Establishment Of A Factory For The Production Of Membranes For Water Desalination And The Manufacture Of Pumps With 100% Egyptian Components

Dr. Abdel Aziz Kansowa, President of Alexandria University, announced that the cooperation protocol recently signed by the university with the Arab Organization for Industrialization to cooperate in the areas of water treatment, desalination and renewable energy uses, which is being implemented through the Water Excellence Center at Alexandria University, resulted in several executive steps being taken. Work at the Water Excellence Center at Alexandria University to manufacture 100% Egyptian pumps, as well as establish a factory for the production of membranes for water desalination, which would be a great addition to the region.

This came during a meeting of the Council for Community Service and Environmental Development Affairs.

The university president added that this protocol came with the aim of enhancing cooperation between the state's industrial and research institutions and exploiting national manufacturing capabilities to deepen local manufacturing and exchange technical expertise in the fields of water desalination and renewable energy to find non-traditional alternatives to water resources, pointing out that this cooperation contributed to the success of pump manufacturing with an Egyptian component 100 The experiment was successful on water lifting stations and will be applied during the development of the Egyptian rural project, within the initiative of the President of the Republic, "A Dignified Life", and the initiative of the Egyptian Villages Development Project, within the framework of the university's keenness to participate in this great national project to relieve the burdens of citizens in more communities needs in the Egyptian countryside and slums, stressing that the university is happy to be an integral part of this initiative.

Qansouh called on the colleges' deputies to pay attention to the outputs of research projects within the colleges, to seek to establish companies based on the outputs of scientific research, and to work on applying them with the appropriate industrial partner to achieve maximum benefit for the service and development of the community.

- Dr. Fahmy Charles, Emeritus Professor at the Higher Institute of Public Health, reviewed the precautionary measures of Alexandria University to prevent the emerging corona virus during this period, through full commitment to distancing, wearing masks, continuous sterilization of facilities, and integration between the various university sectors in addressing the spread of the virus, and following up on registration of groups. eligible to receive the vaccine, and to launch awareness programs within the university community.

Dr. Charles also reviewed a number of files adopted by the sector for the development of Egyptian villages and the participation of faculties, faculty members and students in this project, such as eradicating illiteracy, providing aspects of medical, pharmacy and veterinary care, community participation, and launching awareness and service programs for families.

Dr. Essam Wahba, Vice Dean of the Faculty of Engineering, reviewed a report on the visit of the Alexandria University delegation to Bahij village in Borg El Arab last week as part of a decent life initiative, during which the health unit and youth center were visited, awareness programs were provided to the villagers and training courses in sewing and literacy were also listened to. To the requests of the people of the village and the most important problems they face and the possibility of solving them.

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Role of Pillar

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Key Activities

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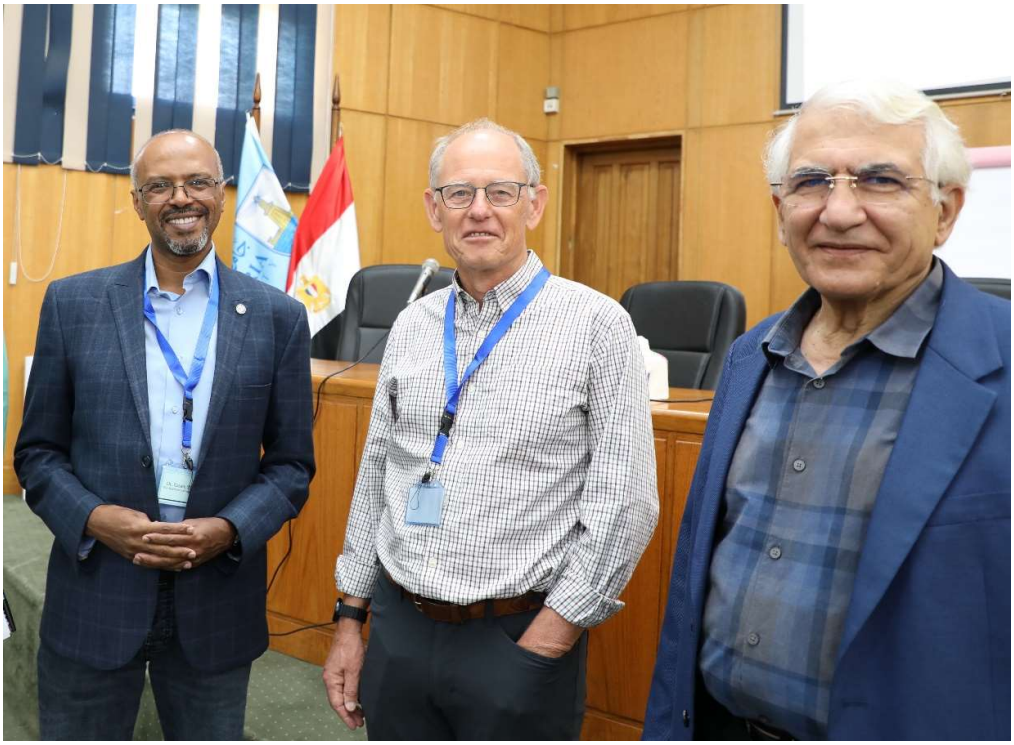

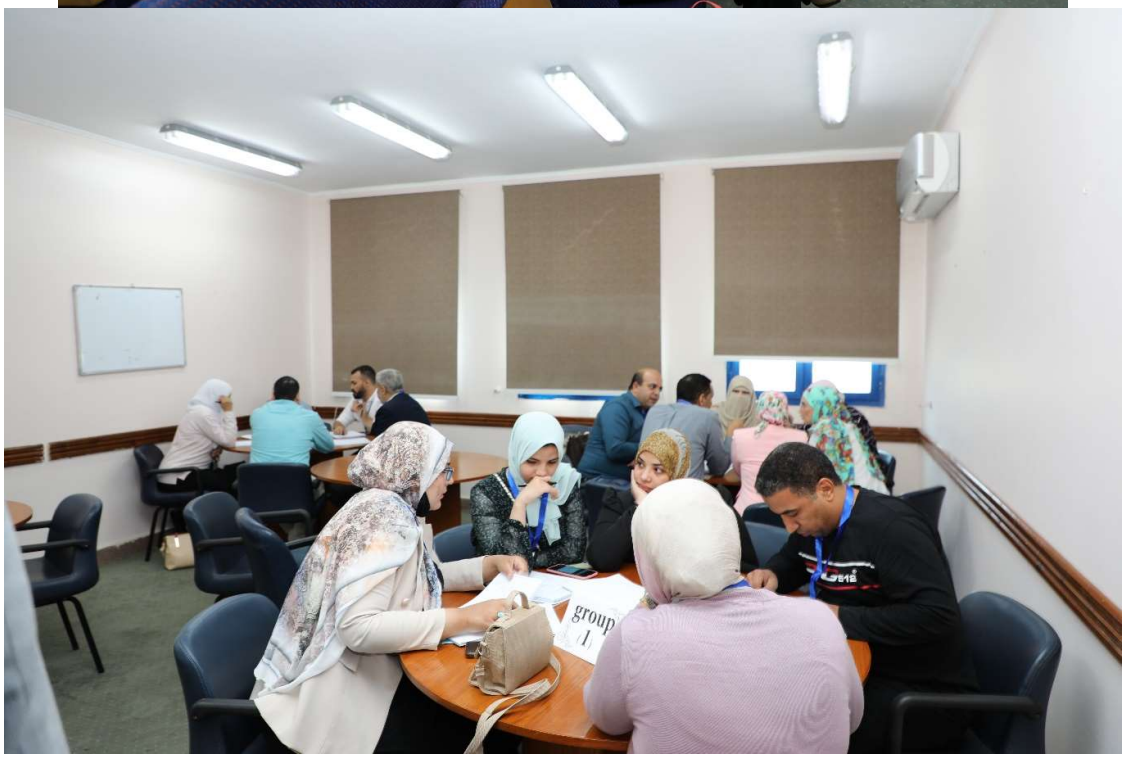
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Opportunity for advanced training on education and research, leading to capacity building and sustainability takes part in the Center of Excellence for Water activities for faculty. The faculty exchange program will strive towards meeting these envisioned goals through teaching and applied research capacity building, peer-reviewed publications, and technology commercialization activities.

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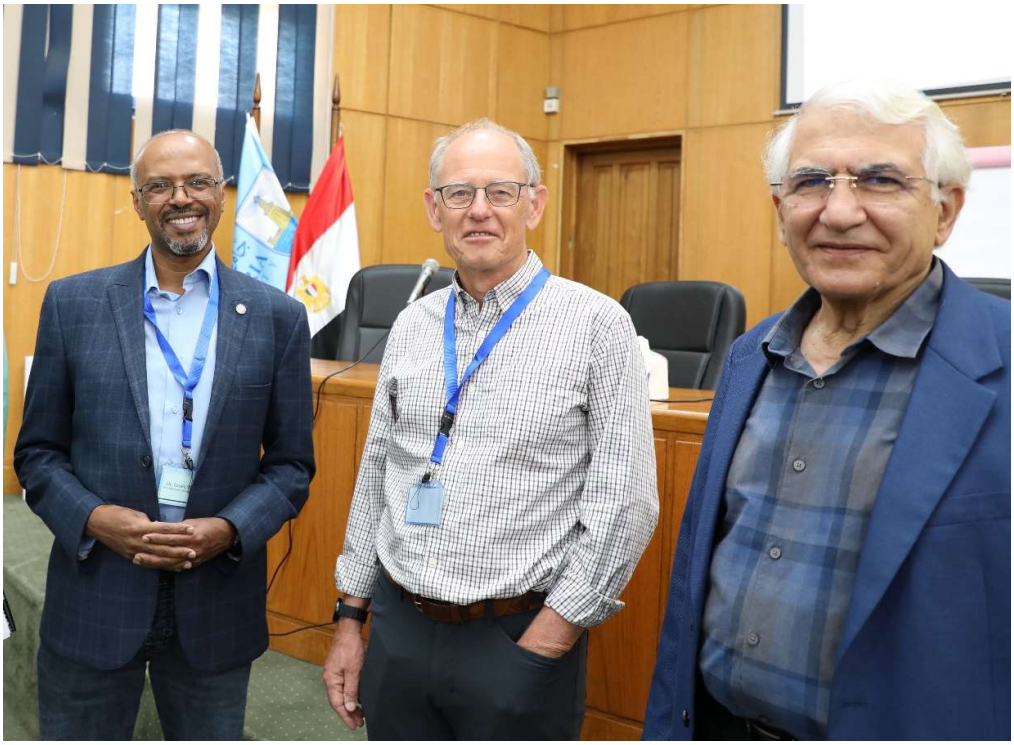

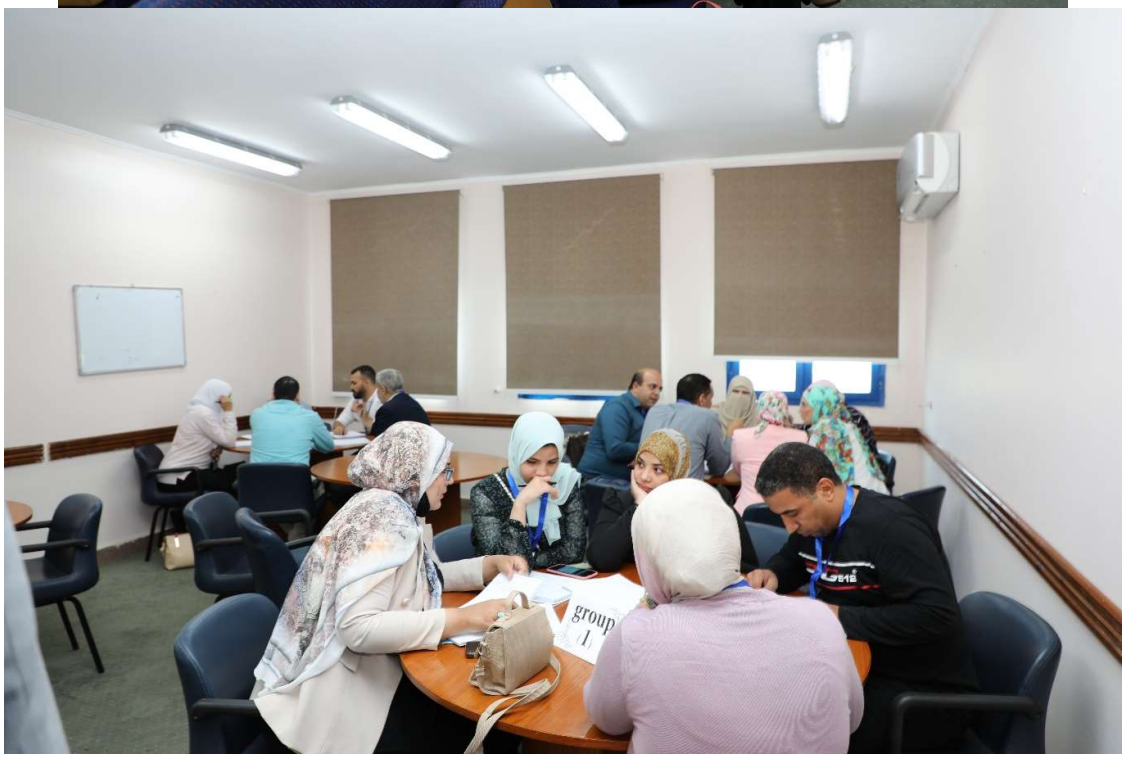
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First Call

From 29 November to 10 December 2021.

