoring the Nile River regime and rice cultivation in the Nile Delta, enhancing agricultural and water resource planning.

Associate Research Professor & General Supervisor of Main Information Center of the MWRI
(5/2001 - 5/2006)
National Water Research Center, Ministry of Water Resources & Irrigation (MWRI), Cairo, Egypt
Responsibilities and duties:

- Implemented Decision Support Systems (DSS) and Information Systems (IS) for managing irrigation and drainage systems in Integrated Water Management Districts.
- Conducted research on flood prediction using neural networks, groundwater optimization, reservoir operations, and desalination technology.
- Developed GIS-based hydrological analysis and DSS tools for the Nile Basin and Aswan High Dam operations.
- Supervised the development of national information systems and remote sensing/GIS labs for MWRI.
- Reviewed and evaluated academic research on water resource management, decision support systems, and simulation models.

- Coordinated multidisciplinary research activities, including data analysis and system integration for ministry-wide projects.

Assistant Research Professor & General Supervisor of Main Information Center of the MWRI (4/98 - 5/2001)

National Water Research Center, Ministry of Water Resources & Irrigation (MWRI), Cairo, Egypt

Responsibilities and duties:

- Supervised the development of an extensive database and Decision Support System (DSS) to support MWRI activities.
- Established a GIS lab and a ministry-wide LAN system with advanced servers and over 100 clients.
- Managed staff assignments, evaluated performance, and resolved operational issues.
- Prepared technical reports, research papers, and work plans aligned with technical standards.
- Provided on-the-job training for research assistants in computational tools and methodologies.
- Designed and maintained high-quality databases, utilizing advanced software and online resources.
- Collaborated with decision-makers to align DSS and information systems with ministry needs.
- Oversaw work plans, budgets, and technical evaluations for devices, software, and human resources.

Assistant Research Professor, Staff Scientist with the Nile Water Strategic Research Unit, (NWSRU)
(1/96 - 4/98)

National Water Research Center, Cairo, Egypt

Responsibilities and duties:

- Developed a decision support system and an expert system for NWSRU to identify and evaluate the impact of water resource shortage and to face the different demand scenarios.
- Identified water resources and water demand elements in the Egyptian irrigation system, reviewed water policies, set up relationship rules, and built knowledge base.
- Formulated problems, developed methodology, collected and analyzed data, and documentation.
- Designed and developed a database, wrote computer programs, extensive use of different academic software, and extensive internet search for information.
- Wrote technical reports, research proposals, and research papers.

Graduate Research Assistant, Integrated Decision Support System (IDS) Group
(1/93 - 12/95)

Chemical and Bioresource Engineering Department, Colorado State University, Ft. Collins, Colorado, USA

Responsibilities and duties:

- Conducted applied research in the area of water resources planning, management, desalination technology, GIS, simulation models, optimization techniques, multi-objectives and multi-criteria evaluation.
- Worked on two projects: Natural Resources Workstation, NRWS (USA), and the Multi-Criteria Model for Red Bluff Division Dam in California.
- Developed a surface water network sub-model for NRWS, USA.
- Developed a simulation model for the economical and biological system for the Red Bluff Dam.
- Wrote geographic user interfaces using C++ and C computer languages under X-MOTIF for HEC-5, and WASP programs.
- Prepared research proposals, software user manuals, and research papers.

Graduate Student
(1/91 - 12/92)

Civil Engineering Department, Colorado State University, Ft. Collins, Colorado, USA

Responsibilities and duties:

- Full time master's student in water resources planning and management, desalination as special topic, Civil Engineering Department, Colorado State University, Fort Collins, Colorado, U.S.A.

System Engineer
(10/88 - 12/90)

National Water Research Center, Cairo, Egypt

Responsibilities and duties:

- Extensive use of academic software.
- Developed, maintained, and operated database systems for NWRC.
- Reviewed and summarized technical papers.
- Collected, analyzed and verified data and information regarding the Aswan High Dam.
- Operated, calibrated and performed sensitivity analyses of mathematical models.
- Organized and conducted workshops, seminars, and conferences.

Structure Engineer and Designer
(7/87 - 10/88)
Complete Studies Office, Giza, Egypt
Responsibilities and duties:

- Designed concrete and steel components for public transportation and hospital buildings.

Programmer (Part Time)
(7/87 - 10/88)
Complete Computer Systems, Ltd., Cairo, Egypt
Responsibilities and duties:

- Designed custom software programs and database systems for various commercial companies.

TECHNICAL ACHIEVEMENTS IN MATHEMATICAL MODELING

During the last three decades of my educational and professional career, I developed a number of mathematical models that are used in nationally and internationally as follows:

- **NB-Sim**: (**N**ile **B**asin **Sim**ulation model) is a comprehensive simulation model for reservoirs in the Nile Basin including High Aswan Dam (HAD) in Egypt and Grand Ethiopian Renaissance Dam (GERD) in Ethiopia. The model has been utilized to study the effect of different reservoir operation rules of GERD on HAD.

- **HAD-Opt**: (**H**igh **A**swan **D**am **Opt**imization model) optimizes the releases from HAD according to different objectives. The model is using dynamic programming to find daily optimal releases subject to physical constraints and demand downstream. The model is flexible enough to allow choosing the objective function from a set of pre-determined objectives or solve the optimization problem as multi-objective function.

- **HAD-Sim**: (**H**igh **A**swan **D**am **Sim**ulation model) has the capability to do the following:

    - develop different rules for releasing flow as a function of date, lake elevation, downstream requirement,
    - develop different hydrologic scenarios that include flood and drought conditions,
    - develop alternatives that have a combination of different rules and scenarios,
    - integrate with other water management models, and
    - simulate multi-reservoirs systems to test the impact of different operation policies of the upper Nile basin dam on the HAD.

