

## Semi-governmental International Exhibition & Conference

The 2<sup>nd</sup> edition of EWWI

### Egypt Water, Waste & Infrastructure – „The Blue Economy Round“

Egypt International Exhibition Centre (EIEC)

01.-03.10.2023



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German Water Partnership|

<https://germanwaterpartnership.de/de/erfolgreiche-teilnahme-deutschlands-an-der-egypt-water-waste-and-infrastructure-ewwi-messe-2023/>

*Egypt Water, Waste & Infrastructure (EWWI) 2nd edition in 2023 under the slogan “The blue Economy round” supported measures to boost the development of water economy in the MNEA Region and sustainable growth. With the focus on private sector as a key partner in this context. EWWI aims to close the gap by offering a direct platform for doing business in Egypt in the promising sectors of water, waste & infrastructure by assisting companies to tap in this huge market potential and to accelerate their decision.*

**The most important international & Egyptian bodies came together along with 100 exhibitors from 10 countries and 7500 carefully selected trade show visitors.**

**The exhibition & Conference took place at Egypt International Exhibition Centre (EIEC), Hall 03, 6500 sqm.**

The highlight of the fair was the state-of-art conference with the focus on private sector as a fast-track solution and key to success.

Over the 3 days speakers (international and local) discussed in expert sessions and round tables the challenges and opportunities in the water industry, infrastructure, and waste sector in Egypt and beyond, presented the latest technologies and discussed doable solutions.

## Preface

Water resources in Egypt are very limited, the per capita share of water resources is already below 1000 m<sup>3</sup>/year less than water poverty limit.

The 2005 National Water Resources Plan had officially adopted the integrated water resources management (IWRM) concept, which was internationally accepted and widely applied. It combines all aspects of Egypt's water resources, including all water user sectors, as well as a socioeconomic perspective.

The Integrated Water Resources Management Plan (2005), a companion to the National Water Resources Plan, provided a concrete roadmap for implementing IWRM but at the time it was developed, the Government had not yet implemented IWRM at project level. There was a strong Government appetite to pilot IWRM through the EWRMP. There was no change in the project's importance for the Government even when the country faced significant political upheaval starting in February 2011.

**So, Under the auspices of His Excellency Prof. Dr. Asem El-Gazzar - Minister of Housing, Utilities and New Urban Communities, the Holding Company for Drinking Water and Wastewater and its subsidiaries, in cooperation with Expotec Egypt for events (Expotec International 2023), organized the international conference and exhibition for water and wastewater technology, waste treatment and recycling (Expotec International 2023 ) from 1-3 October 2023 at the Egypt International Exhibition Center in the Fifth Settlement, Cairo, Egypt.**

**The organizing of this international conference and exhibition comes within the framework of the directives and vision of His Excellency the President of Arab Republic of Egypt Abdel Fattah El-Sisi to achieve sustainable development Goals (SDGs) and to preserve the environment in line with Egypt's vision 2030.**

EWWI 2023 Exhibition is considered a vital platform for exchanging experiences and presenting the latest innovative technologies, but not limited to, for drinking water & wastewater treatment technologies, sludge & waste recycling, clean energy, and water desalination. Extensive European companies specialized in water & waste sectors have participated effectively at Expotec 2023.

National companies as well have also participated in the conference. Two main poses were located for HCWW and Acs.

The 2<sup>nd</sup> edition of the Egypt Water, Waste & Infrastructure (EWWI) – The Blue Economy Round was carried out under the patronages and enormous support by the following Ministries, their affiliated authorities and the most important industry federations and associations:

- ✓ Prime Minister of Egypt
- ✓ Ministry of Housing, Utilities & Infrastructure
- ✓ Ministry of Trade and Industry
- ✓ Ministry of International Cooperation
- ✓ Ministry of Public Business Sector
- ✓ Ministry of Environment
- ✓ Ministry of Youth & sports (Catalyzing the Arab Youth Innovations for Water Economy & Waste Management)
- ✓ Holding Company for Water & Wastewater (HCWW) and its 25 affiliated Companies
- ✓ Arab Water Council
- ✓ Arab Organization for Industrialization
- ✓ Arab Industrial Development & Mining Organization
- ✓ Arab Union for International Exhibitions & Conferences
- ✓ The Arab Contractors

- ✓ Federation of Egyptian Industries (FEI)
- ✓ Micro, Small & Medium Enterprise Development Agency (MSMDA)
- ✓ Egyptian Organization for Standardization and Quality
- ✓ Cairo Water Company
- ✓ The "Nile Delta Water Management Programme" (NDWMP)
- ✓ National Authority of Portable Water and Sewage (NOPWASD)
- ✓ The Egyptian Armed Forces Engineering Authority - Water Sector Department
- ✓ Executive Agency of Drinking Water and Wastewater
- ✓ Industrial Development Authority
- ✓ Holding Company for Construction & Development
- ✓ Egyptian Environmental Affairs Authority
- ✓ Waste Management Regulatory Authority
- ✓ VDMA- The largest European Federation for the Machinery Construction Industry
- ✓ GSTT- German Society for Trenchless Technology
- ✓ GWP- German Water Partnership e.V.
- ✓ BVMW- The German Federal Association of Small and Medium-Sized Enterprises (SMEs).
- ✓ German RETech Partnership e.V.- Recycling and Waste Management Association
- ✓ AUMA- Association of the German Trade Fair Industry
- ✓ GIZ- Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
- ✓ AHK German-Arab Chamber of Industry & Commerce
- ✓ The German Embassy in Cairo
- ✓ ACWUA - Arab Countries Water Utilities Association

## Product categories

### WATER & SANITATION

- Sewer Systems
- Leak Detection Technologies
- Drilling Technology
- Installation Material
- Laboratory Equipment
- Pumps
- Sanitary Fittings
- Wastewater Treatment Technologies
- Industrial Wastewater
- Valves and Fittings
- Desalination Industry
- Water Treatment Technologies
- Smart Tech. & Artificial intelligence
- Agr. Drainage W. Treatment Techn.