The workshop covered several topics as: a. Lab safety training and Laboratory Compliance, b. Introduction to water quality parameters, c. State of the art equipment used in water quality analysis, d. Quality control and Quality Assurance (QA/QC), e. Precision and Accuracy, f. pH, Acidity, Alkalinity & Hardness, Dissolved Oxygen, Turbidity, TSS, DSS, VSS, g. Total Organic Carbon, Chemical Oxidation Demand (COD), and 5-day Biological Oxidation Demand (BOD), h. Inorganic chemicals (Fluoride, Chloride, Nitrates, etc.), i. Disinfection By-Products, j. Microbial Enumeration, k. Use of TOC Analyzer, Ion Chromatograph (IC), UV/vis Spectrophotometer. In addition to: a. Seminars from industry experts, b. Field Trip to Drinking Water Treatment Plant, c. Field Trip to Municipal Wastewater Treatment Plant.

Second Call

Module 1:

From 31 July to 13 August 2022.

The workshop covered several topics as: a. Introduction to conventional water quality parameters, b. Acidity, Alkalinity, and Hardness, c. pH, Conductivity, Turbidity, and Solid analysis (TS, TDS, TSS and VSS), d. Dissolved Oxygen, 5-day Biological Oxidation Demand (BOD), Chemical Oxidation Demand (COD), Theoretical Oxidation Demand (ThOD), e. Total Organic Carbon analysis, f. Microbial Enumeration, g. Precision and Accuracy, and Quality control and Quality Assurance (QA/QC), h. Lab safety training and Laboratory Compliance, i. Water Sampling.

Module 2:

From 17 to 30 July 2022.

The workshop covered several topics as: a. State of the art equipment's used in water quality analysis, b. Inorganic chemicals (Fluoride, Chloride, Nitrates, etc.) using Ion Chromatography (IC), c. Use of advanced analytical instruments such as Gas and Liquid Chromatography-Mass Spectrometry (GC/MS, LC/MS/MS), d. Inductively Coupled Plasma Mass Spectrometry (ICP/MS), e. Gene detection and quantification using Quantitative Real-Time Polymerase Chain Reaction (qPCR), f. Quality control and Quality Assurance (QA/QC), including Precision and Accuracy, g. Solid phase extraction (SPE) and Liquid phase extraction (LLE), h. Lab safety training and Laboratory Compliance.

The State-of-the-Art Water Curriculum workshop

USAID-funded Center of Excellence for Water launches a total of four workshops on the use of Learning Management Systems, Innovative Teaching Strategies, and State-of-the-Art Water Curriculum. The State-of-the-Art Water Curriculum (SOAC) workshop is held on 27 and 28 June 2022 at Alexandria University. This workshop brings together 25 faculty, faculty teaching assistants, researchers, water professionals from industry and municipalities, and ministry personnel.
Over the course of seven months (between July 2022 – February 2023), participants will work in groups to create a set of recommendations for future water science and engineering

curricula and teaching methods targeted at meeting Egyptian water challenges in 2035 in all organizations with a water focus.

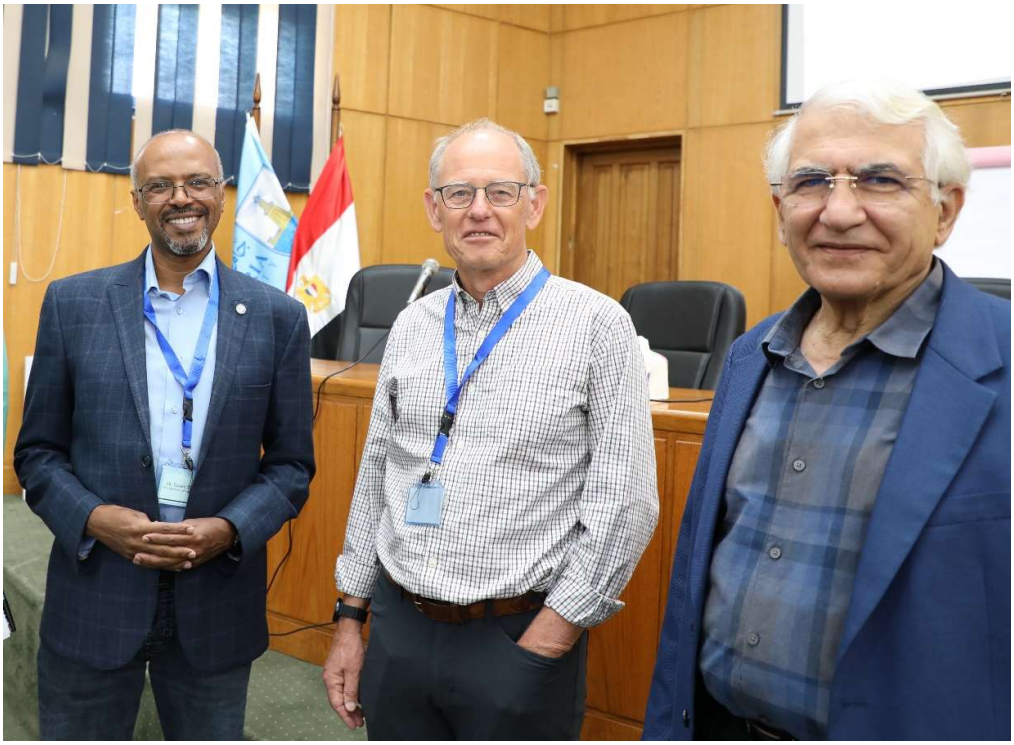
The main lecturer for this Workshop include Dr. David Stevens, Professor at Civil and Environmental Engineering, @utahstate. Additionally, representatives from Egyptian Partner Universities Ain Shams University, Alexandria University, Aswan University, Beni Suef University and Zagazig University will be attending to help with the activities.

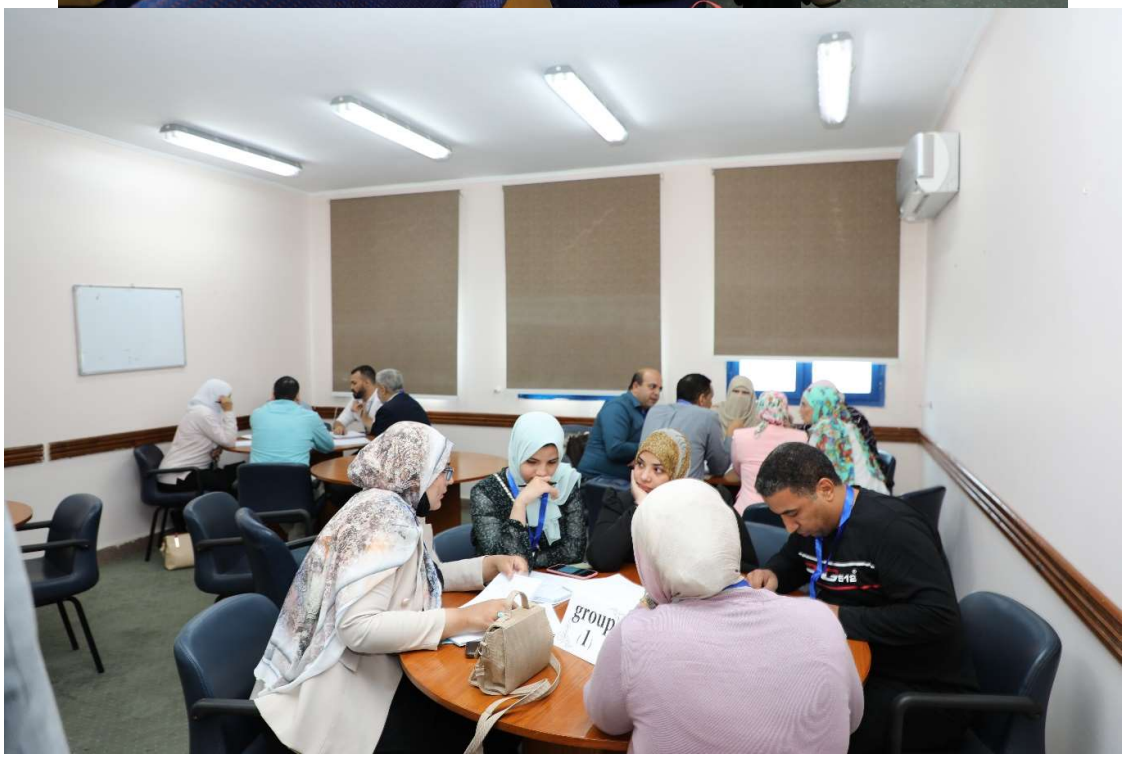
The ultimate goal of this workshop is to produce a report and roadmap to help inform water engineering and science education in Egypt to meet the future needs of the water sector with a target date of 2035.

The workshop's main objectives are to review the state-of-the-art water engineering and science issues critical to Egypt's long-term water security and water engineering and science curricula in Egypt and the greater Middle East, Europe, Asia, and the Western Hemisphere; envision Egypt's water needs by 2035, both quantity, and quality, that will serve the domestic, agriculture, industrial, and energy sectors, and identify education gaps that will prevent providing professional training to meet those needs. Also, the workshops aim to identify subject areas that are critical to defining a core curriculum suitable for all Egyptian Universities, identify location-specific curricula to be used as technical electives tailored to the needs of a community, and discuss how those needs are best translated to the undergraduate, postgraduate, ministry, and industry levels and cultivate a community of practice (CoP) as a means of managing knowledge sharing and promoting learning sustainability among faculty members and water professionals in Egypt.

By the end of this program, participants will reconvene in Aswan in February 2023 for a 5-day workshop to bring together their recommendations into an overall State-of-the-Art Water Curriculum Report and Roadmap to help inform water education into the future.


مركز تنمية قدرات
أعضاء هيئة التدريس والقيادات
FACULTY AND LEADERSHIP DEVELOPMENT CENTER
FLDC




group
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Faculty Exchange – Semester Abroad

First

Host: Temple University
From 09/01/2022 – 12/31/2022.

Opportunity for advanced training on education and research, leading to capacity building and sustainability takes part in the Center of Excellence for Water activities for faculty. The faculty exchange program will strive towards meeting these envisioned goals through teaching and applied research capacity building, peer-reviewed publications, and technology commercialization activities.

Second

Host: Utah State University
From 09/01/2022 – 12/16/2022.

Opportunity for advanced training on education and research, leading to capacity building and sustainability takes part in the Center of Excellence for Water activities for faculty. The faculty exchange program will strive towards meeting these envisioned goals through teaching and applied research capacity building, peer-reviewed publications, and technology commercialization activities.

Undergraduate Semester Abroad – USU

Host: Utah State University
From 08/20/2022 – 12/16/2022.

The students will take courses at Utah State University that have been previously articulated with coursework at their home universities. These courses include hydrology, hydraulics, green infrastructure, solid/hazardous waste management, environmental management, and environmental quality analysis.

The First International Symposium

The International Symposium on “Sustainable Water Solutions”, organized by the Alexandria Water Resilience – Center of Excellence for Water, which is bringing together leading experts from Egypt and the United States to find solutions to problems caused by climate change in Egypt and around the world.
This annual event gathers prominent scientists and leading engineers to present their findings and research outputs and share their knowledge in four areas of the water field, namely, Water Use Efficiency, Integrated Water Resources Management, Safe Treated Water and Reuse, and Non-Conventional Water Resources and Desalination with climate change in the core.


USAID
The American University in Cairo
Center of Excellence for Water
مركز التميز للمياه

Training for Undergraduate Students

The program's students visited the drinking water treatment plant in Alexandria (Al-Mansheya 2) to learn about the stages of water purification and the plant's boredom.

Training for civil and environmental engineering students at the Eastern Wastewater Treatment Plant in Alexandria.

Badya, Palm Hills, 6 October construction site visit for Civil and Environmental Engineering program Students.

The Center of Excellence for Water

Apply	Scholarships Program to study Water Engineering	برنامج المنح الدراسية في مجال هندسة المياه
Apply	Research Grants to study Water Engineering - call for proposal, research work program	منح مشروعات بحثية في مجال هندسة المياه
Apply	Workshops Calls for Water Engineering	إعلانات ورش العمل في مجال هندسة المياه
Apply	Semester Abroad Calls for (Graduate Students MSc / PhD or Faculty members) exchange at US universities	اعلانات تبادل طلاب الدراسات العليا / أعضاء هيئة التدريس لقضاء فصل دراسي بالجامعات الأمريكية

The Center of Excellence for Water is a USAID funded project implemented by the American University in Cairo with the aim to create the Center of Excellence for Water at Alexandria University and in partnership Egyptian Ministries and Governorates, US Universities (Temple University, Utah State University, University of California at Santa Cruz and Washington State University), Egyptian Universities (Ain Shams University, Alexandria University, Aswan University, Beni Suef University and Zagazig University), Egyptian Research Centers, and Egyptian and US foundation and private sector.

مركز التميز في المياه هو مشروع ممول من الوكالة الأمريكية للتنمية الدولية وتنفذه الجامعة الأمريكية في القاهرة بهدف إنشاء مركز للتميز في المياه بجامعة الإسكندرية وبالتعاون مع العديد من الوزارات والمحافظات والجامعات المصرية (جامعة عين شمس، جامعة الزقازيق، جامعة بني سويف وجامعة أسوان) والجامعات الأمريكية (جامعة ولاية يوتا، جامعة كاليفورنيا سانتا كروز، جامعة تيمبل وجامعة ولاية واشنطن)، بالإضافة إلى الشراكة مع العديد من مراكز البحوث والقطاع الخاص في مصر والولايات المتحدة الأمريكية.

The Center of Excellence for Water aims at Improving the relevance and quality of Water Curricula Develop effective / innovative teaching methods for undergraduate, graduates and professionals of Water Engineering Elevate Water related research capacities and ability to produce market driven research products Contribute to achieve the Egyptian

يهدف مركز التميز في المياه إلى تحسين ملاءمة وجودة مناهج المياه تطوير طرق تدريس فعالة ومبتكرة للطلاب الجامعيين وطلاب الدراسات العليا والمهنيين المحترفين في مجال هندسة المياه رفع القدرات البحثية المتعلقة بالمياه والقدرة على إنتاج أبحاث علمية تلبي احتياجات سوق العمل المساهمة في تحقيق استراتيجية التنمية المستدامة المصرية ورؤية ٢٠٣٠

Water Education in Alexandria University

Postgraduate Water Resource Management Scholarship Program
2021 – 2022

The Center of Excellence for Water is a USAID funded activity and implemented by the American University in Cairo (AUC). The Center of Excellence for Water, which is based at Alexandria University aims at improving the relevance and quality of water curricula, developing innovative teaching methods and elevating water related research capacities to produce market driven research products towards achieving the Egyptian Sustainable Development Strategy and Vision 2030.