  This model simulates the HAD on daily basis. The model was tested successfully using 49 years of historical inflow data for the period from August 1968 to July 2017.

- **MCEWR**: A comprehensive, Multi-Criteria Evaluation for Water Resources tool that ranks alternatives using five methods including ELECTRE, AHP, PROMETHEE, Compromise Programming, and Weighted Average Method with two methods of assigning weights. The model is applied to GIS coverage maps. It is written in C++ and is compatible with both UNIX and MS-Windows platforms. This model is still used in California, USA to study the alternatives for Sacramento Lake and is also used in Egypt to evaluate various desalination projects.

- **HDDP**: (**H**igh **D**imensional **D**ynamic **P**rogramming model) is an Optimization software that can solve the highest dimensional dynamic programming problem. It has been successfully tested to solve problems including 12 decision variables and 12 state variables simultaneously over a period of 30 years with monthly increments. The model utilizes the "g-uniqueness" technique to check the global optimality of the output result. Objective space dynamic programming integrated with mixed integer programming is utilized by the model to find the optimal solution. The model is written in C++ and is compatible with both UNIX and MS-Windows platforms.
- **NNMNRR**: (A **N**eural **N**etwork **M**odel for **N**ile **R**ainfall-**R**unoff process) is a model that trains the network to map rainfall patterns into measures of runoff.
- **REDBLUFFDSS**: This is DSS software that includes three sub-models, economic, environmental, and multi-criteria evaluation to generate, simulate, and evaluate alternative solutions for the Red Bluff Dam resources-setting problem. The model also has a GUI designed to be used by the general public interests in a city nearby Red Bluff Lake, California. The model is written in C++ and works in MS-Windows platforms.
- **OSSDF**: (**O**ptimal **S**ize and **S**ite of **D**esalination **F**acility model) is a DSS model for establishing the optimal size and site of desalination facilities. In this software, GIS models the facility location theory in an intuitive way to generate all possible locations for siting a desalination facility. Moreover, it integrates the LP and MCE to rank the output results on the DM preferences.
- **ESMGWP**: (**E**xpert **S**ystem for **M**anagement and **G**enerating **W**ater **P**olicies model) is an expert system that utilizes the knowledge base technique to generate different water supply and demand scenarios for Egypt. The model utilizes more than 100 rules. It is written in C++ and works on MS-Windows platforms.
- **SMBNC**: **(S**imulation **M**odel for evaluating the **B**ahig and **N**asr **C**anal) is an evaluation and planning simulation model for water management of northwestern Egypt.

CERTIFIED CONSULTANT

- Certified Consultant from Egyptian Engineers Syndicate in the field of ***Irrigation and Drainage Networks Design***, Civil Engineering Branch, August 2003.
- Certified Consultant from Egyptian Engineers Syndicate in the field of ***Remote Sensing and Geographic Information Systems***, Civil Engineering Branch, March 2005.
- Certified Consultant from Egyptian Environmental Affairs Agency in the field of ***Environment Impact Assessment***, Nov 2019.

CONSULTATIONS

- ***Project Title*** **Assessment of Dams Operations in Different Regions of the KSA**
  Position Title Water Resources Management Consultant
  Organization King Abdullah Research & Consulting Institute, Saudi Arabia
  Duration Feb 2010 until Aug 2012
  Responsibilities & Duties:
  - **a.** Simulate and test reservoirs' performance (single/ multi-reservoir systems) under different hydrologic scenarios that include flood and drought conditions. Build deterministic optimization model for the reservoirs system of the Byash, King Fahd, Al-Aqiq watershed area. The optimization model finds the optimal release for firm water municipal supply and store one-year water reserve.
  - **b.** Build operation policy for flood protection to Houtat Bani Tamim and Thadiq reservoirs under different hydrological conditions.

- ***Project Title*** **Integrated Water Management Districts (IWMDs)**
  Position Title Local Senior Information Specialist in Water Resources

Organization US Agency for International Development (USAID), and International Resources Group (IRG)
Duration September 2003 until January 2010.
Responsibilities & Duties:

- **a.** Analyze satellite images of the study area and provide guideline of using remote sensing technology in determining 4 crops in the project area.
- **b.** Establish low cost IT system and GIS for IWMD to evaluate their policies in water management.
- **c.** Provide technical assistance to support the Information System activities in the integrated water management districts. This included assisting the Red Sea Coast and Water Project component, Integrated Water Management Units, and the Ministry of Water Resources and Irrigation (MWRI) central offices and staff to develop and implement a plan for consolidating and integrating information centers at the MWRI.
- **d.** Assist in preparing a description of data flow between the (IWMDs), Directorates, Central MWRI, and water users/stakeholders.
- **e.** Gave recommendations on how to improve the collection, processing, storage, sharing, and transmission of the data between the district level, directorate and central level.

- ***Project Title*** **Private Public Partnership Portal**
  Position Title Information Technology/Database Expert in Water Resources System Analysis
  Organization World Bank
  Duration May 2008 until Dec 2008
  Responsibilities & Duties:
  - **a.** Develop requirements and frameworks for collecting and disseminating information.
  - **b.** Develop a database framework for collecting and disseminating information on pipeline PPP water projects in Arab Water Council member countries.
  - **c.** Construct web-based PPP water portal.