### WASTE

- Sludge Treatment
- Landscape Preservation
- Composting equipments
- Renewable Energies
- Road Cleaning
- Sanitary Facilities
- Sewer Systems
- Soil Protection
- Special Transport Vehicles
- Treatment of Toxic Waste
- Waste Avoidance and Utilization
- Waste Composting Installations
- Waste Disposal
- Waste Plants and Containers

### INFRASTRUCTURE

- City Planning
- Communication Technology
- Energy Engineering
- Energy Generation
- Solar Energy Systems
- Solar Cells/Energy
- Information Technology
- Mobility Solutions
- Municipal Engineering
- Research and Development
- Sustainable Building
- Telecommunications
- Transport
- Urban Design



## Conference Agenda

The conference was divided to main sessions and seminars. Sessions held at the conference room. Seminars for further discussion and more engagement of exhibition visitors were conducted at the venue for Egypt- German pose and HCWW pose at parallel time.

### Session's brief:

#### A) Session 1:

#### **Non-Conventional Water Resources Use under Scarcity Conditions**

01 October 2023 (1:30 pm- 3:30 pm)

## Scope of the Session

MENA region as a whole faces' extreme scarcity, but each country has a different water resource endowment that will shape its broader water challenges. Scarcity is so great in the Gulf States, for example, that there is a strong focus on non-conventional water resources, such as desalination and treated wastewater recycling for non-potable uses as alternatives to the continued withdrawal of non-renewable fossil groundwater. Understanding and diversifying the range of potential water resources in the region is essential. Therefore, water scarcity requires moving towards a diversified water management portfolio. Diversified solutions lead to greater resilience to systemic shocks — be they climatic or economic. This starts with “closing the water resources loop” rather than thinking of water usage as “once through the system.” Examples of diversification include optimizing local surfaces as well as groundwater storage, developing non-conventional water resources, such as desalination, recycling of treated drainage and industrial water, water harvesting, reducing leakage, and promoting conservation. The role of stakeholders, including women's role, in the safe reuse of treated water is of utmost importance. Mega projects for water treatment and reuse are considered an indispensable step towards sustainability and a water-secure future. This session will discuss not only the Non-Conventional Water Resources, but also the tools to face the challenges to close loop for water scarcity. Session Agenda

- Chairman / Moderator: H.E. Prof. Dr. Hussein El-Atfy (5 min) Secretary-General, Arab Water Council (AWC), Egypt
- Opening / Keynote Speech: H.E. Prof. Dr. Mahmoud Abu-Zeid (15 min) President, Arab Water Council (AWC), Egypt

Panelists: (60 min)

- Prof. Dr. Abdin Salih, Director, Arab Water Academy / AWC (Water Harvesting for Water Security in the Arab Region: The Case of Sudan).
- Dr. Peter Riad (Doctor in the Department of Irrigation and Hydraulics, Faculty of Engineering, Ain Shams University - and coordinator at the German Chamber in the Arab Republic of Egypt)
- Ms. Faten Said, Director, Cairo Regional Office, Arab Industrial Development Standardization & Mining Organization (AIDSMO), Egypt. (Role of AIDSMO for Industrial Pollution Control & Sustainable Development.
- Eng. Abed Ezz El-Regal, Chairman, Abu Qir Fertilizers Company (Water is the blessing of life and existence, and its wastage is the most precious loss).
- Prof. Dr. Hala Yousry, Professor of Rural Sociology, Desert Research Center, Egypt (Women and Non-Conventional Water Use).
- Prof. Dr. Mohamed Haikal, Techn. Consult., Orascom Construction Ltd, Egypt (Egypt's Pioneering Experience in Agricultural Wastewater Treatment and Reuse)

Rapporteur: Dr. Mai Afifi (HCWW)

Brief about session -1:

**The session began with a speech from Prof. Dr. Hussein Al-Atfi**, in which he stated that the agenda of the conference, which Egypt is hosting in its second edition under the auspices of the Prime Minister and H.E. the Minister of Housing, Utilities and Urban Communities, in partnership with the Holding Company for Potable Water and Sanitation and in cooperation with the German side, which comes in A framework for transferring technology and knowledge of the most important modern technologies in the field of water treatment and management, transferring experiences and lessons learned, enhancing cooperation between the German side and the Egyptian side, and also how to achieve the sustainable development goals in Egypt that we seek while achieving Egypt's Vision 2030.

He pointed out the importance of the session to discuss **water scarcity in the Arab region and Egypt and the enormous and major challenges facing water management**, whether freshwater scarcity, population increase, or climate change, which have a major impact on the water sector, and the challenges will remain unless quick and urgent measures are taken in the next stage.

He added that the session focuses on various experiences in the field of non-conventional water resources, examples of which include water desalination, the safe reuse of treated water, whether from agricultural drainage or treated sewage, harvesting rain and torrential rains, and industrial wastewater, making use of it and recycling it. He acknowledged that the session was important because non-traditional water resources are receiving attention in the Arab region and Egypt to fill the water gap resulting from water scarcity and increased demand for it. He welcomed and thanked the speakers of the session.