It is within this context of improving quality and relevance of water curricula at Egyptian partner Universities that the Center of Excellence for Water is pleased to announce the

First Call for application for the Academic Year AY 2021 - 2022:

"Full Two Years Masters Scholarships"

to obtain their MSc in Sustainable Water Management at one of the Egyptian Partner Universities (Alexandria University, Ain Shams University, Aswan University, Beni Suef University, Zagazig University).

Scholarship Benefits

Scholarship recipients are entitled to the following benefits:

- Postgraduate tuition fees (for the two years of the master's program.
- Monthly stipend.
- Housing allowance (for students coming from governorates other than the one they will be studying in).
- Lap top.
- Compete for a "Semester abroad" opportunity to conduct thesis research at one of the US partner universities (Temple University, University California Santa Cruz, Washington State University, Utah State University).

Eligibility Criteria

Selection of candidates for the scholarships is based on an evaluation of the submitted application in addition to an interview considering equal opportunity without prejudice, regardless of gender, race, religion, age, disability or other personal attributes. The Center of Excellence for Water strongly encourages **female** applicants, and students with **disabilities** to apply for the scholarship.

Successful applicants should meet the following eligibility criteria:

1. Have Egyptian Nationality

2. Fulfill the host university's enrollment criteria (academic and administrative)
3. Demonstrate personal skills and interest in a water related career
4. Respectful and flexible to adapt to other cultures
5. Willing to participate in other activities of the Center of Excellence for Water and transfer experience to other students

Requirements

Admitted students to the **Postgraduate Water Resource Management Scholarship Program** should comply with the following two requirements:

a. Students should select elective courses based on the required course load at their home university, from the following list of 23 courses identified by the Center of Excellence for Water.

1. Water Resources Management
2. Systems Thinking for Sustainable Development
3. Introduction to Sustainable Systems Design
4. Water Policy, Security and Governance
5. Advanced Geographic Information Systems in Water Engineering
6. Remote Sensing of Land Surfaces
7. Groundwater Modelling
8. Surface Water Quality Modeling
9. Hydrologic Field Methods, Monitoring and Experimentation
10. Engineering and Science Informatics/Hydroinformatics
11. Climate Change Mitigation in Water Resources Management
12. Pollution Prevention and Industrial Ecology
13. Infrastructure Planning for Water Sustainability and Reuse
14. Risk and Benefit Analysis in Sustainable Design
15. Integrated River Basin/Watershed Planning and Management
16. Wadi Hydrology
17. River Bank Filtration
18. Ecosystems Restoration
19. Wetlands Management and Conservation
20. Advanced Water and Wastewater Treatment for Reuse
21. Water Supply and Demand Management
22. Advanced Irrigation and Drainage Engineering
23. Design of Wells and Dewatering Systems

Signing A Protocol Between Alexandria University And The Arab Organization For Industrialization For Cooperation In The Fields Of Water Desalination Plants And Renewable Energy Uses

Within the implementation of President Abdel Fattah El-Sisi's directions to enhance cooperation between the state's industrial and research institutions and exploit national manufacturing capabilities to deepen local industrialization and localize technology for designing and manufacturing equipment for desalination plants and renewable energy uses, in accordance with international quality standards, Lieutenant-General Abdel Moneim Al-Terras, President of the Arab Organization for Industrialization, witnessed today Signing a joint cooperation protocol between Alexandria University and the Arab Organization for Industrialization, with the aim of transferring technical knowledge in the fields of water desalination and renewable energy uses.

The protocol was signed by Dr. Abdel Aziz Konsowa, President of Alexandria University, and Engineer Abdel Rahman Abdel Azim

Othman, Director General of the Authority, at the headquarters of the Arab Organization for Industrialization in Cairo.

For its part, the “Terrace” praised the expertise of the University of Alexandria and its scientific and research centers specialized in the field of seawater desalination, well water, and sewage and industrial wastewater treatment. Expenses of importing components that are used in the manufacture of desalination plants, and settling this industry in a way that contributes to reducing the price of a cubic meter of desalinated water and achieving a high added value for the national industry, stressing the importance of strengthening joint cooperation to discuss successful models of technical and economic feasibility at Alexandria University that can be applied to me The industrial level by converting research outputs to the scope of quantitative industrial production, and pointed out that the areas of cooperation aim to meet the needs of the local market and national projects, and to expand in the future to African and Arab markets. Targeted training of technical personnel on technology Ornament, processing and after-sales services for technical cadres determined by the Arab Organization for Industrialization in cooperation with Alexandria University, as well as providing the necessary support for research and development work, benefiting from research and applied studies at the university, and conducting market studies for targeted products locally and abroad.

For his part, Prof. Kansouh, President of the University, praised the pivotal role played by the Arab Organization for Industrialization in introducing the latest production technologies and deepening local manufacturing in accordance with international quality standards, pointing to the importance of strengthening cooperation with Arab Industrialization to reduce the economics of establishing seawater desalination plants within the framework of the government’s direction to find alternatives. Unconventional water resources, and expansion in the establishment of seawater desalination plants,

especially in coastal cities, in addition to increasing the production and capacities of some existing plants. Through technological development and innovation, pointing out the importance of reaching the minimum percentage of the local component in various industrial sectors to a percentage close to 100%. and ultimately contribute to achieving the main goals of sustainable development.

The signing of the protocol was attended by Major General Issam Arafa, Chairman of the Board of Directors of the Engine Factory at the Arab Organization for Industrialization, Major General Ismail

Head of the technical sector in the authority, and Dr. Essam Wahba, Vice Dean of the Faculty of Engineering, Alexandria University for Community Service and Environmental Development Affairs.

https://alexu.edu.eg/index.php/?option=com_content&view=article&id=5932&catid=21&lang=ar-AA

Alexandria University – A Green University

Alexandria University is a pioneering University in changing many societal and environmental beliefs and practices that could negatively affect climate changes and carbon emissions. It has an important role in as a leader university and is committed to participate to developing environment friendly infrastructure, arranging universities according to sustainable development processes and adherence to green environment standards.

The university took an initiative towards to implement the state's general policies launched to ensure the role of universities to implement sustainability and a green environment through the university's unity and activities and the product of scientific research and its application.

The implementation green university is in line with of the goals of the United Nations to achieve true sustainable development, whether for the university community or the surrounding community. It is also in line with Egypt's 2030 Sustainable Development Plan and is compliant with the recommendations of the United Nations on the necessity of campus sustainability.

Sustainability indices for green universities is based on 10 basic axes that represent the basic concepts of the principles of preserving the environment, sustainability, environment friendly infrastructure and fulfilling the standards for both energy, climate exchange, waste management, water management, internal transport, environmental quality, and sustainability compliance with environmental laws and legislation.

Alexandria University adopted a set of integrated standards on strategies, tools and resources that the university should adopt and use in order to achieve the principle of sustainability. Such standards should bring about a positive change on the environmental aspect of the university campus, its buildings, reduce environmental impacts, work to reduce the environmental footprint of Alexandria University and raise the positive environmental footprint of the university.

Green economy as a context of sustainable development is one of the important tools available to achieve the areas of development, and it contributes to eliminating waste of resources, achieving economic growth, promoting social inclusion, improving human conditions, creating job opportunities and providing decent work for all. At the same time, this will ensure the sustainability of ecosystems' goods and services and a clear understanding of the interdependence between environmental sustainability and good political practices and effective institutional mechanisms, so that this will be decisive criteria for setting an effective national policy and making a fundamental contribution to the international efforts to achieve sustainable development.

Foundation of a green university has the following objectives:

- spreading the culture of sustainability in Egyptian universities.
- To contribute to having environment friendly buildings in Alexandria University
- Promote university-led social change in relation to sustainability goals.
- Contributing to achieving global goals for preserving the environment.

The criteria to achieve the principle of green sustainability in Alexandria university are as follows:

1. Energy and Climate Change (EC). Using solar energy as a clean source of electricity as an alternative to electricity based on fuels.
2. Providing green spaces on campus.
3. Transfer within the university. Adopting means of transportation inside and outside the university campus for students, staff and faculty members that do not pollute the environment.
4. Waste Management (WS).
5. Water (WR).

Smart Green University Proposal Indicators:

1. Energy and Climate Change (EC)

According to this indicator, solar energy is relied on as a clean and renewable source of electricity instead of relying on traditional sources of electric energy that depend on fossil fuels and pollute the environment. In this context, we suggest:

- The use of lighting poles inside the university campus equipped with solar cells for night lighting.
- Putting solar energy cells on the roofs of buildings inside the campus to provide those buildings with electric energy during work periods.
- Supplying cafeterias on campus with solar energy cells to generate electricity instead of the traditional sources of electric energy
- Adopting the use of LED lighting that save electrical energy inside the campus buildings instead of the traditional lighting that use more electrical energy.

- Taking into account the use of devices that help to save electricity as much as possible on the campus.
- Establishing a mechanism to save the use of electric energy inside the university campus that ensures the ideal use of electric energy inside the classrooms, as well as administrative

offices during non-working hours, to prevent energy waste and achieve optimal use of it while continuing to maintain the efficiency of the educational process.

- Adopting the concept of the smart building in order to accommodate the use of all devices energy saving which means using internet-connected technology, as an integral part architecture engineering to monitor and control structural design elements to share information between users, systems and buildings.

2. Providing green spaces on campus

Designing open spaces inside the university campus in a way that provides the largest possible amount of green spaces and trees, which would reduce the rate of carbon dioxide emissions resulting from activities on the campus.

3. Transfer within from /to the University university

The transportation system plays an important role on the level of carbon emissions and pollution sources in the university. The transportation policy encourages reducing the number of cars in universities, and the use of campus buses and bicycles which collectively create a healthy environment. Also, this policy encourages students, staff, and faculty to walk around, and to avoid using private cars. The use of environmentally friendly public transportation will reduce the carbon level on campus.

- Providing bicycle parking in suitable spaces allows students and workers to use them to move within the university campus effectively as an alternative to traditional means of transportation.
- Providing mass transportation (buses) for staff and faculty members to travel to and from the university campus instead of using private cars as a single means of

transportation, which will reduce carbon dioxide emissions.
- Adopting the state's initiative to provide bicycles announced by the Ministry of Youth and Sports under the slogan "Your bicycle is Your Health" for students and workers with supported prices to expand the base for practicing sports and play sports a lifestyle

4. Waste Management (WS)
According to this indicator, a policy is adopted to recycle waste by separating it from the source into four types:

- Organic waste and food residues.
- Plastic waste and plastic bags.
- Mineral waste and carbonated water cans.
- Paper waste

This allows for the recycling and utilization of as much of that waste as possible instead of disposing of it in landfills, which will eventually lead to its burning and the consequent pollution of the environment and the increase in emissions of greenhouse gases.

Alexandria University adopted a mechanism for healthy food and beverage within university dorms (providing healthy, balanced foods, a mechanism for packaging food and drinks, storing them, and a mechanism for maintaining a healthy atmosphere for dining places on campus).

5. Adoption of a preservation mechanism for water.

Water use in the campus is an important indicator in the sustainability scale. The aim is to urge universities to reduce water use, increase water conservation programs, and protect the environment.

The steps taken are: a water conservation program, a recycling program Water, Using Water-Saving Equipment, and Treating Wastewater . This was carried out through:
- Water-saving appliances are used instead of traditional appliances. This indicates the extent to which water-saving devices are used (for example, using a sensor-controlled automatic hand washing faucet, and highly efficient bathroom appliances.
- Supplying water taps with water saving units.
- Adopting a mechanism for maintaining water pipes to prevent waste resulting from leaks.

• Adopting plans and mechanisms to maintain the university's internal supply networks and taps to prevent water wastage.
• Providing a wastewater treatment plant in the university to make it suitable for irrigation of green spaces and gardens located within the university campus

RE-NF-MSF

Innovative Renewable Energy (RE) Driven - Multi Stage Flash (MSF) System with Salts Precipitator and Nano Filtration (NF) Feed Water pre Treatment.

Project # C2-S1-148

Arab Republic of Egypt
Research, Development & Innovation (RDI) Program

Egypt and the surrounding MEDA and other regional countries have exceeded the so called water poverty level. The per capita water resources, in Egypt for example, dropped from 1123 m^3/y to 794 m3/y in the period from 1990 to 2005 and expected to drop to 500 - 600 m^3/y in 2025 giving a drop of around 51%. The situation is not better in the other nearby courtiers in MENA, MEDA and EU.

Desalination has become a promising alternative and viable way to shrink the deficit in fresh water supply and has been adopted by 120 countries in the world. Luckily, Egypt and many MEDA countries enjoy a relatively high intensity Renewable Energy (RE) resources (solar & wind). Matching RE with desalination systems present a real challenge, and are the field of this project.

On the other hand, Multi Stage Flash (MSF) has proven to be the most reliable thermal desalination technology and dominates the thermal desalination market. MSF performance and economy can be more superior if the Top Brine Temperature (TBT), which is limited by scale deposits, is increased.