- ***Project Title*** **Hydrological analysis for Salbokh Area**
  Position Title Water Resources and Hydrologist Consultant
  Organization Fawaz Alhokair & Engineering Consultants Group
  Duration Oct 2007 until Oct 2008
  Responsibilities & Duties:
  - **a.** Conducted satellite image and digital map analysis to define watershed characteristics and provide input data for hydrological modeling in the Salbokh area, Riyadh, Saudi Arabia.
  - **b.** Developed a hydrological model to assess flood risks and design flood control schemes and drainage systems, ensuring cost-effective hydraulic structure development and project area protection from flash floods.

- ***Project Title*** **Decision Support System for Dez and Karun Reservoirs System**
  Position Title Water Resources System Analysis Expert
  Organization Scott Wilson Group
  Duration Jun 2006 until Feb 2007
  Responsibilities & Duties:
  - **a.** Build a deterministic and stochastic optimization model for the reservoirs system of the Dez and Karun watershed area. The optimization model finds the optimal release from 7 connected reservoirs to produce best energy or minimize water supply shortage.
  - **b.** Build ARIMA forecasting model to predict different inflows to different reservoirs and to be integrated with the DSS.

- ***Project Title*** **Euro-Mediterranean Water Information System (EMWIS)**
  Position Title National Focal Point, Steering committee member
  Organization European Union (EU)
  Duration November 1999 until February 2010
  Responsibilities & Duties:

a. Study the system for sharing information among the Euro-Mediterranean countries regarding know-how in the water sector.
b. Elaborate on common outputs and cooperation programs to disseminate available information and promote the collection of missing information.
c. Attend meetings and seminars covering new information tools provided by EMWIS, reviewed recommendations given by each national representative of the Euro-Mediterranean countries, and analyzed specific local problems related to the use or set-up for EMWIS.
d. Establish a website for the Egyptian National Focal Point to share the information regarding the Egyptian side.

- ***Project Title*** **Manual Channel Maintenance Project**
  Position Title Water Resources Information Specialist
  Organization Dutch Government and ARCADIS Euroconsult
  Duration November 1999 to March 2003
  Responsibilities & Duties:
  a. Supervise the design and implementation of the database structure, the data collection and its quality control.
  b. Supervise training, the delivery and the integration of the system into other information systems within the ministry.

- ***Project Title*** **Water Policy Reform Program**
  Position Title Water Resources Modeling Consultant
  Organization US Agency for International Development (USAID), and Winrock International.
  Duration January 1999 until October 2000
  Responsibilities & Duties:
  a. Support the development and improvement of the Agriculture Sector Model of Egypt (ASME). The ASME model is being used as a tool to assist in the evaluation of irrigation water and the projection of cropping activity changes which may occur as a result of the implementation of various policies. The model is implemented using GAMS software.
  b. Evaluate and establish a policy on GIS standards and data for the MWRI.
  c. Recommend standards and specifications for future GIS activities within MWRI.

- ***Project Title*** **National Water Quality & Availability Management (NAWQAM)**
  Position Title Water Resources Management Specialist
  Organization Canadian International Development Agency (CIDA) represented by SNC-Lavalin Inc. and National Water Research Center
  Duration August 1998 to January 1999
  Responsibilities & Duties:
  a. Review state of the art water quality models (implemented techniques, accuracy, and applicability).
  b. Review water quality models used in Egypt (implemented techniques, uses, and accuracy).

- ***Project Title*** **Rainfall Forecasts and Strategic Irrigation Management**
  Position Title Water Resources Management Specialist
  Organization ISMES S.P.A, Italy, and Cairo University
  Duration March 1996 to August 1997
  Responsibilities & Duties:
  a. Review water management models and selected the appropriate one to be applied in the study.
  b. Formulate an irrigation management policy based on 1) analysis of rainfall potential in the Northwest Coast of Egypt, 2) analysis of irrigation method, irrigation scheduling, and crop pattern, and 3) economic study of crop pattern and water consumption to optimize multi-objective functions for water resources management.

TEACHING EXPERIENCE

- "Python Programming in Water Resources", National Water Research Center, Egypt, 2022.
- "Hazard Assessment Using Spatial Analysis", international short course, Egyptian Agency of Partnership for Development, Cairo Egypt, 2016 - 2019.
- "Integrated Water Resources Management", international short course, Nile Basin Initiative, Nile Sector, Cairo Egypt, 12-22 January 2010.
- "Use of Remote Sensing for Water Resources Management in Egypt", international short course, Learning Course on how to use remote sensing to improve water management, AWC/NASA, Istanbul, Turkey, March 18, 2009.
- "Reservoir Operations: Simulation and Optimization", regular course, graduate studies, Cairo University, Egypt, from 2001- 2009.
- "Application of GIS for Water Resources Management", regular course, graduate studies, Cairo University, Egypt, from 2003- 2009.
- "Introduction to Geographic Information System and Remote Sensing", irregular course, Training Center, Ministry of Water Resources and Irrigation, 6th of October, Egypt, from 2002-2009.
- "Information Systems for Water Resources", irregular course, Training Center, Ministry of Water Resources and Irrigation, 6th of October, Egypt, from 2002-2009.
- "Soil and Water Management", international short course, The International Agriculture Center, Dokki, Giza, Egypt, 1997.