**The 1<sup>st</sup> presentation** by the former Minister of Water Resources, Professor Dr. Mahmoud Abu Zeid and President of the Arab Water Council, entitled **“Prospects for non-traditional use of water towards sustainable development in the Arab region.”**

The most important points of the presentation are the following:

- Major challenges related to water in the Arab region and the Middle East and North Africa region.
- Using non-conventional water resources is a strategic solution.
- Types and possibilities of using unconventional water in the Arab region and the Middle East.
- Examples of global and regional non-conventional water use initiatives.
- Obstacles to the use and development of unconventional water.
- The rationale for initiatives to use non-conventional water resources.
- The vision of enhancing the use of non-conventional water resources in the Arab region.

He referred to examples of the most important initiatives of the Arab Water Council in the field of using non-traditional water resources, which are as follows:

- Arab Water Security Strategy in the Arab World (2010-2030) (League of Arab States)
- The National Water Council's regional initiative on the use of non-traditional water resources in the Arab region (2016)
- Water Scarcity Initiative / Earth and Water Days (FAO)
- UN/ESCWA Regional Initiative to Assess the Impacts of Climate Change on Water Resources (RICAR) (2007)
- Rio+20 Conference on Sustainable Development: The Future We Want (Brazil, 2012)
- Decade of Action on Water for Sustainable Development (2018-2028).

He also explained that the percentage of conventional water from the available freshwater resources is 92%, compared to 8% for unconventional water. He added that among the challenges facing the use and development of non-conventional water are infrastructure and technological challenges, social and economic challenges, capacity building challenges, and water management challenges.



He also pointed to the role of the Arab Water Council in initiatives to use non-conventional water, including preparing six policy summaries in 2016, in cooperation with UNESCO, the Food and Agriculture Organization (FAO), CEDAR, and partners, each of which deals with one type of non-conventional water resource development, and that these are being updated. Policies, strengthening institutions, improving awareness and efficiency of employees, partnerships, and management.

Guidelines for the use of salt water in agricultural production in the Middle East and North Africa were also developed in a project in cooperation with the FAO, and they are Arabized and simplified so that the simple farmer can use them. They include the different types of crops and the water used to irrigate these crops.

A project to reuse water in a safer way was implemented in partnership between three countries: Egypt, Jordan, and Lebanon, to prepare strategies for reusing unconventional water. Two dialogue sessions were held to discuss the lessons learned in reusing unconventional water in the Middle East and North Africa region. A book was prepared in this regard, and the book is available on the website. Arab Water Council.

A communication network has also been established for the reuse of non-conventional water with the aim of preparing experts in this field and enabling publication and preparation of books and articles. This network is available on the Arab Water Council's website. A report has also been prepared in cooperation with CEDARE on the reuse of non-conventional water in the Arab world.

Among the achievements, the Arab Water Council issued an award for creativity and innovation in the field of non-conventional water reuse in the Arab region and published the Encyclopedia of Water Resources Development and Management in Arid and Semi-arid Regions in the Arab World in cooperation with the Italian Bari Organization. The encyclopedia consists of 13 volumes, each of which deals with an item in Water Resources Management, where one of the volumes (Volume 7) deals with the use of non-conventional water. The encyclopedia is also available on the Arab Water Council website.

**The 2<sup>nd</sup> presentation by the speaker, Abdin Salih** - Director General of the Arab Water Academy and former Director of the UNESCO Regional Office in Egypt.

At the beginning, pointed out that, with the exception of four countries, **the Arab countries are classified below the water poverty line (1000 cubic meters/capita/year), and that 14 countries fall below the extreme water poverty line (less than 500 cubic meters/capita/year).**

**The total area of arable land is 197 million hectares, and the arable area of rainwater is 70 million hectares, of which the cultivated area reached 40 million hectares in 2011, representing 80% of the total arable area.**

He also pointed out that the Sustainable Development Goals (SDG 6, Goal 7), showed interest in the issue of water, and recognized that by 2030, international cooperation must be expanded and capacity building support for developing countries in activities and programs related to water and sanitation, including water harvesting and desalination. Water, water use efficiency, wastewater treatment, recycling and reuse technologies including rain harvesting or water harvesting.

350-400 billion in South Sudan is rainwater, of which very little is utilized. Water harvesting is defined as collecting rainwater, floodwater and/or groundwater and managing it sustainably to increase the availability of water for domestic and agricultural uses in addition to preserving the ecosystem.

He explained the technologies for collecting rainwater, including collecting rainwater with groundwater. Examples of rainwater harvesting include springs and aflaj, found in Sudan, Saudi Arabia, and some Arab countries.

He added that policies must be developed regarding water harvesting, including the establishment of an Arab regional initiative on water harvesting, with the aim of providing financial and technical support to individuals and organizations at the local, national, and regional levels to adopt and build appropriate structures for water harvesting.

Water harvesting should be based on the formulation of government policies and strategic plans and the translation of approved strategies into pilot water harvesting projects using appropriate water harvesting methods and technologies and building on local knowledge heritage.

Governments must take responsibility for raising national awareness about the importance of water harvesting and creating effective networks to increase cooperation at local, national, and regional levels through the exchange of relevant information, scientific knowledge base and water harvesting techniques.

Capacity building, scientific research, and innovations in the field of water harvesting should be implemented to sustain the development of water harvesting. The government and relevant stakeholders should consider the maintenance costs of these schemes in the annual budget to ensure high efficiency and sustainability of water harvesting projects and assess the impacts of climate change on water harvesting regularly as well as the use of water harvesting technologies as sources of adaptation to the impacts of climate change and regular monitoring and evaluation should form an important part of the WSI.

### The 3<sup>rd</sup> presentation was conducting via Prof. Dr. Peter Riad:

He indicated **Germany's interest in linking it with African countries**, and accordingly the German side studied the most important topics and needs of African countries, specifically Egypt, to know the most important critical issues in it that require the German side to transfer technology to it. After the study, it was concluded that the most important topics that Egypt needs to transfer German expertise is the water sector. And water resources management.