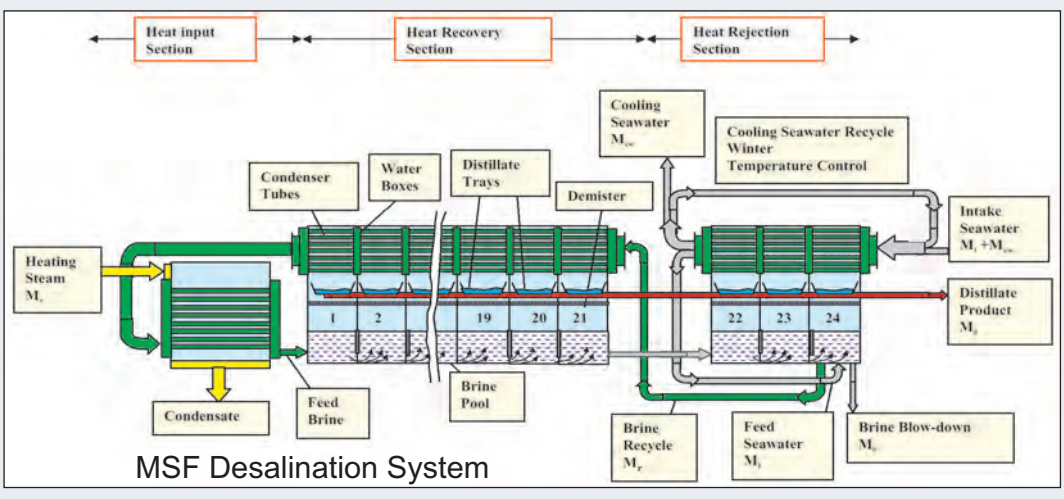
The use of salts precipitators (crystallizers), high TBT anti scalant, and Nano Filtration (NF) for feed water pre treatment can improve the systems performance by removing the divalent and mono-valent ions. This will, therefore, reduces both soft and hard scales which lead to reduction in specific Capital (CAPEX), Operational (OPEX) and water production costs.

The project aims at developing an innovative RE (solar-wind) system integrated with High Performance Multi Stage Flash (MSF) units using salts precipitator & Nano Filtration (NF) for feed water pre-treatment and Cooling Tower (CT) for heat sink. The concentrated brine reject from NF & MSF will be crystallized for salts/minerals recovery, as by-product and leading to near zero brine discharge.

Macroscopic and microscopic analyses will be conducted for the new (RE-NF-MSF) system components. Pilot test unit(s) will be designed and constructed to verify the innovative system performance. Conceptual design of a cost effective "Autonomous Commercial" RE-NF-MSF system of 5000 m^3/day water production capacity will be developed. The targeted performance are; i- Gain Output Ratio >= 15, ii- Specific power consumption of < 2.5 kWh/m^3, and iii- reduction in CAPEX, OPEX. The tools, results, patents and experience will be disseminated to stack holders, investors and companies to support the project sustainability.

Overall project objectives

1. Provide industry with the conceptual design of commercial desalination unit to support the future business plans of SME/SMI and encourage stack holders, investors, companies and utilities to invest in green energy and desalination,
2. Support the development of remote areas and new areas (far from the Nile) through developing a Renewable Energy (RE) Driven water production system to help the population re-distribution and create more job chances, and minimize the internal (and across boarder) migration.
3. Increase the communication & exchange of experience between industries and universities, NGOs and R&D centers and as well as MEDA-EU specialists in water production field using green energy.



MSF Desalination System

Specific objective: Develop the conceptual design of an innovative, high performance, cost effective, and of (near) zero brine discharge "Autonomous Commercial" MSF desalination unit, of 1.0 MIGD (5000 m3/d); named as RE-NF-MSF.

Target group(s): SME/SMI, Community Based Organization, Local authorities, NGOs, Migrants

Final beneficiaries: Industry, Water Supply and Sanitation, Energy, Tourism, General Environmental Protection, Promotion of Development Awareness

Total duration: 18 months starting 21st Oct. 2009

Main activities

1. Comprehensive literature survey, state of art, analysis, and designs of the RE-NF-MSF Integrated system,
2. Develop RE design tool(s) & study on the transient behavior of the RE system on the MSF design & operational performance,
3. Develop a techno-economical computer program for the "Macroscopic" Design & Performance Analysis of the developed NF-MSF system,
4. Develop a CFD computer program & Salts precipitation & recovery modes for "Microscopic" design and performance analysis of developed system. Techno-economical study of the effect of salts precipitators and NF on seawater properties and the recovered salts/ minerals,
5. Construct a pilot test unit to study; i- NF& scale inhibitors testing in MSF, ii- study NF / crystallizer performance, and iii- CFD program verification,
6. Develop the Conceptual Design of a cost effective "Commercial" RE-NF-MSF unit of 1.0 MIGD (5000 m3/d) capacity, of (near) zero brine discharge
7. File patent(s), publish paper(s) and disseminate the results to stack-holder to apply the system in a large scale. Sell the project outcomes for the project sustainability.

w w w . r e - n f - m s f - p r o j e c t . c o m

Project Partners

- Alexandria University (Applicant)
- Tafila Technical Univ. (TTU), Jordan MEDA Partner)
- Clear Water Solution (CWS), Industrial Partner
- Egyptian association for Water & Energy (EWE), NGO Partner

Management Team

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EU-Egypt Innovation Fund

RE-NF-MSF

تطوير منظومة مبتكرة لتحلية المياه
بالتبخير الوميضى متعدد المراحل ، تستخدم مرسبات الأملاح ،
وأغشية النانو للمعالجة الأوليه ،وتدار بالطاقة المتجددة

Project # C2-S1-148

جمهورية مصر العربية
برنامج البحوث والتنمية والإبتكار

تجاوزت كل من مصر ودول حوض البحر المتوسط وبعض دول المنطقة الأخرى ما يسمى بحد الفقر في المياه. و لقد انخفض المخزون الإحتياطي من المياه في مصر من ١١٢٣متر مكعب عام إلى ٧٩٤ متر مكعبعام في الفترة من ١٩٩٠ حتي ٢٠٠٥ ومن المتوقع أن ينخفض إلى ٥٠٠ – ٦٠٠ متر مكعب عام في عام ٢٠٢٥ ويمثل هذا الإنخفاض حوالي ٥١% من المخزون كما أن الوضع ليس بالأفضل في دول الإتحاد الأوروبي والشرق الأوسط.

ولذلك أصبحت عملية تحلية المياه في الأونة الأخيرة أحد البدائل الهامة والحيوية والوسيلة الواعده لتجاوز أزمة نقص مياه الشرب و لقد تم تطبيقها في أكثر من ١٢٠ دولة في العالم.

تتمتع مصر ودول حوض البحر المتوسط بكثرة مصادر الطاقة المتجددة مثل الرياح والشمس وهي من أكثر الطرق الأمنة لإستخدامها في عمليات تحلية المياه ويمثل هذا النظام تحدياً حقيقياً وهو ما نسعى إلى تحقيقه. ومن الناحية الأخرى أثبت التبخير الوميضي ذو المراحل المتعددة أنه من أكثر التقنيات المستخدمة في تكنولوجيا التحلية الحرارية ويهيمن على سوق عمليات التحلية المختلفة خاصة إذا زادت درجة الحرارة العليا لمحلول الملح والتي تتحكم في نسبة الأملاح المترسبة.

إن استخدام مرسبات الأملاح والتحكم في درجة الحرارة العليا لمحلول الملح مع وجود مضاد للتكلس والمعالجة الأولية بأغشية النانو لمصادر التغذية الأولية يحسن من الأداء وذلك لإزالة الأيونات الأحادية والثنائية التكافؤ، وهذا بالتأكيد يقلل من تكوين التكلسات الصلبة والهشة والتي تؤدي إلى إنخفاض النفقات الرأسمالية والعملية وتكاليف إنتاج المياه الصالحة للشرب.

يهدف هذا المشروع إلى تطوير وإنتاج مياه صالحة للشرب عن طريق استخدام منظومة حديثة تتكون من الطاقة المتجددة وإستخدام التبخير الوميضي المتعدد المراحل ومرسبات الأملاح مع أغشية النانو للمعالجة الأولية للمياه المستخدمة (التغذية) وبرج التبريد.

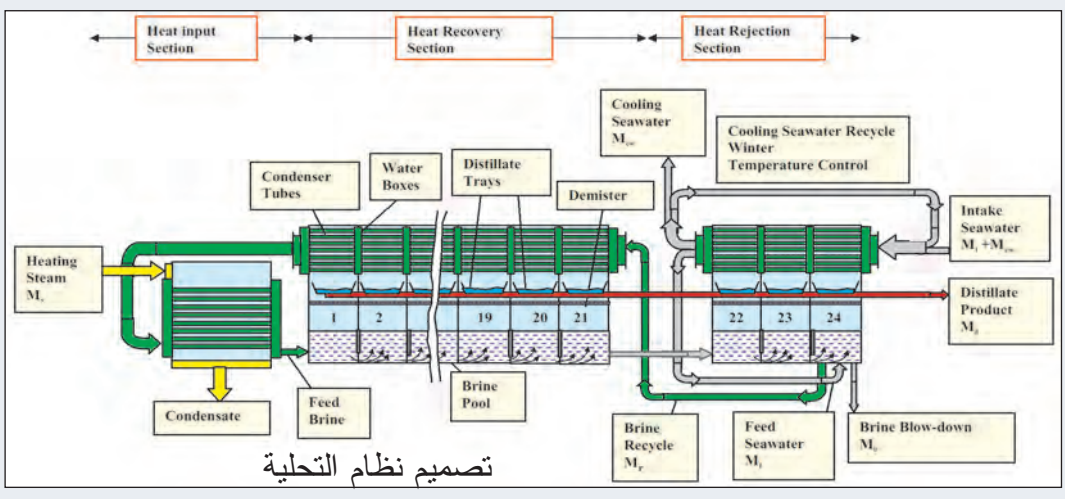
إن محلول الملح المركز المتبقي من هذه العملية يمكن بلورته لإسترجاع الأملاح كمنتج ثانوي وترك المحلول المتبقي خالياً من الأملاح.

سيتم إخضاع منتجات هذه المنظومة سواء الأولية أو الثانوية إلي عدد من التحاليل وذلك للتأكد من سلامة الأداء.

يتم تصميم وإنشاء الوحدة الاختبارية لكي تحقق الأداء الأمثل لهذه المنظومة وفي مرحلة متقدمة سيتم وضع التصميم لوحدة تحلية تجارية بطاقة ٥٠٠٠ متر في مكعب اليوم من المياه الصالحة للشرب وهذه الوحدة سوف تهدف إلى:

- تكون نسبة المخرجات اكبر من او تساوي 15
- إنخفاض التكاليف الرأسمالية والإنتاجية
- أقل إستهلاك للطاقة

أهداف المشروع الرئيسية:



تصميم نظام التحلية

إمداد الصناعة بنموذج تصميم تجريبي
١. لتحلية المياه يدعم الخطط المستقبلية و يشجع المستثمرين و الشركات و حاملي الأسهم و شبكات التوزيع بالاستثمار في الطاقة الخضراء و عملية التحلية.
٢. دعم تطوير و استصلاح المناطق النائية و البعيدة عن نهر النيل من خلال صناعة تحلية تستخدم الطاقة المتجددة مما يساعد على إعادة توزيع الكثافة السكانية و توفير فرص عمل مع الحد من الهجرة الداخلية و الخارجية.
٣. دعم و زيادة التعاون و تبادل الخبرات بين الصناعة و الجامعات و الجمعيات الأهلية و مراكز الأبحاث.

هدف متميز:
تطوير نموذج تصميم خلاق عالي الأداء ، اقتصادي و شبه منعدم الفضلات" و ذلك بتطوير منظومة مبتكرة لتحلية المياة بالتبخير الوميضى متعدد المراحل ، تستخدم مرسبات الأملاح ، وأغشية النانو للمعالجة الأولية ،وتدار بالطاقة المتجددة .

الجهات المستهدفة: الصناعات الصغيرة و المتوسطة، المنظمات المجتمعية، المحليات، الجمعيات الأهلية، المهاجرين.

المستفيدين النهائيين: الصناعة / جهات الإمداد بالماء و الصرف / السياحة / الحماية العامة للبيئة / تطوير الثقافة العامة عن الموضوع.

مدة المشروع : ١٨ شهرا شهرا تبدأ ١٨ يولية ٢٠٠٩

ألانشطة الرئيسية:
١. مسح، دراسة و تحليل تصميم وحدة التحليم المدمجة.
٢. تطوير ادوات طاقة متجددة مع دراسة تأثيراستخدام وحدة الطاقة المتجددة على تصميم و تشغيل واداء نظام التحلية.
٣. تطوير برنامج حاسب آلي اقتصادي لتحليل تصميم و اداء نظام التحلية الذي تم تطويره.
٤. تطوير برنامج حاسب آلي لتحليل الاملاح المترسبة و دراسة التصميم المجهري وتحليل اداء النظام المطور مع الدراسة التقنواقتصادية لأثار مترسبات الاملاح و الفلترة المجهرية على خواص مياه البحر و الاملاح و المعادن المسترجعة.
٥. عمل نموذج اختباري لدراسة اغشية النانو و موانع التكلس في وحدات التبخير الوميضي. دراسة اغشية النانو مع اداء البلورة و اخيرا دراسة حسابات ديناميكة السوائل للمشروع.
٦. تطوير نموذج مبدئي للتبخير الوميضي بسعة ٥٠٠٠ متر مكعب يوميا شبه منعدم الفضلات.
٧. عمل براءات اختراع و نشر اوراق بحثية و توزيع نتائج المشروع على المهتمين لتطبيق النظام على نطاق واسع مع تسويق نتائج المشروع لدعم الاستمرارية.

w w w . r e - n f - m s f - p r o j e c t . c o m

الشركاء

- جامعة الأسكندرية / الشريك الأساسي
- جامعة الطفيلة التقنية-الأردن- شريك المنطقة الجغرافية
- المصرية السويسرية لتكنولوجيا المياه النقية- شريك الصناعة
- الجمعية المصرية للمياه و الطاقة - جمعية اهلية

ادارة المشروع

- استاذ دكتور/ حسن البنا فتح – الباحث الرئيسي–جامعة الاسكندرية
- دكتور/ أسامة السمني –الباحث الرئيسي المشارك – جامعة الاسكندرية
- استاذ دكتور/ بشرى سالم – مدير تنفيذي – جامعة الأسكندرية
- استاذ دكتور / مدحت سرور – الاستشاري التقني
- دكتور ايمن الرواجفة (جامعة الطفيلة التقنية)
- مهندسة بهجة بكر (المصرية السويسرية لتكنولوجيا المياه النقية)
- مهندس أحمد هاشم (الجمعية المصرية للمياه و الطاقة)

An invitation from the Center of Excellence for Water to members of the teaching staff to spend a semester in one of the American universities to participate in the Water Excellence Project

Who are we

The Center of Excellence for Water is a USAID- funded program, managed by the American University in Cairo.