ACADEMIC AWARDS

- State Recognition Award for Engineering Sciences, presented by the **National Academy for Scientific Research and Technology** for the year 2008, 2009, Cairo, Egypt.
- Best Research Paper in Integrated Water Resources Management for 2008, presented by the **Ministry of Higher Education and Scientific Research Al-Shorouk Academy**, 2008, Cairo, Egypt.
- Best Research Paper in Development Nonconventional Water Resources for 2006, presented by the **Ministry of Water Resources and Irrigation (MWRI)**, 2006, Cairo, Egypt.
- Best Research in Water Resources Development and Management for 2003, presented by the **National Water Research Center (NWRC)**, Ministry of Water Resources & Irrigation, 2003, Cairo, Egypt.
- Best Research Paper in Water Resources Development for 1999, "Dr. Ibrahim El-Asuity Award," presented by the **National Academy for Scientific Research and Technology**, 1999, Cairo, Egypt.
- Best Research Paper in Irrigation and Drainage, "Fourth Dr. Hassan Ismail Memorial International Award", presented by the **International Commission on Irrigation and Drainage (ICID)**, 1999, Granada, Spain.
- Best Research Paper in Development and Management of Conventional and Non-Conventional Water Resources for 1996, presented by the **National Water Research Center (NWRC)**, Ministry of Public Works and Water Resources, 1996, Cairo, Egypt.
- Best Ph.D. Paper as Poster Presentation for 1995, presented by the **American Geophysical Union** for The Fifteenth Annual "Hydrology Days" Conference, Fort Collins, Colorado State University, Colorado, USA.
- Nominated to Prince Sultan Bin Abdulaziz International Prize for Water, Alternative (Non-traditional) Water Resources (Branch 3), 2004-2006, **The Prince Sultan Bin Abdulaziz International Prize for Water**, Saudi Arabia.

PROFESSIONAL AWARDS

- Best General Manager in the Ministry of Water Resources and Irrigation Headquarter for the year 2004, presented by the **Ministry of Water Resources and Irrigation (MWRI)**, 2004, Cairo, Egypt.
- Best Information Center Director for the year 2001-2002, presented by the **Egyptian Cabinet of Information and Decision Support Center (IDSC)**, 2002, Cairo, Egypt.

GRANT AWARDS

- ***Project Title*** **Egyptian Data Logger & Information System for Smart Water Resources Management.**
  Funded by National Telecom Regulatory Authority (NTRA), Research & Development Department, Egypt
  Amount USD 200,000
  Duration August 2014 to June 2017
  Summary:
  a. Assessed and documented the features, pitfalls, and requirements of Egyptian water monitoring networks and decision-makers across central and regional levels.
  b. Reviewed hardware, software, and firmware compliance with standard requirements to address water resource management needs.
  c. Designed the conceptual framework for a water resources information system and locally developed data logger.
  d. Developed a data logger laboratory prototype with necessary modifications to meet specified needs.
  e. Created a water resources information system integrated with a decision support system for smart management, including a unified database, security measures, GIS integration, and accessibility to commercial water management models.

- ***Project Title*** **Use of Remote Sensing for Detecting Soil Salinity and Estimating Evapotranspiration.**
  Funded by Science and Technology Development Fund, U.S. - Egypt Joint Board
  Amount USD 200,000
  Duration January 2011 to January 2013
  Summary:
  a. Use the remote sensing to estimate the soil salinity, evapotranspiration (ET) and the impact of soil salinity on ET for an irrigation command area in Al-Daqahliya governorate the Nile River Delta in Egypt. This information will be used to determine the demand for a command area over time, this information will be compared to the actual diversion to determine the irrigation efficiency over time and this information can be used to improve the operation of the irrigation system.
  b. Two main techniques of interpolation are proposed to be applied, deterministic and geostatistical. Landsat images will be used along with soil salinity data that might be collected close to the time the satellite image was collected. Many models will be applied and evaluated to determine the main irrigation efficiency.

- ***Project Title*** **Using Remote Sensing to Improve Water Quality Monitoring and Modeling in the Nile Delta of Egypt**
  Funded by Italian-Egyptian Debt for Development Swap Program
  Amount EURO 200,000
  Duration July 2009 to December 2011
  Summary:
  a. Explore the use of remote sensing technology to improve the spatial and temporal estimates of water quality parameters along one of the river branches in the Nile Delta. The project will utilize the water quality samples collected by NWRC and the remote sensing images to demonstrate the status of different sites in the waterways.
  b. Explore using hyperspectral images to relate water quality parameters to spectral signatures in order to derive estimates of one or a number of water quality parameters in water ways.

- ***Project Title*** **Establishing the National Focal Point for EMWIS in Egypt**
  Funded by Cooperation Attache', Italian Embassy in Cairo
  Amount EURO 265,557
  Duration August 2006 to February 2009
  Summary:

a. Access and evaluate different tools and methodologies for information management that can help in establishing the EMWIS NFP in Egypt. Perform a capacity building program for the EMWIS NFP to strengthen its capability and resources to enable it in successfully achieving the objectives of the program. Collecting data and information according to EMWIS system

b. Setting up a data web-server to facilitate remote access to all interested parties in the water sector. Organize Seminars and Workshop, attended by institutions and organizations linked in some way to the system, to promote its continuous up-grading and discuss topics of common interest.

ACADEMIC TRAINING

- Water Diplomacy, sponsored Ministry of Water Resources & Irrigation, Egypt, organized by Program on Negotiation at **Harvard Law School**, Boston, **USA**, 23/06/2014 – 27/06/2014.
- Information Systems in Water Resources Management and Hydrology, sponsored by Belgian Administration for Development Cooperation and UNESCO, organized by Vrije Universiteit Brussel, Brussels, **Belgium**, 01/12/1997 – 31/03/1998.
- Management of Municipal Water Supply and Waste Water Treatment, Part II, sponsored by Swedish International Development Agency (SIDA), managed by Chalmers University of Technology (Sweden), Jordan Water Authority, El Aqaba, **Jordan**, 4/1997- 5/1997.
- Management of Municipal Water Supply and Wastewater Treatment, Part I, sponsored by Swedish International Development Agency (SIDA), managed by Chalmers University of Technology (Sweden), Goteborg, **Sweden**, 3/1996 – 4/1996.