Through Dr. Peter's speech, he summarized the initiative of the German Ministry of Economy, called the German African Investment Authority, which was launched three years ago with the aim of transferring German expertise and technology to Africa, from which the initiative stated that Egypt is the gateway to Africa.

He also added that by transferring expertise and developing water solutions in Egypt, these experiences and solutions will be transferred to all Arab countries.

Dr. Peter explained that his role in the project is to link and transfer technologies from the German side to the Egyptian side, and that the most important technologies that can be transferred from the concept of the German side to the concept of quality and sustainability, including reducing and saving energy consumption, and this is a major challenge that the world must pay attention to and move toward, because by the year 2060 it will begin The United Nations imposed fines on countries that produce carbon emissions, used renewable energy and linked it to the water sector, and used green hydrogen, which is the fuel of the future, and also transferred expertise in the control and measurement sector to enable the system to be managed well, and also invested in the field of artificial intelligence. He also added that there is no expression The word "waste" is used in Germany because it is considered a resource, and all waste is reused.

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### The 4<sup>th</sup> presentation presented by Ms. Faten Saeed:

Mrs. Faten presented the organization's role in **supporting the goals of sustainable development and reducing the impact of industrial pollution**. At the beginning, she pointed out that the issue of water is one of the most important topics that constitute a major problem, whether at the global level or in the Arab region, because the Arab region suffers from water scarcity and poverty. She stated that the organization includes three important sectors: industry, mining, and standardization. The industrial and mining sectors are among the sectors that pollute the environment and therefore water. Therefore, it is important to present this problem and present technologies from the German side to solve this problem and to localize it in the Arab world.

It also stated that the Arab Organization for Industrial Development, Standardization and Mining has its permanent headquarters in Rabat, Morocco, and its regional office in Cairo, and one of the organization's main goals is to develop the industrial sector to meet the needs of Arab countries to achieve coordination and integration, raise the level of industry quality, pay attention to the raw materials for manufacturing and product quality, and encourage Arab industries based on innovation and knowledge. In addition to developing the organization's management and keeping it abreast of global technologies, the organization works as an Arab think tank working on a few topics. Since the adoption of the Sustainable Development Goals by the United Nations in 2015, the organization is keen in all its activities in conferences, training courses, workshops, or studies to be prepared to support the achievement of the goals. Sustainable development, which includes the ninth clause concerned with industrial activity, and the organization encourages small and medium industries, and attention to environmental and sustainability issues in order to develop production and combat pollution.

The organization also organizes conferences and seminars for cleaner production, green industries, and pollution control, and issues unified environmental specifications in coordination with standardization bodies in Arab countries. The organization adopts all Arab standard specifications.

The organization celebrates Arab Environment Day on the fourteenth of October of each year with the League of Arab States and the Arab Water Council.

There is also a project to link academic research with industry and apply it practically, create coordination between scientific research centers and industrial companies, and transfer and localize Western technology in the Arab world.



In the field of mining, the Arab Initiative for Minerals Used in Clean Energy Technologies was launched in Riyadh in January 2022. The initiative aims to maximize the value of mineral resources used in clean energy technologies in Arab countries, exploit them well, and enhance their value chain, in order to support the economies of Arab countries and keep pace with global strategies towards confronting... Climate change.

The initiative includes programs and activities within a proposed action plan that will be implemented in cooperation with Arab countries through the establishment of the “Arab Committee for the Initiative for Minerals Used in Clean Energy Technologies.”

In the field of industry, we are keeping pace with the Fourth Industrial Revolution and modern technologies in water management, and the organization holds several conferences and seminars in this regard.

The most recent thing the organization has done is to launch a platform for requests and offers for Arab industrial and mining products, which currently includes 40,000 industrial and mining establishments, 1,400 requests for mining and industrial products, and 30 mining and manufacturing classifications for 21 Arab countries.

As part of the continued development and modernization of the platform, the organization added electronic stores, which provide industrial and mining establishments with a private online store for free, as well as developing the web version and its applications on smart phones on the Store App and Google Play, in addition to the Business Intelligence system to provide indicators. (KPI) to serve establishments registered on the platform.

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**The fifth presentation by Speaker: Eng. Amr El-Dawy - Vice Chairman of the Board of Directors of Abu Qir Fertilizer Company:**

Talking about the Abu Qir Fertilizer Company, the company began 47 years ago to establish basic principles for managing its water resources and reducing the rate of waste. It established a major advisory committee of universities and industrialists on how to manage water resources using available technologies that allow for the reuse and recycling of water, and to create a preventive maintenance map to reduce Water losses, carrying out the necessary repairs for each factory to renovate it, training engineers and workers, treating incoming water, and measuring and controlling operations. (ZLD)Zero Liquid Discharge is a project he talks about

The project began through an idea from Dr. Fatima Badawi, Chairman of the Board of Directors of Smart Solutions Company and Assistant Chairman of the Board of Directors for Technical Affairs at this time, and the idea began to be implemented with motives including protecting Abu Qir Bay from pollution and water scarcity, achieving compatibility with the environment, saving an amount of water supplied to the factory, and recovering an amount of water. Water is about 4.5 million m<sup>3</sup>/day, and they provide the Rakta canal for use with other parties.

Knowing that Abu Qir Fertilizers is an economic organization, it is necessary to think about how to transform the project into added value and reuse pollutants, especially since the main pollutant present in the water that is dumped on the Gulf is ammonia, which is a major product of the company, and it was recovered in the form of ammonium sulfate, one of the new types of fertilizers. Which were used and which added value to the project. There is also a community goal specifically for Gulf water, air purification, and the use of labor in the project area.