Its goal is to catalyze long-term improvement in Egyptian water resources management by improving its innovative applied research and educated enterprise.

Located at Alexandria University, and in cooperation with four Egyptian Universities (Ain Shams University – Aswan University – Beni Suef University – Zagazig University) and four U.S. Universities (University of California, Santa Cruz, Temple University, Utah State University, and Washington State University),

The Center of Excellence for Water is designed to be a state-of-the-art center that raises the quality of all aspects of higher education, including curriculum, teaching, and applied research to international standards.

The Center supports the Egyptian government, academia, and industry to address water challenges, and prepare a new generation of graduates and entrepreneurs to be change agents that stimulate economic growth.

Leveraging on the public-private partnerships established, the Center of Excellence for Water will be the hub for research and a vibrant network of Egyptian industries, research centers, and ministries.

Exchange, Training and Scholarships

Role of Pillar

Strengthen the capacity of Egyptian Faculty, students and researchers and promote the exchange of expertise, knowledge, and technology in the water discipline between U.S. partner universities and industries and the Egyptian government, academia, and private sector.

Key Activities

- Providing 350 undergraduate/ graduate full scholarships in specialized water programs.
- Funding one-semester abroad in U.S.-Based Universities for selected undergraduate/ postgraduate students.
- Providing internship opportunities in U.S/ Egyptian industries for undergraduate/ postgraduate students.
- Building the capacity of Egyptian Faculty on governance, research and instructional innovation.
- Conducting training workshops at U.S.- Based Universities.
- Organizing faculty Exchange between the U.S. Universities and the Egyptian universities.
- Organizing more than 20 webinars on water-related topics.

High-quality Applied Research

Role of Pillar

Elevates Egypt's water-related research capacity and ability to create policy-relevant, innovative, and market-driven research products.

Key Activities

- Funding 42 high-quality applied research projects to address water-related challenges.
- Developing a National Water Research Roadmap.
- Organizing Annual International Water Symposium.
- Promoting the linkage between supply and demand for water research by engaging the public and private sectors in research initiatives.

Instructional Innovation and Curriculum Development

Role of Pillar

Improve the relevance and quality of the water curricula in partner Egyptian Universities to meet the needs of the public and private sectors and introduce innovative teaching methods for undergraduate and graduate students in water-related fields.

Key Activities

- Developing and updating new/ existing undergraduate water-related programs to strengthen their water dimensions.
- Establishing two new Graduate programs in Sustainable Water Management.
- Developing 12 new undergraduate water-related courses.
- Developing 18 new postgraduate water-related courses.
- Establishing four new Professional Certification Programs.
- Developing nine Water Resources Career Development Modules.
- Introducing innovative teaching methods and supporting online learning management systems.

Governance

Role of Pillar

Establish the governance structure of the Center of Excellence for Water at Alexandria University that would enable the center to create collaborations and maintain accountability among partners and stakeholders.

Key Activities

- Establishing of the Center of Excellence for Water at Alexandria University
- Establishing Center of Excellence for Water Advisory Committee
- Establishing Center of Excellence for Water steering Committee
- Developing the Center of Excellence for Water guidelines for reporting, agreements, and documentation system.
- Signing MoUs with the key private and public sectors.
- Developing the Center of Excellence for Water Strategic Plan.

Sustainability

Role of Pillar

Ensure the institutional and financial sustainability of the Center through revenue generation and the creation of a network of partners from the public and private sectors.

Key Activities

- Organizing Public-Private Partnership Seminars
- Expanding the Center of Excellence for Water network to include more partners in the US and Egypt.
- Developing revenue-based models to ensure the financial sustainability of the Center of Excellence for Water.
- Establishing the Center of Excellence for Water Website and dissemination Channels.
- Developing water-specific technical publications.

Activities

Governance and strategic planning workshop:

The COE conducted a workshop, titled ‘Governance and strategic planning workshop in cooperation with Washington State University from 24th of October to 29th of October 2021.

the workshop discussed the academic or COE’s related governance mechanisms appropriate for a national water center. This is to build a sustainable governance structure for AWR-COE

Exchange Opportunities for Faculty and Graduate/Undergraduate Students:

There are many opportunities for Faculty and Students at the Egyptian Partner Universities to apply for several activities:

Water Energy Food Nexus Winter School

Water Energy Food Nexus Winter School (Faculty and Graduate Students)– Cairo organized by the AUC: 1 November 2021 – 31 January 2022

Water Quality and Equipment Testing Workshop

Water Quality and Equipment Testing (Faculty and Graduate Students) – US – organized by Temple University.

First Call

From 29 November to 10 December 2021.

The workshop covered several topics as: a. Lab safety training and Laboratory Compliance, b. Introduction to water quality parameters, c. State of the art equipment used in water quality analysis, d. Quality control and Quality Assurance (QA/QC), e. Precision and Accuracy, f. pH, Acidity, Alkalinity & Hardness, Dissolved Oxygen, Turbidity, TSS, DSS, VSS, g. Total Organic Carbon, Chemical Oxidation Demand (COD), and 5-day Biological Oxidation Demand (BOD), h. Inorganic chemicals (Fluoride, Chloride, Nitrates, etc.), i. Disinfection By-Products, j. Microbial Enumeration, k. Use of TOC Analyzer, Ion Chromatograph (IC), UV/vis Spectrophotometer. In addition to: a. Seminars from industry experts, b. Field Trip to Drinking Water Treatment Plant, c. Field Trip to Municipal Wastewater Treatment Plant.

Second Call

Module 1:

From 31 July to 13 August 2022.

The workshop covered several topics as: a. Introduction to conventional water quality parameters, b. Acidity, Alkalinity, and Hardness, c. pH, Conductivity, Turbidity, and Solid analysis (TS, TDS, TSS and VSS), d. Dissolved Oxygen, 5-day Biological Oxidation Demand (BOD), Chemical Oxidation Demand (COD), Theoretical Oxidation Demand (ThOD), e. Total Organic Carbon analysis, f. Microbial Enumeration, g. Precision and Accuracy, and Quality control and Quality Assurance (QA/QC), h. Lab safety training and Laboratory Compliance, i. Water Sampling.

Module 2:

From 17 to 30 July 2022.

The workshop covered several topics as: a. State of the art equipment's used in water quality analysis, b. Inorganic chemicals (Fluoride, Chloride, Nitrates, etc.) using Ion Chromatography (IC), c. Use of advanced analytical instruments such as Gas and Liquid Chromatography-Mass Spectrometry (GC/MS, LC/MS/MS), d. Inductively Coupled Plasma Mass Spectrometry (ICP/MS), e. Gene detection and quantification using Quantitative Real-Time Polymerase Chain Reaction (qPCR), f. Quality control and Quality Assurance (QA/QC), including Precision and Accuracy, g. Solid phase extraction (SPE) and Liquid phase extraction (LLE), h. Lab safety training and Laboratory Compliance.

The State-of-the-Art Water Curriculum workshop

USAID-funded Center of Excellence for Water launches a total of four workshops on the use of Learning Management Systems, Innovative Teaching Strategies, and State-of-the-Art Water Curriculum. The State-of-the-Art Water Curriculum (SOAC) workshop is held on 27 and 28 June 2022 at Alexandria University. This workshop brings together 25 faculty, faculty teaching assistants, researchers, water professionals from industry and municipalities, and ministry personnel.
Over the course of seven months (between July 2022 – February 2023), participants will work in groups to create a set of recommendations for future water science and engineering

curricula and teaching methods targeted at meeting Egyptian water challenges in 2035 in all organizations with a water focus.

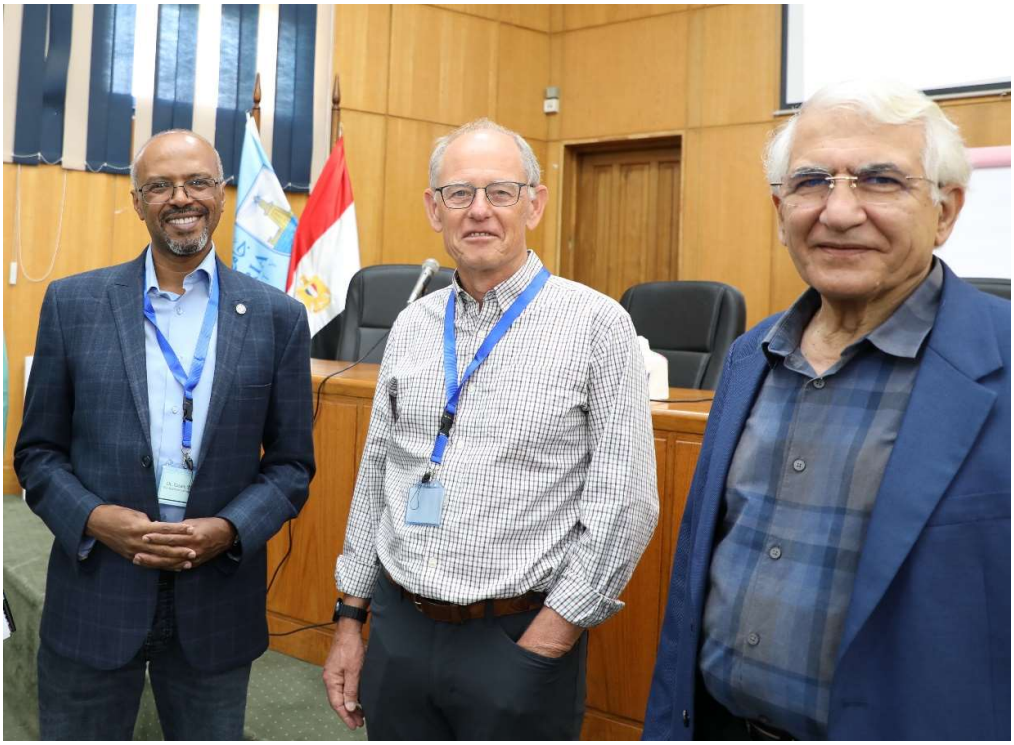
The main lecturer for this Workshop include Dr. David Stevens, Professor at Civil and Environmental Engineering, @utahstate. Additionally, representatives from Egyptian Partner Universities Ain Shams University, Alexandria University, Aswan University, Beni Suef University and Zagazig University will be attending to help with the activities.

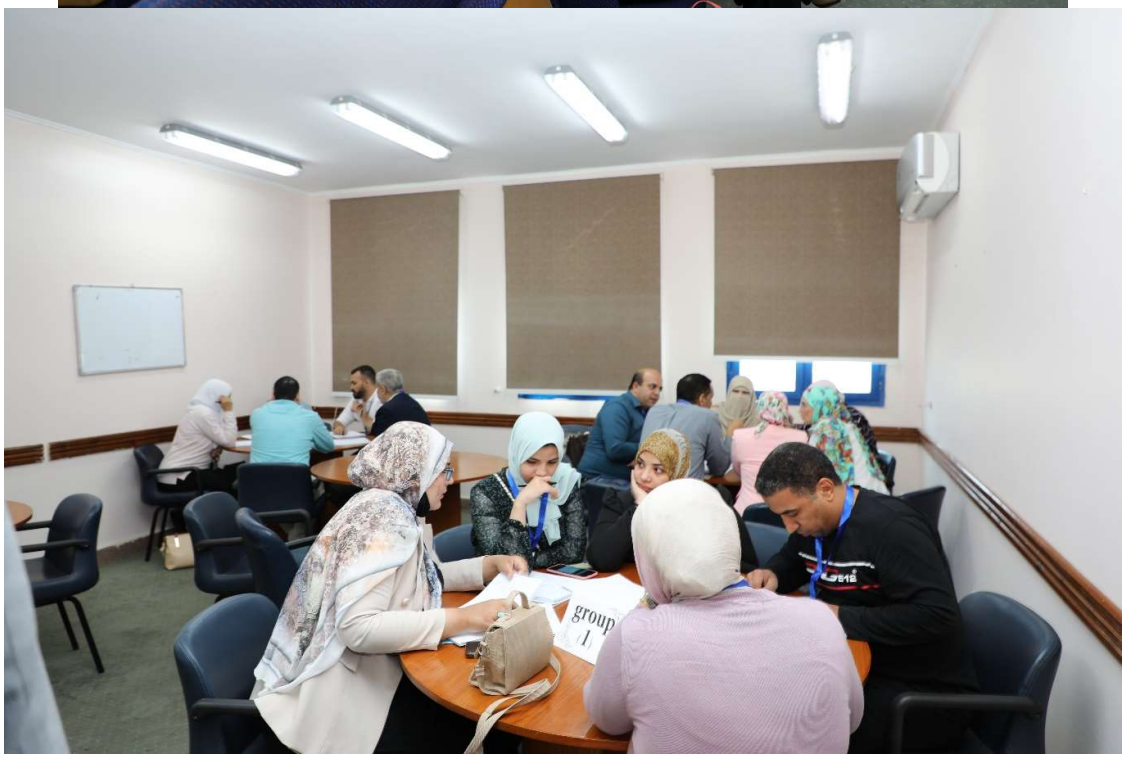
The ultimate goal of this workshop is to produce a report and roadmap to help inform water engineering and science education in Egypt to meet the future needs of the water sector with a target date of 2035.

