

## Template for Evidence(s) UI GreenMetric Questionnaire

University : Alexandria University  
Country : Egypt  
Web Address : <https://alexu.edu.eg/>

### [4] Water (WR)

#### [4.2] Water Recycling Program Implementation

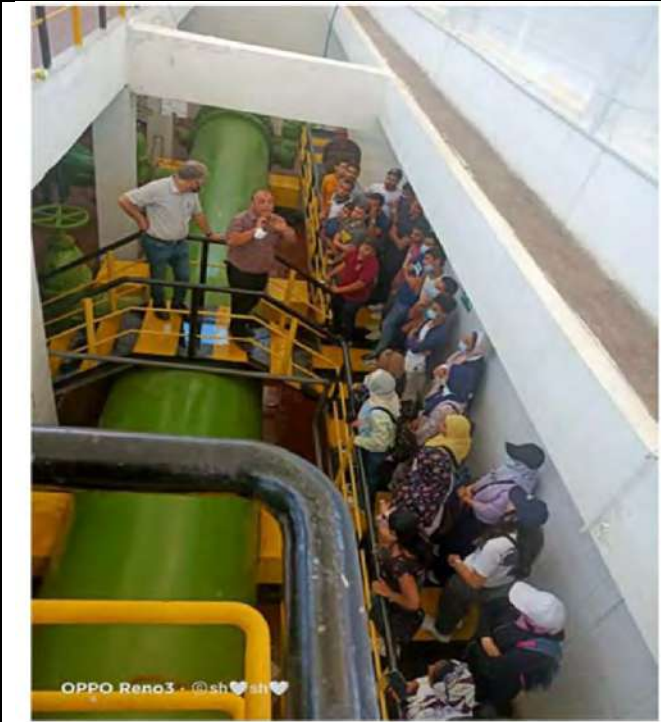




100 m3 Desalination Unit, Wadi El-Natroom (Faculty of Agriculture, Alexandria University)



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



### Water Excellence Center - Alexandria University

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.



### Water Excellence Center - Alexandria University

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

#### Description:

#### Alexandria University program for water recycling:

1. Providing a sewage treatment plant at the university to make it suitable for irrigating green areas and gardens inside the university campus.
2. The irrigated water supplied to the fish farm at the Agriculture Experimental Research Station of the Faculty of Agriculture is recycled to irrigate the crops, vegetables, and fruits of the land farm. The recycled water is rich with natural fertilizers and enhances the crops production.
3. In addition, the water recycling in Fish Aquaculture of the Faculty of Agriculture, Alexandria University: The water sewage of the Aquaculture of the Faculty of Agriculture, Alexandria University



which consist of eight ponds (one acre and quarter/each) in Abis region. Alexandria University used the recycled water for crops culturing in the adjacent agriculture research center in Abis.

4. The use of biochar produced from Agricultural waste and waste Forests in residual removal chlorpyrifos pesticide Imidacloprid is from water agricultural drainage. Cooperation project between the Egyptian Academy of Research Science and Technology and the Czech Academy of Sciences.
5. IOT Pilot Project in Egypt by Shanghai Water Saving Irrigation Corp. Etd performed an automatic controlled irrigation systems IOT project for modern irrigation technology. The company implanted the IOT platform project to irrigate economic crops and facilitate irrigation systems to overcome the water shortage problems in Egypt. This project will be performed in Alexandria University Farm for agroecological farming in Egypt.

**Additional evidence link:**

**Link for Green University:**

[https://alexu.edu.eg/index.php/?option=com\\_content&view=article&id=5932&catid=21&lang=ar-AA](https://alexu.edu.eg/index.php/?option=com_content&view=article&id=5932&catid=21&lang=ar-AA)

### **Renewable Energy and Water Desalination Activities at Alexandria University**

Renewable Energy Center site is a host of different RE technologies and different RE-Desalination technologies. The site “ East of EL-Gaar Village” at Wadi El-Natroon has both predictable wind energy as well as an abundance of sunlight. Thus, this is a natural application for a hybrid system.

The modular hybrid power supply concept proposes the coupling of all sources of energy, storage media and loads on the AC-side.

**Advantages of the Modular Hybrid RE systems:**

- Simplicity in System Design
- Expandable, can be run autonomously or be connected to a larger grid
- Offer higher reliability and supply security
- Lower power cost for the consumers
- Production of AC single phase or three phase
- The AC-side structure provides standardization, quality assurance and serial production
- The coupling on the generation technologies on the AC side offers the possibility of placing the generators far apart from each other (distributed generation).

REC site is planned to be a host of different RE technologies and different RE-Desalination technologies such as:

- Hybrid RE technologies (solar, wind, biomass, Hydrogen and fuel cell)
- Hybrid Desalination technologies (RO, MSF, NF,... Etc)
- Different types of solar cell technologies (thin film, Mono crystalline, Polycrystalline cells)
- Different solar energy technology (PV, CSP, Solar water heating systems, solar dryers)
- Solar Greenhouses.

**Activity:** Innovative Renewable Energy (RE) Driven - Multi Stage Flash (MSF) System with Salts Precipitator and Nano Filtration (NF) Feed Water pre Treatment (RE-NF-MSF)-, contract # RDI - C2/S1/148.

**Additional evidence link:** [www.areac-agr.com](http://www.areac-agr.com)



## **Water Excellence Center - Alexandria University**

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.

Evidence Link: <https://www.facebook.com/profile.php?id=100069123600268>

## Alexandria University program for waste recycling


- 1-The University applied a strategy in all its faculties to segregate the waste into special containers for plastic, papers, glass, and metal objects.
- 2- The University set an initiative for waste recycling in all faculties with a set of labeled containers for waste segregation distributes in each faculty.
- 3- The University set initiative for increasing the awareness about Purchase Recycled Products: It is important to buy products made from recycled materials to strengthen the market for recyclables.
- 4-The University developed an initiative with the governorate (Alexandria Youth alliance) to participate with us in waste management initiative.
- 5-The University has a contract with Nahdet-Misr Company (the official company in the governorate for waste disposal) for collection and recycling.
- 6- The University is trying to develop an initiative as a student project with Titan<sup>®</sup> Company for manufacturing of MDF sectors using university collected waste for maximal benefit from this waste.
- 7- University students at the Faculty of Science initiated a student project for plastic recycling.

Our *recycling program* aims to recycle waste by separating it from the source into:

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

This allows the recycling and utilization of as much of the 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. Our university promotes maintaining the campus environment in clean condition using high quality non-toxic detergents and cleaning materials.

Sincerely,

  
**Prof. Ashraf Elghandour, MD**  
Vice president of graduate Students & Research  
Acting Vice president Community Service &  
Environment Development  
Alexandria University



Alexandria Water Resilience-Center of Excellence  
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## **Who are we**

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## **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.



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## **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 24<sup>th</sup> of October to 29<sup>th</sup> 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





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## 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.



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## **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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## **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.



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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.