Solutions were proposed and discussed with the German side for treating the outgoing water to choose the appropriate technology, and treatment was chosen as an integration between biological and chemical treatment.

When developing the treatment units, attention was paid to preserving energy by using general theories of energy saving. The most important unit in the project was the ammonia removal unit and the process of recovering the existing ammonia. The physical and chemical method was chosen for treatment with this unit, and to return and recover the exiting water, removal units were used (and the project cost 395 million pounds about 7 years ago.

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## Sixth presentation by Dr. Hala Yousry:

She indicated that the most important feature of the conference is the diversity of partners specialized in the fields of water and industry, bodies, universities, and companies at the international level. She stated that the agricultural sector is the sector that consumes the most water, so it needs more attention and the transfer of deeper technologies and partnerships, and women are the first driver in the field of agriculture.

Women innovate technologies that are compatible with their needs in order to do useful things and innovate appropriate technologies that are environmentally and socially compatible with the surrounding conditions.

In managing the water sector, the percentage of women's presence must increase because of their nature of conservation, which is useful in rationalizing the consumption and use of water, and innovating water-saving technologies, because the drop of water is of very great importance. Scientific research mechanisms are still not keeping pace with our ambition for technologies that are beneficial to society. For example, the water sector, all sectors must work in an integrated manner with the sectors of agriculture, environment, and others, and women must be present in the middle of this integration. We need units provided to schools, universities, and mosques that are water-saving and socially and economically compatible.

A message to the water sector to use women because they have a different nature than men in rationalizing and saving water. I also call on many of our girls to turn to the scientific side, which is what the country needs now and, in the future, and to start thinking creatively and innovatively to create new methods.

The private sector must also be given the opportunity to work with research bodies to create products to benefit from, and finally communication networks in inter-specializations, which are among the most important specializations and which we need to do something different, and that each specialization working alone will not obtain results, so integration must be worked to achieve for the desired goal.

### **Presentation by Dr. Mohamed Heikal:**

He began his presentation by providing an idea of **what has been implemented in Egypt in the field of water reuse**, beginning in the year 2012, a study report was published on the impact of climate change, in which it was stated that there is a continued rise in temperatures and that temperatures in the year 2030 will exceed the normal rate by 2.3, which will cause its impact on water and the agricultural sector, and as a result of the loss of a lot of water, the production of some grains will decrease and their price will increase, such as rice, corn, and wheat.

He began working on national projects to confront these changes by starting to reuse wastewater and desalinate water. As a result of the water shortage in Egypt and the fresh water sources in Egypt being limited and facing many challenges, including waste and population increase, thinking began about projects to reuse agricultural drains, and Egypt has leadership in In this experiment, all existing drains were initially counted and we started with the Al-Mahsama drain, through which about 1 million m<sup>3</sup>/day passes, and the second drain is the Bahr al-Baqar drain, through which about 5 to 8 million m<sup>3</sup>/day passes.

The first project is the Al-Mahsama treatment station with a capacity of 1 million m<sup>3</sup>/day, and work on the Al-Mahsama drain and water treatment and reuse in agriculture. After the success of this experiment and project, the President of the Republic was directed to start the Bahr Al-Baqar drain station project with a capacity of 5.6 million m<sup>3</sup>/day, the third project. On the Commons Bank, which combines more than one bank, which is the Al-Hamam project, which is being completed. These stations are considered giant and have enabled us to reuse the drains' water again.

Al-Mahsama station was implemented in 12 months and currently irrigates 100,000 acres in addition to the agricultural area. In the new Delta project, the Delta station was established, which sources its water from more than one drain through 12 lifting stations to reach the Delta station to treat 7.5 million m<sup>3</sup>/day. To irrigate about 1 million acres, which has a significant environmental impact.



The third experiment is the Bahr Al-Bahr drain, which flows into Lake Manzala and was responsible for the continued pollution in Lake Manzala. The location of the station was studied to treat 5.6 million m<sup>3</sup>/day on the eastern side of the Suez Canal by crossing the water through tunnels under the Suez Canal, and in the end about 460 thousand acres will be irrigated. Currently, the station irrigates about 260 thousand acres.

The Bahr Al-Baqaar drain station was established in 16 months, and the technologies used in the station were chosen with more than one technology and operating process, due to the change in the quality of the water supplied to the station throughout the day, month, and year. Therefore, the treatment process was chosen to be compatible with these changes and analyzes showed that the produced water Suitable for irrigation of all agricultural crops, in accordance with the Egyptian code and international codes. Finally, discussion was. conducting which was mainly about water desalination and the vision of Egypt governorate to use desalinated water and the challenges that face the government.

## B) Session 2:

### **Desalination Industry & Technologies Nationalization**

02 October 2023 (9:30 am- 11:00 am)

#### **Scope of the Session:**

Water desalination occupies an important place in Egypt's drinking water supply strategy. Therefore, the Egyptian government intends to implement an ambitious strategic plan until the year 2050, which will be implemented through 6 five-year plans, currently estimated at a value of about 420 billion Egyptian pounds (\$13.5 billion), to build 46 seawater desalination plants with a private sector participation system. This initiative is in line with the government's policy aimed at Encouraging the exploitation of non-traditional water resources. The government wants to implement this plan in 11 coastal governorates. The first phase of the government program aims to enhance water supplies and meet the needs of hot areas in the coastal governorates, especially in the Red Sea and Matrouh governorates and the coastal governorates in the northern Delta. Through which the authorities are counting on establishing 21 seawater desalination plants with a capacity of 3.4 million cubic meters per day, with investments estimated at about 160 billion Egyptian pounds, (5.1 billion dollars.) With investments estimated at approximately 260 billion Egyptian pounds (\$ 8.4 billion), the remaining stages of the 2050 strategic plan will enable the production of 5.6 million cubic meters of drinking water per day through the implementation of 25 seawater desalination plants to cover all the targeted governorates. This session addressed the importance of localizing water desalination technology, and through discussion of successful case studies from other countries and the extent to which it can be applied within Egypt, with the aim of maximizing the benefit from these experiences to raise the proportion of the local component in desalination plants in order to achieve economic growth and water security.