The workshop's main objectives are to review the state-of-the-art water engineering and science issues critical to Egypt's long-term water security and water engineering and science curricula in Egypt and the greater Middle East, Europe, Asia, and the Western Hemisphere; envision Egypt's water needs by 2035, both quantity, and quality, that will serve the domestic, agriculture, industrial, and energy sectors, and identify education gaps that will prevent providing professional training to meet those needs. Also, the workshops aim to identify subject areas that are critical to defining a core curriculum suitable for all Egyptian Universities, identify location-specific curricula to be used as technical electives tailored to the needs of a community, and discuss how those needs are best translated to the undergraduate, postgraduate, ministry, and industry levels and cultivate a community of practice (CoP) as a means of managing knowledge sharing and promoting learning sustainability among faculty members and water professionals in Egypt.

By the end of this program, participants will reconvene in Aswan in February 2023 for a 5-day workshop to bring together their recommendations into an overall State-of-the-Art Water Curriculum Report and Roadmap to help inform water education into the future.


مركز تنمية قدرات
أعضاء هيئة التدريس والقيادات
FACULTY AND LEADERSHIP DEVELOPMENT CENTER
FLDC




group
1

Faculty Exchange – Semester Abroad

First

Host: Temple University
From 09/01/2022 – 12/31/2022.

Opportunity for advanced training on education and research, leading to capacity building and sustainability takes part in the Center of Excellence for Water activities for faculty. The faculty exchange program will strive towards meeting these envisioned goals through teaching and applied research capacity building, peer-reviewed publications, and technology commercialization activities.

Second

Host: Utah State University
From 09/01/2022 – 12/16/2022.

Opportunity for advanced training on education and research, leading to capacity building and sustainability takes part in the Center of Excellence for Water activities for faculty. The faculty exchange program will strive towards meeting these envisioned goals through teaching and applied research capacity building, peer-reviewed publications, and technology commercialization activities.

Undergraduate Semester Abroad – USU

Host: Utah State University
From 08/20/2022 – 12/16/2022.

The students will take courses at Utah State University that have been previously articulated with coursework at their home universities. These courses include hydrology, hydraulics, green infrastructure, solid/hazardous waste management, environmental management, and environmental quality analysis.

The First International Symposium

The International Symposium on “Sustainable Water Solutions”, organized by the Alexandria Water Resilience – Center of Excellence for Water, which is bringing together leading experts from Egypt and the United States to find solutions to problems caused by climate change in Egypt and around the world.
This annual event gathers prominent scientists and leading engineers to present their findings and research outputs and share their knowledge in four areas of the water field, namely, Water Use Efficiency, Integrated Water Resources Management, Safe Treated Water and Reuse, and Non-Conventional Water Resources and Desalination with climate change in the core.


USAID
The American University in Cairo
Center of Excellence for Water
مركز التميز للمياه

Training for Undergraduate Students

The program's students visited the drinking water treatment plant in Alexandria (Al-Mansheya 2) to learn about the stages of water purification and the plant's boredom.

Training for civil and environmental engineering students at the Eastern Wastewater Treatment Plant in Alexandria.

Badya, Palm Hills, 6 October construction site visit for Civil and Environmental Engineering program Students.

Publications at Alexandria University

Within: **Groundwater; Groundwater Resources; Aquifers** TC.502 | Year range: 2019 to 2022

Export

Authors

- Aly, A.A. 3
- Ashour, M. 2
- Chérifa, A. 2
- El-Geziry, T.M. 2
- Elkholy, M. 2

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Assessment of water quality, eutrophication, and zooplankton community in lake Burullus, Egypt *Open Access* View in Scopus View abstract	Alprol, A.E., Heneash, A.M.M., Soliman, A.M. and 4 more	2021	Diversity	30
Assessment of water quality and phytoplankton structure of eight alexandria beaches, southeastern mediterranean sea, egypt *Open Access* View in Scopus View abstract	Alprol, A.E., Ashour, M., Mansour, A.T. and 3 more	2021	Journal of Marine Science and Engineering	15
Sustainable agriculture development in thewestern desert of Egypt: A case study on crop production, profit, and uncertainty in the Siwa region *Open Access* View in Scopus View abstract	Moghazy, N.H., Kaluarachchi, J.J.	2020	Sustainability (Switzerland)	12
Assessing the agricultural drainage water with water quality indices in the El-Salam Canal Mega Project, Egypt *Open Access* View in Scopus View abstract	Assar, W., Ibrahim, M.G., Mahmod, W. and 1 more	2019	Water (Switzerland)	10
Hydrochemical and quality assessment of groundwater resources in Al-Madinah City, Western Saudi Arabia *Open Access* View in Scopus View abstract	Alghamdi, A.G., Aly, A.A., Aldhumri, S.A. and 1 more	2020	Sustainability (Switzerland)	9

Publication types

Publication stage

Scopus Sources

Subject Areas

Institution Numbers

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Steps for rehabilitation of a lake suffering from intensive pollution lake mariut as a case study *Open Access* View in Scopus View abstract	El-Rayis, O.A., Hemeda, E.I., Shaaban, N.A.	2019	Egyptian Journal of Aquatic Biology and Fisheries	7
Geochemical characterization of recent Nile Delta inner shelf sediments: Tracing natural and human-induced alterations into a deltaic system *Open Access* View in Scopus View abstract	Mandour, A.S., Ghezzi, L., Lezzerini, M. and 3 more	2020	Egyptian Journal of Aquatic Research	4
Assessing risk of collapse of Lake Burullus Ramsar site in Egypt using IUCN Red List of Ecosystems View in Scopus View abstract	Ghoraba, S.M.M., Halmy, M.W.A., Salem, B.B. and 1 more	2019	Ecological Indicators	3
Sustainable Development Goals (SDGs) Associated with Groundwater Over-System-Based Multi-criteria Decision Analysis View in Scopus View abstract	Saqr, A.M., Ibrahim, M.G., Fujii, M.	2021	Natural Resources Research	2
GIS-based evaluation and statistical determination of groundwater geochemistry for potential irrigation use in El Moghra, Egypt View in Scopus View abstract	Eltarabily, M.G., Moghazy, H.E.M.	2021	Environmental Monitoring and Assessment	2
Forecasting shoreline changes along the Egyptian Nile Delta coast using Landsat image series and Geographic Information System View in Scopus View abstract	Dewidar, K., Bayoumi, S.	2021	Environmental Monitoring and Assessment	1

Soil and groundwater salinization in Siwa Oasis and management opportunities: twenty year change detection and assessment View in Scopus View abstract	Aly, A.A.	2020	Arid Land Research and Management	1
Assessment of Groundwater Resources in Egypt's Deserts View in Scopus View abstract	Elkholy, M.	2021	Springer Water	1
Sea level characteristics and extremes along Alexandria coastal zone View in Scopus View abstract	Hendy, D.M., El-Geziry, T.M., El Raey, M. and 1 more	2021	Arabian Journal of Geosciences	1
Physico chemical studies for water at Rosetta Branch of River Nile, Egypt *Open Access*	Masoud, M.S., Ismail, A.M., Kamel, H.M. and 2 more	2020	IOP Conference Series: Materials	1

Title	Authors	Year	Scopus Source	Citations
Comparison and Hydrochemical Characterization of Groundwater Resources in the Arabian Peninsula: A Case Study of Al-Baha and Al-Qassim in Saudi Arabia View in Scopus View abstract	Fahad N. Al-Barakah, Aly, A.A., Abaakhel, E.H.S. and 3 more	2020	Water Resources	1
Assessment of Water Resources in Egypt: Current Status and Future Plan View in Scopus View abstract	Elkholy, M.	2021	Springer Water	1
Feasibility of Water Reuse for Agriculture—Case Study of Ain Temouchent (Algeria) View in Scopus View abstract	Haidara, R., Abdelbaki, C., Badr, N.	2022	Advances in Science, Technology and Innovation	0
Natural and manmade impact on Rosetta eastern shoreline using satellite Image processing technique *Open Access* View in Scopus View abstract	Sanhory, A., El-Tahan, M., Moghazy, H.M. and 1 more	2022	Alexandria Engineering Journal	0

Application of water quality indices for assessment of influent and effluent wastewater from wastewater treatment plant of oran city, algeria View in Scopus View abstract	Bessedik, M., Abdelbaki, C., Badr, N. and 2 more	2021	Desalination and Water Treatment	0
Using flood map analysis for coastal city resiliency and sea rise level adaptation plan. *Open Access* View in Scopus View abstract	Abdelgawad, D., Dwidar, S., Abdelsattar, A. and 2 more	2022	IOP Conference Series: Earth and Environmental Science	0
Increasing vulnerability to hydro-climatic threats by coastline modifications in Alexandria, Egypt View in Scopus View abstract	Sahar, T., Abbas, E.-Z., Tarek, R. and 1 more	2019	Disaster Advances	0
Integrated water balance	Abou	2022	Climatic	0

Title	Authors	Year	Scopus Source	Citations
climate change and population growth: a case study of Upper Litani Basin, Lebanon *Open Access* View in Scopus View abstract				
A decadal sea-level variability in Port-Said Harbour (Egypt) *Open Access* View in Scopus View abstract	El-Geziry, T.M., El-Wakeel, Y.M.	2022	Egyptian Journal of Aquatic Research	0
Time series relationships between chlorophyll-a, physicochemical parameters, and nutrients in the Eastern Harbour of Alexandria, Egypt View in Scopus View abstract	Champagne, P., Dorgham, M.M., Liang, S. and 2 more	2021	Environmental Monitoring and Assessment	0
Hard engineering coastal structures; detrimental or beneficial: A case study of Agami–Sidi Kerair coast, Mediterranean Sea, Egypt *Open Access* View in Scopus View abstract	El-Masry, E.A.	2022	Egyptian Journal of Aquatic Biology and Fisheries	0

Title	Authors	Year	Scopus Source	Citations
Urban dynamics and potential vulnerability of coastal urban areas to sea level rise in the southeastern Levantine Basin View in Scopus View abstract	Abdrabo, M.A., Abdelwahab, R.G., Hassaan, M.A.	2022	Urban Climate	0
Drivers of natural hazards vulnerability in urban waterfront of Alexandria, Egypt View in Scopus View abstract	Sahar, T., Tarek, R., Mennatallah, D.	2019	Disaster Advances	0
Study of the Sea Level variability and Storm Surges at Mersa Matruh, Egypt View in Scopus View abstract	Ibrahim, O.	2021	Arabian Journal of Geosciences	0
Heavy metal contamination in the approach for comprehensive health risk assessment *Open Access* View in Scopus View abstract	Jaiswal, M., Gupta, S.K.,	2022	PLoS ONE	0

Publications at Alexandria University

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Authors

- Fawzy, A.M. 2
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Sustainability Evaluation of Rainwater Harvesting-Based Flood Risk Management Strategies: A Multilevel Decision-Making Framework for Arid Environments View in Scopus View abstract	Haider, H., Ghumman, A.R., Al-Salamah, I.S. and 2 more	2019	Arabian Journal for Science and Engineering	16
Influence of silica fume on the pervious concrete with different levels of recycled aggregates View in Scopus View abstract	Galishnikova, V.V., Abdo, Sh., Fawzy, A.M.	2020	Magazine of Civil Engineering	13
Impact of sludge bulking on receiving environment using quantitative microbial risk assessment (QMRA)-based management for full-scale wastewater treatment plants View in Scopus View abstract	Deepnarain, N., Nasr, M., Amoah, I.D. and 5 more	2020	Journal of Environmental Management	8
Development of context specific sustainability criteria for selection of plant species for green urban infrastructure: The case of Singapore View in Scopus View abstract	Radhakrishnan, M., Kenzhegulova, I., Eloffy, M.G. and 3 more	2019	Sustainable Production and Consumption	7
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Cost analysis and health risk assessment of wastewater reuse from secondary and tertiary wastewater treatment plants *Open Access* View in Scopus View abstract	Abdelmoula, S., Sorour, M.T., Aly, S.A.A.	2021	Sustainability (Switzerland)	2
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Properties of recycled aggregate pervious concrete modified with Styrene Butadiene Rubber Latex View in Scopus View abstract	Abdo, S., Galishnikova, V., Fawzy, A.	2021	Magazine of Civil Engineering	0
Mitigating the Impacts of Climate Change on Water Scarcity and Drought: Wastewater Treatment as an Exemplary Solution in the Mediterranean View in Scopus View abstract	Madi, A.I., Elshazly, A.	2021	Lecture Notes in Civil Engineering	0
Integrated Approach to Assess the Urban Green Infrastructure Priorities (Alexandria, Egypt) View in Scopus View abstract	Ibrahim, M.G., Elboshy, B., Mahmod, W.E.	2019	Advances in Science, Technology and Innovation	0

The president of Alexandria University inaugurated the first symposium on sustainable water solutions

Abdel Aziz Konsowa, President of Alexandria University, inaugurated this morning, Tuesday, 6/9/2022, the first international symposium for sustainable water solutions in Alexandria, organized by the Water Excellence Center at Alexandria University (funded by the US Agency for International Development in Cairo, and in partnership with a coalition of from Egyptian and American universities with the aim of supporting learning and research in the field of water)

The international symposium was attended by Ms. Leslie Reed, Director of the US Agency for International Development in Cairo, Dr. Hossam Maghazi, former Minister of Water Resources and Irrigation, Dr. Said Allam, Dean of the Faculty of Engineering, Dr. Yasser Khalil, Director of the Center of Excellence for Water at Alexandria University, and university presidents and their deputies.

Presidents of company boards, deans of colleges, and representatives of various bodies

. In his speech, Dr. Kansouh thanked the Director of the US Agency for International Development for her unlimited support for the Water Excellence Center project at Alexandria University, stressing that this project has now become a distinguished edifice that conducts joint scientific research, trains and rehabilitates scientific cadres, and establishes partnerships with specialized bodies in the field of water in line with The national strategy of the sustainable development plan for the Egyptian state and Egypt's vision 2030, and pointed to the role of researchers, specialists and experts at the Center for Water Excellence at Alexandria University to find solutions to the expected water problems in light of the increasing population growth. In addition to working on rationalizing water use, Dr. Konsowa that Alexandria University adopts an ambitious strategy for cooperation with the industry sector, noting that there are 7 integrated projects in cooperation between Alexandria University and the industry sector, in order to put the Egyptian industry on the global stage. Kansouh said that the university, through the Engineering Center, is cooperating with the Alexandria Governorate in the rainwater drainage projects that are taking place now, stressing that these projects come in light of the directives of President Abdel Fattah El-Sisi and the Prime Minister to implement the integrated strategy for rainwater management in Alexandria Governorate.