PROFESSIONAL TRAINING

- Innovation & Adoptable Technologies for Treated Waste Water Re-use, Including the Re-charge of Aquifers and Desalination, organized by UNESCO-IHE Institute for water Education and Arab Countries Water Utilities Association (ACWUA), Tunisia, **Tunis**, 13/Apr/2012.
- Modern Management Strategies, organized by Ibrahim Elfiky International Enterprises Inc. (IEIE), managed by Ministry of Water Resources & Irrigation, Cairo, **Egypt**, 11-12 Jun 2007.
- Assistant Minister, organized by Central Agency for Organization and Administration, managed by Cabinet Presidency, Training Center for Executives in Government Sector (T.C.E.G), **Egypt**, 12/3/2005-15/6/2005.
- Implementing a National Information Center, sponsored by European Union, organized by Euro-Mediterranean Water Information System, managed by Avolys Formation Information, Sophia Antipolis, **France**, 2/4/2001-6/4/2001.

PROFESSIONAL AND TECHNICAL AFFILIATIONS

- Associate Editor of the Water Sciences Journal, National Water Research Center, publisher Taylor & Francis, Cairo, **Egypt** (2015 to present).
- Member of the board of directors of the National Water Research Center, Cairo, **Egypt** (2019 to present).
- Member of National Committee of Cybersecurity, Ministry of Communication, Cairo, **Egypt** (2014 to 2021).
- Member of the Tripartite National Committee for the GERD Dam between Egypt, Sudan and Ethiopia, Cairo, **Egypt** (2014 to 2015).
- Member of Scientific Committee, National Water Research Center, Cairo, **Egypt** (2015 to 2018).
- Steering Committee Member of the Regional Knowledge Network on Water (RKNOW), Water-Food-Energy-Nexus, European Union (EU), Amman, **Jordon** (2014 to 2016).
- Member of National Committee of Water Resources, Ministry of Water Resources and Irrigation, Cairo, **Egypt** (2013 to present).
- Member of National Committee of Irrigation and Drainage, Ministry of Water Resources and Irrigation, Cairo, **Egypt** (1999 to 2018).
- Member of National Focal Point of Euro-Mediterranean Water Information System (Steering Committee Member since 2005), European Union (EU), Sophia Antipolis, **France** (2000 to 2010).

- Steering Committee Member of Water Use Ethics Center, Ministry of Water Resources and Irrigation, Cairo, **Egypt** (2004 to 2010).
- Member of Gender Information Unit, Ministry of Water Resources and Irrigation, Cairo, **Egypt** (2002 to 2008).
- Member of Integrated Decision Support Group, Colorado State University, Fort Collins, Colorado, **USA** (1993 to 1996).

COMPUTER SKILLS

- **Operating systems** MS-WINDOWS, LINUX and UNIX.
- **Networking** Microsoft Networking, CISCO, NOVELL.
- **Languages** Python, C++, C, R-Language, VB.Net, FORTRAN, HTML, Pascal and PROLOG.
- **GIS & Remote Sensing** ArcGIS, ERDAS, ENVI, and TerrSet.
- **Academic software** MATLAB, GAMS, Mathematica, WMS, SMPDBK, GMS, HEC-ResSim, CDEE/DEEP, WEAP, FlowMaster, Cropwat, LINDO/LINGO, Mintab, Statistica, DEFINITE, M4, CSUDP, MODSIM, SPSS, WinQSB and Alyuda NeuroIntelligence.
- **Database** MySQL, Oracle (SQL/PL, Developer) and ACCESS.
- **Other Software** PHP-Runner, Serif Applications, Autocad, Adobe Photoshop, Golden Software Grapher, Dreamweaver.

RESEARCH ARTICLES

- **Mahmoud, M.R.,** "Siting Nuclear Desalination Plant in Egypt Using GIS and Multi-Criteria Evaluation", Under Review, submitted to International Journal of Nuclear Desalination.
- **Mahmoud, M.R.**, Tawfik, M., Madhat, M., and Luis A. Garcia, "Assessment of Water Hyacinth Area Covered Lake Tana", Under Review, submitted to Sensors Journal by MDPI Publication.
- **Mahmoud, M.R.**, Roushdi, M., and Aboelkhear, Mostafa, Feb 2024, "Potential benefits of climate change on navigation in the northern sea route by 2050", Scientific Reports, Nature, Vol. 14, Issue 1, pp. 2045-2322, https://doi.org/10.1038/s41598-024-53308-5.
- **Mahmoud, M.R.**, Fahmy, H., and Luis A. Garcia, June 2022, "Potential Impact of Failure of the Grand Ethiopian Renaissance Dam on Downstream Countries", Journal of Flood Risk Management, Wiley, Vol. 15, Issue 2, pp. 1-16, https://onlinelibrary.wiley.com/doi/full/10.1111/jfr3.12793
- Mohamed A. El-Kordya, **Mahmoud, M.R.**, and Ahmad W., 2016, "Mapping Water Bodies in Tropical Regions under Mixed Inundation. Application to Rosieres Reservoir", Al Azhar University Engineering Journal, Vol. 20, pp. 10-37.
- Mohamed A. El-Kordya, **Mahmoud, M.R.**, and Ahmad W., 2016, "Using MODIS Spectral Indices for Monitoring Shallow Inland Water Bodies.", Al Azhar University Engineering Journal, Vol. 20, pp. 30-57.
- **Mahmoud, M.R.**, and Fredericks, J. W., September 2007, "Using Satellite Imagery for Irrigation Scheduling.", Proceeding of the 58th ICID International Executive Council Meeting and the USCID Fourth International Conference on Irrigation and Drainage, ICID, Sacramento, California, U.S.A., September 30 to 6th October, 2007.
- **Mahmoud, M.R.,** April 2006, "High Dimension Dynamic Programming Model for Water Resources Expansion Projects", Engineering Optimization, Taylor & Francis, Vol. 38, Issue 3, pp. 371-389, https://www.tandfonline.com/doi/full/10.1080/03052150600593218
- **Mahmoud, M.R**., November 2005, "Simulation of the High Aswan Dam Using ResSim", Proceeding of the International Conference of UNESCO FLANDERS FIT Friend/Nile Project: Towards a Better Cooperation, UNESCO and Water Resources Research Institute (NWRC), Sharm El Sheikh, Egypt, November 12-15, 2005.
- **Mahmoud, M.R.**, and Fredericks, J. W., September 2005, "Low Cost Information Technology for Integrated Water Management Districts.", Proceeding of the 19th International Congress on Irrigation and Drainage (ICID), ICID, Beijing, People's Republic of China, September 10-18, 2005.