## ♣ Session Information

- Chairman: Eng. Amro Seoudy, CEO, WTCO, Egypt
- General Eng. Assem Shokr (Vice-Chairman, HCWW) o Desalination in Egypt

### Current Statues & Future prospective

## ♣ Panelist:

- Eng. Frank Jacobs, CEO Gets Water GmbH, Germany
- Dr. Mohamed Heikal, Techn. Consult., Orascom Construction Ltd, Egypt o Capt. Eng Georg. D. Fehner, Port Energy Logistic, Germany
- Dr. Ahmed Abdelkarim, Co-Founder & CTO of Water cycle Technologies, UK

## ♣ Rapporteur: Dr. Mohamed Afifi (HCWW)

### Brief about session -2:

**Frist presentation by GM. Eng. Assem Shoker:** highlighted **the strategic plan of desalination in Egypt**. He pointed that Egypt is facing a crisis in term of water availability and is considered the country with absolute scarcity, to face the challenge the government through HCWW had adapted an ambitious plan to increase desalination production to 10 Mm<sup>3</sup>/ day for year 2052.

The pillars of Egypt desalination plan as he explained that it formalized from 4 pillars:

- Cover the water demand for the upcoming uses.
- To create alternative for surface water resources in the coastal zones specially (Matrouh – red sea- Sinia)
- Replace the water resource that depend on critical water canals in Northern delta.
- Alternative water resources for the new cites depend on desalination.

Facts About the plan:

- Targeting year 2050
- Total desalination production by year 2050 = 9Mm<sup>3</sup>/day
- Investment of 13.5 billion USD

He also addressed the role of private sector and the efforts done by the government to facilitate their participation.

**2<sup>nd</sup> presentation by Eng. Frank Jacobs:** presented **the progress done in desalination and the ability to install a mobile water desalination unit in the sea** to directly desalinate water from the sea and could be connected from the shore. The desalination unit that is an innovative German technology is also powered by solar energy. Spoke about the ability of utilization of such unit for small and medium coastal communities as well. One of the best benefits for it the resilience of the system to be directly connected to the network at the emergency level.

**3<sup>rd</sup> presentation via Dr. Ahmed Abdelkarim:** He pointed **the possibility of extraction of lithium from brine of desalination technology**. He claimed about his startup originated at London the ability to participate in project within Egypt.



## C) **Session 3:**

### **WWT Technologies: Small Scale Sanitation**

Although, the Egyptian government tends to allocate resources for improving sanitation coverage in small communities (Azbas) with three main goals: (i) improving the immediate environment; (ii) assuring the continued collaboration of the middle class; and (iii) placating strategic elements of labor'. However, the sanitation coverage is still low with many residents of small communities (Azbas) suffering from a low level of access to basic public services, including piped water and wastewater disposal.

There are specific characteristics of small communities that seem recurrent in explaining the lack of progress in these settlements. First, the cost of providing services to a widely scattered population is relatively high. Generally, small communities are characterized by relatively low population densities, which hamper the realization of economies of density. As a result, centralized systems may not represent a viable service modality as the costs of such infrastructure cannot be recovered from the revenue that the provider can obtain from the users. Second, there is a presumed mismatch between the technical and financial capacity available at the local level and the requirements demanded by increasingly complex water supply systems.

Addressing sanitation challenges is vital for Egypt's development, especially in rural areas and smaller communities. This session focuses on innovative small-scale wastewater treatment (WWT) technologies that can provide sustainable solutions for decentralized sanitation. We'll highlight cost-effective and eco-friendly systems suitable for various contexts, examining their potential to mitigate pollution, protect public health, and promote environmental preservation. Join us as we explore how adopting small-scale WWT technologies can revolutionize sanitation practices in Egypt.

#### ♣ Session Information

- Chairman: Prof. Dr. AbdelKawi Khalifa (Former Minister-MWWU), Egypt
- Keynote Speech: Prof. Dr. Sayed Ismail (Vice-Minister, MHUUC), Egypt (TBC)

#### ♣ Panelist:

- Prof. Dr. Fatma El-Gohary, National Research Center, Egypt
- Dr.-Ing Norbert Blanke, TIA GmbH, Germany
- Prof. Dr. Maha Halalsheh, University of Jordan
- Capt. Eng Georg. D. Fehner, Port Energy Logistic, Germany

#### ♣ Rapporteur: Dr. Mahmoud Abdel Rahman (HCWW)

## Brief about session -3:

### 1<sup>st</sup> presentation by Prof. Dr. Sayed Ismail:

He represented **Egypt water and sanitation sector overview and strategic future vision.**

### Representing

- ♣ Policies of the Sector
- ♣ Planning of the investments and priorities on National and Programs Levels
- ♣ Overall Management and Follow-up
- ♣ Support Financial Resources allocation and Institutional / Technical Support for different Stakeholders.

The sector development policies have been also demonstrated:

- 1- Improving drinking water and sanitation coverage
- 2- Improving operation system and performance of the services providers
- 3- Strengthening the sectors framework at national level

Water Conservation Plan for Managing Water Scarcity and Sustainability for the Utilities

- ♣ Alternative sources of drinking water
- ♣ Safe reuse of treated wastewater
- ♣ Reduction of NRW

He also demonstrated the challenges that face the water sectors.