While Mrs. Leslie Lied thanked Alexandria University for organizing this distinguished event, noting that there is great cooperation between the United States of America and the Egyptian government through the Center of Excellence for Water at Alexandria University, and stressed that this conference serves as a platform for all concerned to exchange ideas, opinions and experiences in various fields of water. It is also a good opportunity to discuss ways of cooperation and strengthening partnerships, and to learn about recent trends in scientific research in the field of water.

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Establishment Of A Factory For The Production Of Membranes For Water Desalination And The Manufacture Of Pumps With 100% Egyptian Components

Dr. Abdel Aziz Kansowa, President of Alexandria University, announced that the cooperation protocol recently signed by the university with the Arab Organization for Industrialization to cooperate in the areas of water treatment, desalination and renewable energy uses, which is being implemented through the Water Excellence Center at Alexandria University, resulted in several executive steps being taken. Work at the Water Excellence Center at Alexandria University to manufacture 100% Egyptian pumps, as well as establish a factory for the production of membranes for water desalination, which would be a great addition to the region.

This came during a meeting of the Council for Community Service and Environmental Development Affairs.

The university president added that this protocol came with the aim of enhancing cooperation between the state's industrial and research institutions and exploiting national manufacturing capabilities to deepen local manufacturing and exchange technical expertise in the fields of water desalination and renewable energy to find non-traditional alternatives to water resources, pointing out that this cooperation contributed to the success of pump manufacturing with an Egyptian component 100 The experiment was successful on water lifting stations and will be applied during the development of the Egyptian rural project, within the initiative of the President of the Republic, "A Dignified Life", and the initiative of the Egyptian Villages Development Project, within the framework of the university's keenness to participate in this great national project to relieve the burdens of citizens in more communities needs in the Egyptian countryside and slums, stressing that the university is happy to be an integral part of this initiative.

Qansouh called on the colleges' deputies to pay attention to the outputs of research projects within the colleges, to seek to establish companies based on the outputs of scientific research, and to work on applying them with the appropriate industrial partner to achieve maximum benefit for the service and development of the community.

- Dr. Fahmy Charles, Emeritus Professor at the Higher Institute of Public Health, reviewed the precautionary measures of Alexandria University to prevent the emerging corona virus during this period, through full commitment to distancing, wearing masks, continuous sterilization of facilities, and integration between the various university sectors in addressing the spread of the virus, and following up on registration of groups. eligible to receive the vaccine, and to launch awareness programs within the university community.

Dr. Charles also reviewed a number of files adopted by the sector for the development of Egyptian villages and the participation of faculties, faculty members and students in this project, such as eradicating illiteracy, providing aspects of medical, pharmacy and veterinary care, community participation, and launching awareness and service programs for families.

Dr. Essam Wahba, Vice Dean of the Faculty of Engineering, reviewed a report on the visit of the Alexandria University delegation to Bahij village in Borg El Arab last week as part of a decent life initiative, during which the health unit and youth center were visited, awareness programs were provided to the villagers and training courses in sewing and literacy were also listened to. To the requests of the people of the village and the most important problems they face and the possibility of solving them.

- Energy reviews per Faculty							
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575	0	2000	0	1386	97237	Institute of Public Health	9
2136	2000	2500	0	1677	1677	Education	10
1335	245	1126	0	27326	16327	Dentistry	11
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820	0	957.75	0	3052	400	Tourism	15
1124	0	40	0	23451	4842	Fine arts	16
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899	0	1000	0	48209	604725	Physical Education Girls	18
695	520	210	1022	11263	174272	Agriculture- Saba Pacha Branch	19
2888	0	70	0	22263	242764	Nursing	20
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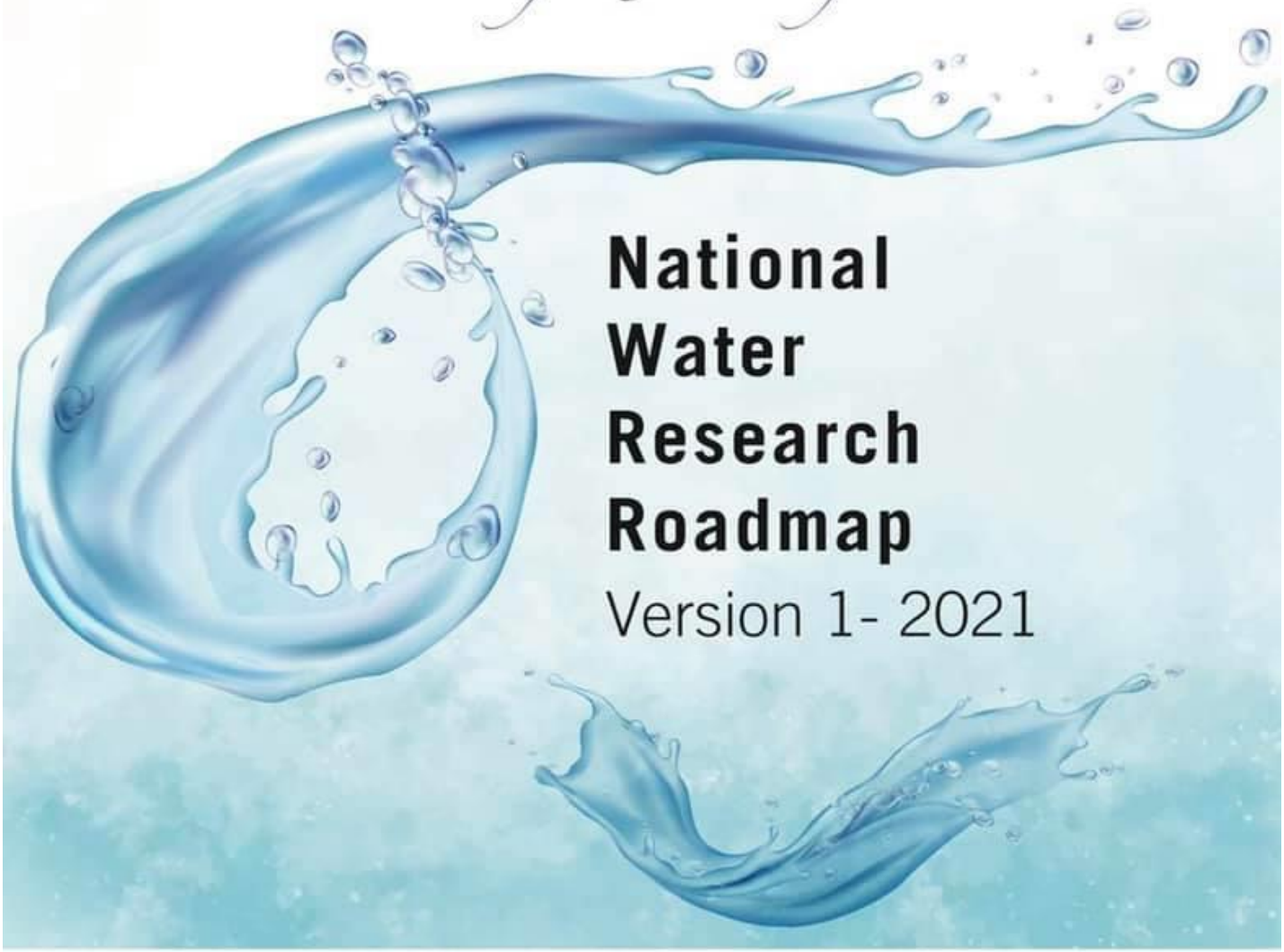
The Center of Excellence for Water



National Water Research Roadmap

Version 1- 2021

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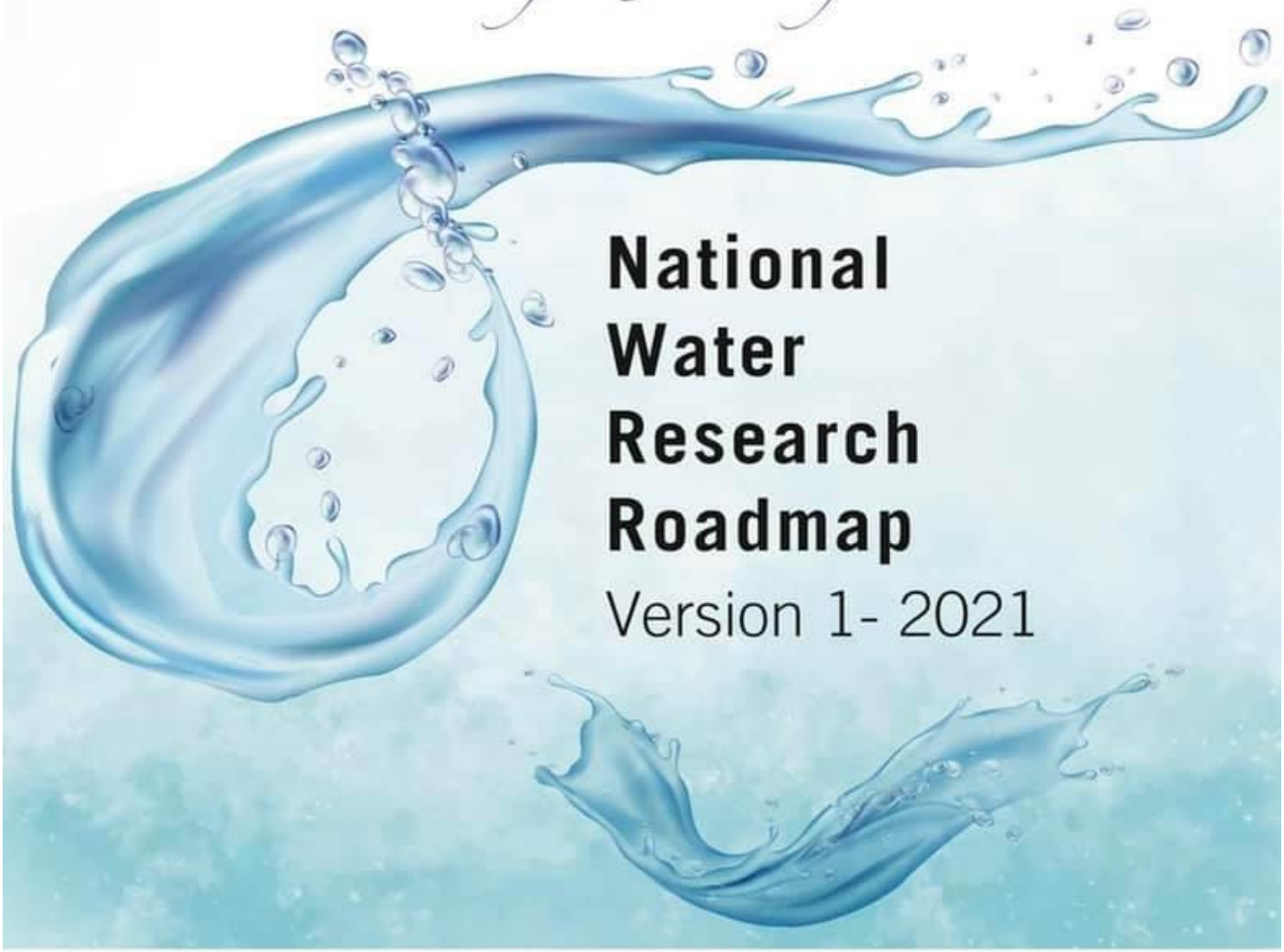

National Water Research Roadmap

Version 1- 2021

In partnership with

Who are we

The Center of Excellence for Water is a USAID- funded program, managed by the American University in Cairo.

Its goal is to catalyze long-term improvement in Egyptian water resources management by improving its innovative applied research and educated enterprise.

Located at Alexandria University, and in cooperation with four Egyptian Universities (Ain Shams University – Aswan University – Beni Suef University – Zagazig University) and four U.S. Universities (University of California, Santa Cruz, Temple University, Utah State University, and Washington State University),

The Center of Excellence for Water is designed to be a state-of-the-art center that raises the quality of all aspects of higher education, including curriculum, teaching, and applied research to international standards.

The Center supports the Egyptian government, academia, and industry to address water challenges, and prepare a new generation of graduates and entrepreneurs to be change agents that stimulate economic growth.

Leveraging on the public-private partnerships established, the Center of Excellence for Water will be the hub for research and a vibrant network of Egyptian industries, research centers, and ministries.

Exchange, Training and Scholarships

Role of Pillar

Strengthen the capacity of Egyptian Faculty, students and researchers and promote the exchange of expertise, knowledge, and technology in the water discipline between U.S. partner universities and industries and the Egyptian government, academia, and private sector.

Key Activities

- Providing 350 undergraduate/ graduate full scholarships in specialized water programs.
- Funding one-semester abroad in U.S.-Based Universities for selected undergraduate/ postgraduate students.
- Providing internship opportunities in U.S/ Egyptian industries for undergraduate/ postgraduate students.
- Building the capacity of Egyptian Faculty on governance, research and instructional innovation.
- Conducting training workshops at U.S.- Based Universities.
- Organizing faculty Exchange between the U.S. Universities and the Egyptian universities.
- Organizing more than 20 webinars on water-related topics.

High-quality Applied Research

Role of Pillar

Elevates Egypt's water-related research capacity and ability to create policy-relevant, innovative, and market-driven research products.

Key Activities

- Funding 42 high-quality applied research projects to address water-related challenges.
- Developing a National Water Research Roadmap.
- Organizing Annual International Water Symposium.
- Promoting the linkage between supply and demand for water research by engaging the public and private sectors in research initiatives.