- **Mahmoud, M.R.,** and Ali, H. M.**,** December 2004, "Modeling Artificial Neural Networks For Forecasting Monthly Nile River Natural Flow", Journal of Engineering & Applied Science, Faculty of Engineering, Cairo University, Cairo, Egypt, Vol. 51, Issue 6, pp. 1119-1134.
- **Mahmoud, M.R.**, and Ali, H. M., April 2004, "Assessment of Desalinating Brackish Groundwater in Sinai Using GIS And Linear Programming", Proceeding of Second Regional Conference on Arab Water 2004: Action Plans for Integrated Development, National Water Research Center, April 13-15, 2004, Cairo, Egypt.
- Ali, H. M., and **Mahmoud, M.R.**, April 2004, "Optimal Conjunctive Use of Surface Water and Groundwater in Egypt Governorates", Proceeding of Second Regional Conference on Arab Water 2004: Action Plans for Integrated Development, National Water Research Center, April 13-15, 2004, Cairo, Egypt.
- **Mahmoud, M.R.,** April 2004, **"**Improved Model for Selecting Water Resources Projects Using Objective Space Dynamic Programming and Mixed Integer Programming", Water Science Journal, National Water Research Center, Cairo, Egypt, Issue 35, pp. 21-32.
- Ali, H. M., and **Mahmoud, M.R.**, April 2004, "Management of Egypt Crop Pattern According to Reservoir Water Volume", Proceeding of Second Regional Conference on Arab Water 2004: Action Plans for Integrated Development, National Water Research Center, April 13-15, 2004, Cairo, Egypt.
- **Mahmoud, M.R.,** and Ali, H. M., April 2003, "Forecasting The Yearly Nile River Natural Flow Using Gradient Descending Neural Networks", Water Science Journal, National Water Research Center, Cairo, Egypt, Issue 33, pp. 21-32.
- **Mahmoud, M.R.,** Fahmy, H., and Labadie, J.W., March, 2002, "Multicriteria Siting and Sizing of Desalination Facilities with Geographic Information System", Journal of Water Resources Planning and Management, ASCE, Vol. 128, Issue. 2, pp. 113-120, https://ascelibrary.org/doi/10.1061/%28ASCE%290733-9496%282002%29128%3A2%28113%29
- **Mahmoud, M.R.,** October 2000, "Expert System Model For Generating Water Policies In Egypt", Water Science Journal, National Water Research Center, Cairo, Egypt, Issue 28, pp. 3-11.
- **Mahmoud, M.R.,** and Garcia, L.A., May 2000, "Comparison of Different Multi-Criteria Evaluation Methods for the Red Bluff Diversion Dam", Environmental Modeling and Software, Elsevier, Vol. 15, Issue 5. pp. 471-478, https://www.sciencedirect.com/science/article/abs/pii/S1364815200000256
- **Mahmoud, M.R.,** April 1999, "Integrated Mathematical Models for Evaluating Desalination Technology", Water Science Journal, National Water Research Center, Cairo, Egypt, Issue 25, pp. 21-32.
- Ali, H. M., and **Mahmoud, M.R.,** March 1999, "Determining Optimal Allocation And Crop Pattern In Egypt By the Use Of Linear Programming ", Proceedings of the Seventh Nile 2002 International Conference of Comprehensive Water Resources Development of the Nile Basin: The Vision for the Next Century, National Water Research Center, pp. EGY7.1–EGY7.11, March 15-19, 1999, Cairo, Egypt.
- **Mahmoud, M.R.**, and Ali, H. M., October 1998, "Developing a Neural Network Model for Predicting the Nile River Inflow.", Proceedings of USCID's International Conference on Shared Rivers - River Basin Management to Meet Competing Needs, U.S Committee on Irrigation & Drainage (USCID) and U.S.A Bureau of Reclamation, pp. 253-266, October 28-31, 1998, Park City, Utah, USA.
- Ali, H. M., and **Mahmoud, M.R.,** October 1998, "Developing Water Indices for Distributing Increased Nile Water Yield Among the Nile Basin Countries.", Proceedings of USCID's International Conference on Shared Rivers - River Basin Management to Meet Competing Needs, U.S Committee on Irrigation & Drainage (USCID) and U.S.A Bureau of Reclamation, pp. 177-187, October 28-31, 1998, Park City, Utah, USA.
- **Mahmoud, M.R.,** and Amer, K. M.**,** August 1998, "Evaluation And Planning Simulation Model For Water Management Of Northwest Egypt", Journal of Engineering & Applied Science, Faculty of Engineering, Cairo University, Cairo, Egypt, Vol. 45, Issue 4, pp. 467-480.
- Ali, H. M., and **Mahmoud, M.R.**, April 1998, "Cultivation of Qattara Depression by the Use of Desalinated Water", Water Science Journal, National Water Research Center, Cairo, Egypt, Issue 18, pp. 34-39.
- **Mahmoud, M.R.,** and Garcia, L.A., 1995, "Multi-Criteria Decision Support System Implementation and Application", Presented at the First International Conference on Multiple