**Population growth and  
increase in water demand**

**Capacity Building for  
service Providers**

**Limited water resources;**

**The huge investments required to establish drinking  
water and sewage projects and the high cost of  
operation and maintenance (Low water Tariff).**

**Impact of Climate changes and their effects on  
ensuring the sustainability of services and  
maintaining water availability.**

**Involving the private sector in the growth of the  
utilities sector and the access of services to all citizens.**

## 2<sup>nd</sup> presentation Prof. Dr. Fatma El-Gohary, **Sanitation Sector in Egypt: Overview and Future Vision**

### Sanitation Coverage in Egypt

- ❖ In Egypt access to improved sanitation is less than half that for water.
- ❖ The rate of sewerage connection varies, with impressively high rates, more than 90 % in some cities, such as Cairo to less than 30% in rural areas.
- ❖ Population living in rural areas uses septic tanks, cesspits, and latrines.
- ❖ High levels of pollution in areas without appropriate sanitation systems undermine the potential health and environmental benefits of near universal access to Potable water.
- ❖ This gap matters, not just because access to sanitation is intrinsically important, but also because the benefits of improved access to water and to sanitation are mutually reinforcing.

And also, has represented the prospective to face challenges:

- ❖ Considering the present socio-economic conditions in Egypt, it may not be possible, either now or in the nearest future, to provide rural and peri-urban areas with sanitation systems using expensive, energy consuming conventional technologies.
- ❖ There is an urgent need, in both the short and long term, to address this problem and find appropriate solutions, which are both economically and technically feasible
- ❖ To do this successfully, requires good planning which in turn should be based on national policy, developed specifically to protect water resources, health of the people and sustain development.
- ❖ Onsite wastewater disposal systems present a sound method of household waste management in communities where the development density is low, little, or no piped water is available and where soil and groundwater conditions permit system use.
- ❖ On-site systems use either a septic tank or pit latrines. Septic tanks and pit latrines are low-cost technologies that allow construction, repair, and operation by local communities or homeowners and effectively reduce public health problems.
- ❖ In a pit latrine, the solids settle but the liquid seeps directly into the soil.
- ❖ A septic tank is a watertight tank that collects wastewater from toilets, showers, and other household utilities through a pipe. Solids settle on the bottom and the liquid flows out of the septic tank into a drainage field or overflows into a drainage system. The required effluent disposal area depends on flow rate and local soil infiltration. The

effects of these flows on the quality of the ground water must be considered. Accumulating solids have to be periodically removed from the tank. In properly designed septic tanks, the soil will remove the remaining BOD, suspended solids, bacteria, and viruses from the effluent.

- ❖ Off-site options for treatment of municipal wastewater should be considered when on-site treatment could entail direct risks to health or to ground water or risk of fecal contamination or eutrophication of coastal waters, as in more densely populated areas.

### **3<sup>rd</sup> presentation via Dr.-Ing Norbert Blanke, he represented the progress in the wastewater treatment plants developed by his company TIA Germany.**

About TIA in Brief:

- ❖ Wastewater Treatment since 1987
- ❖ Solutions for industries and municipalities
- ❖ Owner operated company.
- ❖ Planning and turnkey delivery of more than 170 wastewater treatment plants worldwide (20 – 7,500 m<sup>3</sup>/d), some were temporarily operated.
- ❖ 10 Plants in Egypt in operation or under construction

He mentioned about different projects of the company at the Gulf area. And the application in industrial field.

**Fourth presentation by Dr. Maha:** about the activities of NICE office concerning climate change. Adaptation in Sanitation and reuse subsector in Jordan in term of quality and quantity:

Quantity:

Increasing services to 80% can only be achieved by decentralized sanitation systems.

Quality: Linkages to sanitation safety planning, i.e. SSP

And the required enabling environment:

- ❖ Socially accepted systems
- ❖ Technically feasible robust systems
- ❖ Creating successful business model
- ❖ Legal framework
- ❖ Very much connected through water pricing



## D) **Session 4:**

### **Sludge Management for Sustainable Resource Utilization**

02 October 2023 (02:00 pm- 03:30 pm)

#### **Scope of the Session**

Most Egyptian investments have been primarily focused on providing large, centralized sanitation-related services and infrastructure with a little attention given to sludge disposal and management. For many years, excess municipal sewage sludge has been disposed through drying processes without paying attention to the recovery of the chemically stored energy content in organic matter and/or the potential recovery of nutrients. The management and disposal of this sludge produced from wastewater treatment is one of the main problems towards the sustainability of the drinking water and sanitation sector in Egypt, due to the serious environmental effects resulting from non-controlled disposal of excess sewage sludge without proper treatment.

Currently, Egypt's 550 WWTPs produce about 14 million m<sup>3</sup> of treated effluent and 4,000 tons of sludge per day. The current common scenario for sludge treatment and disposal which is implemented in most wastewater treatment plants in Egypt can be presented as follows: mixed sewage sludge (primary and secondary) is pumped into thickeners, mainly gravity thickeners, to increase the solids content from 1-2% to 4-6%. Then, the thickened sludge is pumped into open drying beds to increase the concentration of dry solids to 40-50%. The required time to achieve a high dewatering efficiency range from 2-3 weeks during summer and more than 6-8 weeks in winter.

Efficient sludge management is a critical aspect of wastewater treatment that often goes unnoticed. In this session, we shed light on the importance of proper sludge handling, disposal, and, more importantly, its potential applications. From energy generation to agricultural and industrial uses, we'll explore how turning sludge from a waste burden into a valuable resource can promote circular economy principles and contribute to Egypt's sustainability goals. Discover the latest advancements in sludge management and its promising role in sustainable development.