Instructional Innovation and Curriculum Development

Role of Pillar

Improve the relevance and quality of the water curricula in partner Egyptian Universities to meet the needs of the public and private sectors and introduce innovative teaching methods for undergraduate and graduate students in water-related fields.

Key Activities

- Developing and updating new/ existing undergraduate water-related programs to strengthen their water dimensions.
- Establishing two new Graduate programs in Sustainable Water Management.
- Developing 12 new undergraduate water-related courses.
- Developing 18 new postgraduate water-related courses.
- Establishing four new Professional Certification Programs.
- Developing nine Water Resources Career Development Modules.
- Introducing innovative teaching methods and supporting online learning management systems.

Governance

Role of Pillar

Establish the governance structure of the Center of Excellence for Water at Alexandria University that would enable the center to create collaborations and maintain accountability among partners and stakeholders.

Key Activities

- Establishing of the Center of Excellence for Water at Alexandria University
- Establishing Center of Excellence for Water Advisory Committee
- Establishing Center of Excellence for Water steering Committee
- Developing the Center of Excellence for Water guidelines for reporting, agreements, and documentation system.
- Signing MoUs with the key private and public sectors.
- Developing the Center of Excellence for Water Strategic Plan.

Sustainability

Role of Pillar

Ensure the institutional and financial sustainability of the Center through revenue generation and the creation of a network of partners from the public and private sectors.

Key Activities

- Organizing Public-Private Partnership Seminars
- Expanding the Center of Excellence for Water network to include more partners in the US and Egypt.
- Developing revenue-based models to ensure the financial sustainability of the Center of Excellence for Water.
- Establishing the Center of Excellence for Water Website and dissemination Channels.
- Developing water-specific technical publications.

Activities

Governance and strategic planning workshop:

The COE conducted a workshop, titled ‘Governance and strategic planning workshop in cooperation with Washington State University from 24th of October to 29th of October 2021.

the workshop discussed the academic or COE’s related governance mechanisms appropriate for a national water center. This is to build a sustainable governance structure for AWR-COE

Exchange Opportunities for Faculty and Graduate/Undergraduate Students:

There are many opportunities for Faculty and Students at the Egyptian Partner Universities to apply for several activities:

Water Energy Food Nexus Winter School

Water Energy Food Nexus Winter School (Faculty and Graduate Students)– Cairo organized by the AUC: 1 November 2021 – 31 January 2022

Water Quality and Equipment Testing Workshop

Water Quality and Equipment Testing (Faculty and Graduate Students) – US – organized by Temple University.

First Call

From 29 November to 10 December 2021.

The workshop covered several topics as: a. Lab safety training and Laboratory Compliance, b. Introduction to water quality parameters, c. State of the art equipment used in water quality analysis, d. Quality control and Quality Assurance (QA/QC), e. Precision and Accuracy, f. pH, Acidity, Alkalinity & Hardness, Dissolved Oxygen, Turbidity, TSS, DSS, VSS, g. Total Organic Carbon, Chemical Oxidation Demand (COD), and 5-day Biological Oxidation Demand (BOD), h. Inorganic chemicals (Fluoride, Chloride, Nitrates, etc.), i. Disinfection By-Products, j. Microbial Enumeration, k. Use of TOC Analyzer, Ion Chromatograph (IC), UV/vis Spectrophotometer. In addition to: a. Seminars from industry experts, b. Field Trip to Drinking Water Treatment Plant, c. Field Trip to Municipal Wastewater Treatment Plant.

Second Call

Module 1:

From 31 July to 13 August 2022.

The workshop covered several topics as: a. Introduction to conventional water quality parameters, b. Acidity, Alkalinity, and Hardness, c. pH, Conductivity, Turbidity, and Solid analysis (TS, TDS, TSS and VSS), d. Dissolved Oxygen, 5-day Biological Oxidation Demand (BOD), Chemical Oxidation Demand (COD), Theoretical Oxidation Demand (ThOD), e. Total Organic Carbon analysis, f. Microbial Enumeration, g. Precision and Accuracy, and Quality control and Quality Assurance (QA/QC), h. Lab safety training and Laboratory Compliance, i. Water Sampling.

Module 2:

From 17 to 30 July 2022.

The workshop covered several topics as: a. State of the art equipment's used in water quality analysis, b. Inorganic chemicals (Fluoride, Chloride, Nitrates, etc.) using Ion Chromatography (IC), c. Use of advanced analytical instruments such as Gas and Liquid Chromatography-Mass Spectrometry (GC/MS, LC/MS/MS), d. Inductively Coupled Plasma Mass Spectrometry (ICP/MS), e. Gene detection and quantification using Quantitative Real-Time Polymerase Chain Reaction (qPCR), f. Quality control and Quality Assurance (QA/QC), including Precision and Accuracy, g. Solid phase extraction (SPE) and Liquid phase extraction (LLE), h. Lab safety training and Laboratory Compliance.

The State-of-the-Art Water Curriculum workshop

USAID-funded Center of Excellence for Water launches a total of four workshops on the use of Learning Management Systems, Innovative Teaching Strategies, and State-of-the-Art Water Curriculum. The State-of-the-Art Water Curriculum (SOAC) workshop is held on 27 and 28 June 2022 at Alexandria University. This workshop brings together 25 faculty, faculty teaching assistants, researchers, water professionals from industry and municipalities, and ministry personnel.
Over the course of seven months (between July 2022 – February 2023), participants will work in groups to create a set of recommendations for future water science and engineering

curricula and teaching methods targeted at meeting Egyptian water challenges in 2035 in all organizations with a water focus.

The main lecturer for this Workshop include Dr. David Stevens, Professor at Civil and Environmental Engineering, @utahstate. Additionally, representatives from Egyptian Partner Universities Ain Shams University, Alexandria University, Aswan University, Beni Suef University and Zagazig University will be attending to help with the activities.

The ultimate goal of this workshop is to produce a report and roadmap to help inform water engineering and science education in Egypt to meet the future needs of the water sector with a target date of 2035.

The workshop's main objectives are to review the state-of-the-art water engineering and science issues critical to Egypt's long-term water security and water engineering and science curricula in Egypt and the greater Middle East, Europe, Asia, and the Western Hemisphere; envision Egypt's water needs by 2035, both quantity, and quality, that will serve the domestic, agriculture, industrial, and energy sectors, and identify education gaps that will prevent providing professional training to meet those needs. Also, the workshops aim to identify subject areas that are critical to defining a core curriculum suitable for all Egyptian Universities, identify location-specific curricula to be used as technical electives tailored to the needs of a community, and discuss how those needs are best translated to the undergraduate, postgraduate, ministry, and industry levels and cultivate a community of practice (CoP) as a means of managing knowledge sharing and promoting learning sustainability among faculty members and water professionals in Egypt.

By the end of this program, participants will reconvene in Aswan in February 2023 for a 5-day workshop to bring together their recommendations into an overall State-of-the-Art Water Curriculum Report and Roadmap to help inform water education into the future.


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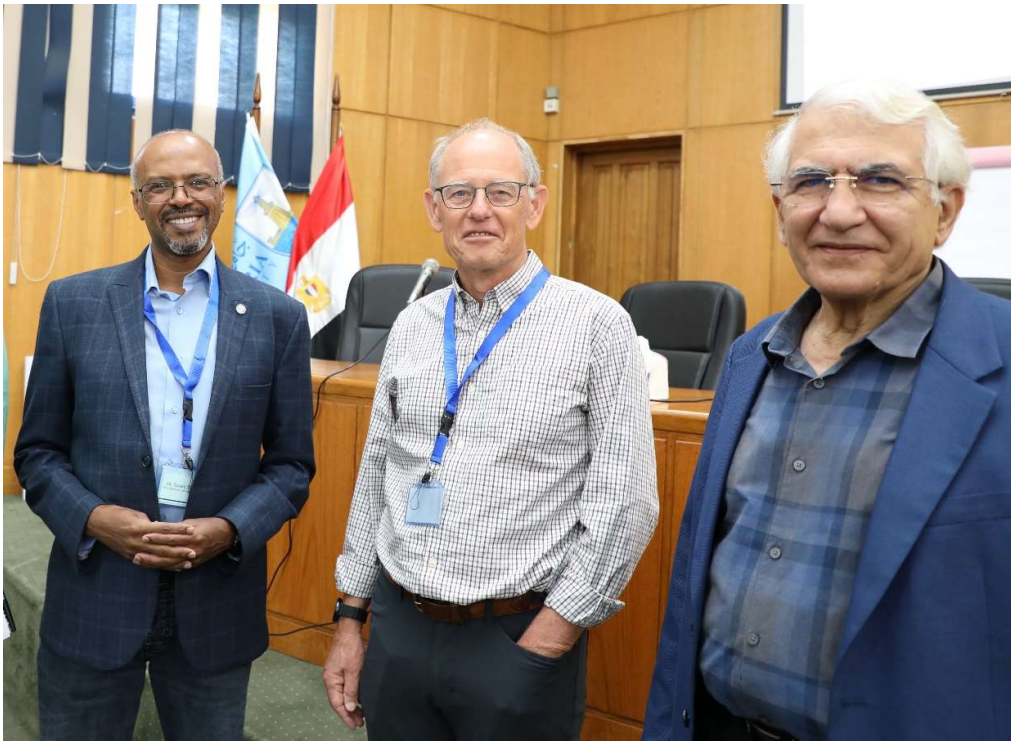

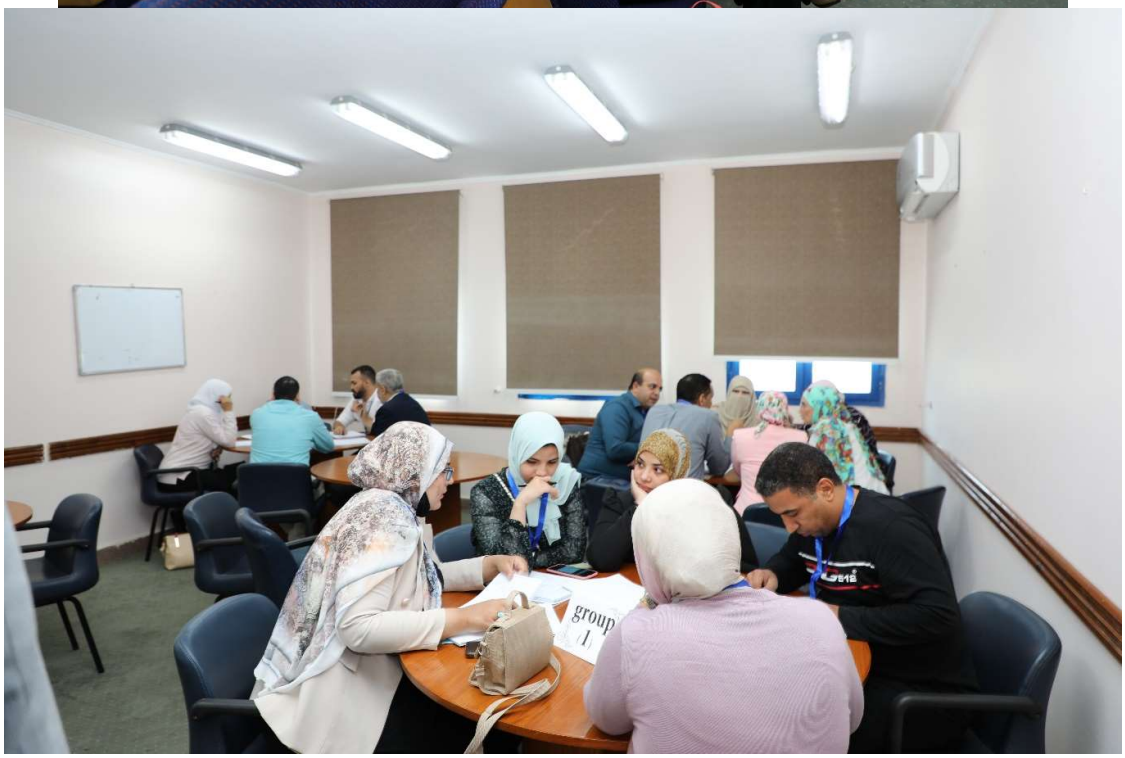
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Faculty Exchange – Semester Abroad

First

Host: Temple University
From 09/01/2022 – 12/31/2022.

Opportunity for advanced training on education and research, leading to capacity building and sustainability takes part in the Center of Excellence for Water activities for faculty. The faculty exchange program will strive towards meeting these envisioned goals through teaching and applied research capacity building, peer-reviewed publications, and technology commercialization activities.

Second

Host: Utah State University
From 09/01/2022 – 12/16/2022.

Opportunity for advanced training on education and research, leading to capacity building and sustainability takes part in the Center of Excellence for Water activities for faculty. The faculty exchange program will strive towards meeting these envisioned goals through teaching and applied research capacity building, peer-reviewed publications, and technology commercialization activities.

Undergraduate Semester Abroad – USU

Host: Utah State University
From 08/20/2022 – 12/16/2022.

The students will take courses at Utah State University that have been previously articulated with coursework at their home universities. These courses include hydrology, hydraulics, green infrastructure, solid/hazardous waste management, environmental management, and environmental quality analysis.

The First International Symposium

The International Symposium on “Sustainable Water Solutions”, organized by the Alexandria Water Resilience – Center of Excellence for Water, which is bringing together leading experts from Egypt and the United States to find solutions to problems caused by climate change in Egypt and around the world.
This annual event gathers prominent scientists and leading engineers to present their findings and research outputs and share their knowledge in four areas of the water field, namely, Water Use Efficiency, Integrated Water Resources Management, Safe Treated Water and Reuse, and Non-Conventional Water Resources and Desalination with climate change in the core.


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Training for Undergraduate Students

The program's students visited the drinking water treatment plant in Alexandria (Al-Mansheya 2) to learn about the stages of water purification and the plant's boredom.

Training for civil and environmental engineering students at the Eastern Wastewater Treatment Plant in Alexandria.

Badya, Palm Hills, 6 October construction site visit for Civil and Environmental Engineering program Students.