Objective Decision Support Systems for Land, Water, and Environmental Management: Concepts, Approaches, and Applications, Honolulu, Hawaii, July 23-29, 1995.

SELECTED TECHNICAL REPORTS

- "Assessment of Water Hyacinth Area Covered Lake Tana", Professor in National Water Research Center, Environment & Climate Change Research Institute, National Water Research Center, Cairo, Egypt, Jan 2019.
- "Challenges in Water-Resources Plan for Future - Egypt", Assistant Minister for Research and Technology, Ministry of Water Resources & Irrigation, Cairo, Egypt, Mar 2016.
- "The Delta of Egypt: Climate Change - Seawater Raising", Assistant Minister for Research and Technology, Ministry of Water Resources & Irrigation, Cairo, Egypt, 2015.
- "Comparison Between HEC-WEAP-DHI-Models Study for Nile Water Sector", Assistant Minister for Research and Technology, Ministry of Water Resources & Irrigation, Cairo, Egypt, 2015.
- “Estimating Irrigated Agriculture Area in Ismailia Command Area Using Sentinel Products”, Assistant Minister for Research and Technology, Information and Decision Support System Department, Ministry of Water Resources & Irrigation, Cairo, Egypt, 2015.
- “Determining the Rice Area Cultivated in Egypt for The Year 2015 Using Remote Sensing Technology “, Assistant Minister for Research and Technology, Information and Decision Support System Department, Ministry of Water Resources & Irrigation, Cairo, Egypt, Nov 2015.
- “Using Remote Sensing for Estimating Merowe Reservoir Volume and Level in Sudan”, Assistant Minister for Research and Technology, Information and Decision Support System Department, Ministry of Water Resources & Irrigation, Cairo, Egypt, May 2014.
- “Using Remote Sensing for Estimating Irrigated Agriculture Area in Delta for 2013”, Assistant Minister for Research and Technology, Information and Decision Support System Department, Ministry of Water Resources & Irrigation, Cairo, Egypt, May 2014.
- “Using Remote Sensing for Estimating Irrigated Agriculture Area in Delta for 2012”, Assistant Minister for Research and Technology, Information and Decision Support System Department, Ministry of Water Resources & Irrigation, Cairo, Egypt, April 2014.
- "Introduction to Landsat-8", Professor in National Water Research Center, Egyptian Engineering Engineers Syndicate, Scientific Magazine, 2013.
- “Assessment of Dams Operations in Different Regions in the Kingdom of Saudi Arabia: Simulation of Al-Aqiq Reservoir Operation”, King Abdullah Research & Consulting Institute, Riyadh, Saudi Arabia, March 2011.
- “Assessment of Dams Operations in Different Regions in the Kingdom of Saudi Arabia: Simulation of Baysh Reservoir Operation”, King Abdullah Research & Consulting Institute, Riyadh, Saudi Arabia, December 2010.
- “Assessment of Dams Operations in Different Regions in the Kingdom of Saudi Arabia: Simulation of Houtat Bani Tamim Reservoir Operation”, King Abdullah Research & Consulting Institute, Riyadh, Saudi Arabia, October 2010.
- “Assessment of Dams Operations in Different Regions in the Kingdom of Saudi Arabia: Simulation of Thadiq Reservoir Operation”, King Abdullah Research & Consulting Institute, Riyadh, Saudi Arabia, July 2010.
- “Determining The Rice Area Cultivated in Egypt for The Year 2009 Using SPOT Satellite Images“, Information and Decision Support System Department, Ministry of Water Resources & Irrigation, Cairo, Egypt, Nov 2009.
- “Determining The Rice Area Cultivated in Egypt for The Year 2008 Using Remote Sensing Technology“, Information and Decision Support System Department, Ministry of Water Resources & Irrigation, Cairo, Egypt, Nov 2008.
- “Developing Renewable Ground Water Resources In Arid Lands: Pilot Case: The Eastern Desert Of Egypt”, Eastern Desert Project, UNDP, Ministry of Water Resources & Irrigation, Cairo, Egypt, Jan 2008.
- “Survey of Geographic Information Activities in Ministry of Water Resources & Irrigation”, Final Report, Main Information Center, Ministry of Water Resources & Irrigation, Cairo, Egypt, July 2000.

- "Assessment of Present Status of Water Quality in Egypt", Final Report, National Water Quality and Availability Management Project, National Water Research Center, Canadian Executing Agency, Cairo, Egypt, March 1999.
- "Nile Water Strategic Research Unit", Final Report, River Nile Protection and Development Project Phase II, National Water Research Center, Canadian International Development Agency (CIDA), SNC-LAVALIN, Cairo, Egypt, May 1997.
- "Rainfall Forecast and Strategic Irrigation Management", Progress Report, Project 93 AVI 093, Commission of The European Communities, Water Management Research Institute, National Water Research Center, Cairo University, ISMES S.P.A Italy, Cairo, Egypt, April 1996.