## Session Information

- ♣ Chairman : Prof. Dr. Ahmed Moawad
- ♣ Chairman, Nova Industries

Prof. Dr. Rifaat Abdel Wahaab (EWWI 23, Coordinator, HCWW),  
An overview of Current Status of Sludge in Egypt.

### Panelist:

- Prof. Dr. Ahmed Gaber, Faculty of Engineering, Cairo University.
- Mr. Stijn Wyffels, Waterleau Ltd., Belgium
- Dr. Maha Khallaf, Head of Programme, Nile Delta Water Management Egypt GIZ, Egypt
- Mr. Felix Meyer-Horn, Aerzener Maschinenfabrik GmbH, Germany

Rapporteur: Dr. Ahmed Gamal (HCWW)

## Brief about Session -3:

**1<sup>st</sup> presentation by Prof. Dr. Rifaat Abdel Wahaab:** presentation entitled **Sludge Management in Egypt- Current Status, Challenges & Opportunities**, the outline of his presentation were about:

- Current Status — Where things stand in Egypt?
- Governorate-WWTPs Sludge/Energy Calculations
- WWTPs receives industrial WW.
- Case Study
- Sludge -To- Energy Inter-linkages
- Conclusion

The coverage of wastewater around Egypt were demonstrated, the main technologies used in Egypt has also been de3clared. The current difficulties concerning sludge management and the amount produced from the sanitation system has also been presented. The management practice within the Egyptian environment have been identified as follow:

- Dried sludge(40%mosture) is selling to 'sludge traders.
- Sludge traders find customers.
- Customers pay for sludge and transport.

- Sludge traders signs a declaration that the sludge will be used according to the sludge regulations.
- Sludge is being used for agriculture applications.

The amount produced ~3 million ton of excess sludge (1% DS) is produced annually.

Comparison has been declared between chemical fertilizers and sludge fertilizers that show the cost benefit of sludge. And the ability of sludge to be used as organic fertilizer and Desert Soil Conditioners. It is an effective low-cost replacement for chemical fertilizers as it contains:



- Significant quantities of NPK
- Organic matter valuable for soil conditioning
- Trace elements- Fe, Mn, Zn and Cu (often deficient in soils) , especially in the new reclaimed area in the desert soil.

Different types and technologies that can be used for sludge and the investment opportunities:

- Incineration
- Energy
- Fertilizers
- Fuel
- Building material

**Second presentation Dr. Felix Meyer:-** hi presentation about - WASTEWATER ENERGY, EFFICIENCY & FINANCE –highlighted about water crisis and challenges globally. AREZEN as one of the leading companies in water management has declared their activities as:

- 159 years of experience
- Presence in all climatic zones worldwide
- in over 100 countries
- 51 subsidiaries
- >100.000 WWTP references
- 24h aftersales service
- In Egypt present > 50 years

		<b>AERsmart</b>		<b>IEQSY</b>
<b>Energy Saving</b>	55%	15%	50%	10-18%
<b>Capacity Increase</b>	35-50%		50%	
<b>Sustainability</b>	Higher efficiency	Higher efficiency	Higher efficiency	Energy reduction
<b>OPEX Reduction</b>	8-15%	5-10%	2-5%	Less downtime
<b>Carbon footprint</b>	Excellent Reduction of COD emissions -45%	Excellent Higher efficiency & energy saving	Excellent Double process capacity	

The benefit of using RMU Aeration Panels

- Highest oxygen transfer rate & energy efficiency
- Long service life (up to 20 years)
- High reliability & operational safety
- Minimum maintenance efforts
- Wide range of applications (municipal & industrial).

Solution for sludge resources:

1. **Agriculture**
  - Soil conditioner & fertilizer
  - Quality of sludge & regulations
2. **Energy production**
  - Biodigester – Methan Gas
  - Combustion
  - Cement industry

## Recommendation

- Regional cooperation and coordination towards integration and communication is a strategic necessity to achieve water, food and energy security
- Promoting the dissemination of knowledge regarding the importance of expanding the use of non-conventional water and enhancing communication, dialogue, and exchange of experiences for the benefit of all
- Political will and stakeholder involvement in the decision-making process to reduce the gap between water supply and demand using non-conventional water is indispensable
- Develop sound policies, strategies, and action plans for reusing non-conventional water
- Consideration should be given to developing a clear institutional framework to encourage and enable the private sector to participate in non-conventional water reuse projects
- Establishing a single entity/committee to deal with all water sectors
- Promoting scientific research and innovations and building local knowledge and skills to localize relevant industries
- Sharing success stories and lessons learned
- Providing a capacity building programme
- Promote social acceptance (regarding the benefits of water treatment and reuse) and raise citizen awareness levels.
- Updated regulations and strict enforcement
- Recent studies indicated that it may not be possible, due to economic reasons, to provide sewerage facilities for all residents of rural and peri-urban areas, either now or in the nearest future.
- As a result, the focus of the field of wastewater management should change from the construction and management of regional sewerage systems to the construction and management of decentralized wastewater treatment facilities.

- Decentralized management allows the application of various cost-effective management options which are tailored to the prevailing conditions in the various sections of the community.
- Decentralization requires the choice of efficient and affordable wastewater treatment technologies which can be placed close to the human settlements without causing nuisance to the community. Developing such treatment technologies requires extensive research and utilization of both simple and sophisticated technologies which may prove effective and efficient. There are well established processes of conventional and non-conventional wastewater treatment.
- Given the fact that soon, increasing demands are being made on freshwater supplies, it is clear that decentralized systems, will increase the opportunities for localized reclamation/reuse.