CONFERENCES & WORKSHOPS ACTIVITIES

- A speaker in the 2022 United Nations Climate Change Conference, Conference of the Parties of the UNFCCC (COP27), for "Disaster Risk Reduction and Sustainable Cities for Improved Livelihoods", Sharm El-Sheikh, **Egypt**, 9-13 Nov 2022.
- Chairman of the session titled "Water, climate change, and future cooperation" in the Cairo Water Week for Water at the Heart of Climate Action, Cairo Water Week 5, Cairo, **Egypt**, 16-19 Oct 2022.
- A keynote speaker in the Cairo Water Week for Climate Change in Arid Countries: The Risks, Cairo Water Week 3, Cairo, **Egypt**, 18-22 Oct 2020.
- A keynote speaker in the World Water Forum 8 for Open source and big data for water use efficiency and sustainable development, World Water Forum 8, Brasilia, **Brazil**, 18-23 Mar 2018.
- A committee member Water Research Cooperation between NWRC and Japan Universities, Organized by Tottori University, Tottori, **Japan**, 31 Aug – 3 Sep 2017.
- A committee member in select group of water leaders for Global Water and Climate Initiative, organized by Colorado State University, Fort Collins, Colorado, **USA**, 13-14 June 2016.
- Participated in Water Diplomacy Workshop, Organized by Harvard & MIT universities, Boston, **USA**, 22-27 Jun 2014.
- Participated in the International Commission of Large Dams (ICOLD) Annual Meeting & Symposium, organized by International Commission of Large Dams, Bali, **Indonesia**, 01-06 June 2014.
- Participated in Energy and Water 2013: Building A Global Energy Network & **Colin Powell** Lecture, organized by American Middle East Institute, Pittsburgh, Pennsylvania, **USA**, 29-30 October 2013.
- Participated in the International Roundtable on Transboundary Water Resources Management in the Southern Mediterranean, organized by United Nations Economic Commission for Europe - Environment Division, Rome, **Italy**, 26-27 November 2012.
- Participated in the 2ed Arab Water Forum, organized by Arab Water Council, Cairo, **Egypt**, November 20-23, 2011.
- Participated in the 5th World Water Forum, organized by World Water Council, Istanbul, **Turkey**, March 16-22, 2009.
- Attended the 3rd International Conference on Water Resources and Arid Environments, sponsored by the Prince Sultan Research Center for Environment, Water and Desert, Riyadh, **Saudi Arabia**, on 16 to 19 November 2008.
- Participated in the 58th ICID International Executive Council Meeting and the USCID Fourth International Conference on Irrigation and Drainage, Sacramento, California, **USA**, on 30 September 2007 to 6th October 2007.
- Attended the 4th World Water Forum, sponsored by World Water Council, Mexico City, **Mexico**, March 14-24, 2006.
- Participated and Rapporteur in the International Conference of UNESCO Flanders Fit, FRIEND/ Nile Project: Towards A Better Cooperation, UNESCO and Water Resources Research Institute, NWRC, Sharm El Sheikh, **Egypt**, November 12-15, 2005.
- Participated in the 19th International Congress on Irrigation and Drainage (ICID): Use of Water and Land for Food Security and Environmental Sustainability, sponsored by International Congress on Irrigation and Drainage (ICID), Beijing, People's Republic of **China**, September 10-18, 2005.

- Participated in the 3ed International Water Seminar, Water Resources Information System, JICA, Demashq, **Syria**, 3-6 September 2005.
- Attended the First African Regional Conference on Drainage (ARCOD): Challenges and Opportunities for Enhancing Quality of Life, Organized by the Egyptian National Committee on Irrigation and Drainage (ENCID), Cairo, **Egypt**, December 6-9, 2004.
- Participated in the Second Regional Conference on ARAB WATER 2004: Action Plans for Integrated Development, sponsored by National Water Research Center, Cairo, **Egypt**, April 13-15, 2004.
- Attended the 3rd World Water Forum, sponsored by World Water Council, Kyoto, **Japan**, March 15-23, 2003.
- Rapporteur in the International Conference on Wadi Hydrology, sponsored by National Water Research Center, Sharm El-Sheikh, **Egypt**, November 21-23, 2000.
- Rapporteur in the International Conference of the Integrated Management of Water Resources in the 21st Century, sponsored by the National Water Research Center, Cairo, **Egypt**, November 21-25, 1999.
- Participated in the 17th International Congress on Irrigation and Drainage, Sponsored by International Commission on Irrigation and Drainage, Granada, **Spain**, 11-19 September 1999.
- Technical assisted and participated in the Seventh Nile 2002 International Conference, Comprehensive Water Resources Development of the Nile Basin: The Vision for the Next Century, sponsored by the National Water Research Center, Cairo, **Egypt**, 15-19 March 1999.
- Participated in International Conference on Shared Rivers, River Basin Management to Meet Competing Needs, sponsored by U.S. Committee on Irrigation & Drainage and Bureau of Reclamation, Park City, Utah, **USA**, 28-31 October 1998.
- Attended the International Conference on Arab Water, Cairo International Conference Center, sponsored by the National Water Research Center, Cairo, **Egypt**, 26-28 April 1998.
- Attended the 16th International Congress on Irrigation and Drainage, Sponsored by International Commission on Irrigation and Drainage, Cairo, **Egypt**, September 1996.
- Participate in the Fifteen Annual American Geophysical Union International Conference: Hydrology Days, Sponsored by American Geophysical Union and Colorado State University, Fort Collins Colorado, **USA**, 3-7 April 1995.