جمعية علوم وتقنية المياه
Water Sciences and Technology Association

مؤتمر الخليج الخامس عشر للمياه
The 15th Gulf Water Conference

KAHRAMAA
المؤسسة العامة القطرية للكهرباء والماء
كهرماء
Qatar General Electricity & Water Corporation

# WSTA 15th Gulf Water Conference

## Embracing Technological Progress

### Doha, 28-30 April, 2024

الأمانة العامة لمجلس التعاون لدول الخليج العربية
Secretariat General - GCC

IWMI
International Water Management Institute

المؤسسة العامة لتحلية المياه المالحة
Saline Water Conversion Corporation

IDA

Arabian Gulf University

الجمعية العمانية للمياه
Oman Water Society

EDS

QEERI
معهد قطر لبحوث البيئة والطاقة
Qatar Environment & Energy Research Institute
جامعة حمد بن خليفة
HAMAD BIN KHALIFA UNIVERSITY

GSO
هيئة التقييس الخليجية
GCC Standardization Organization

UNESCO

UNITED NATIONS ESCWA الاسكوا

Food and Agriculture Organization of the United Nations

UN environment

ICARDA
Science for resilient livelihoods in dry areas

ICBA
AGRICULTURE FOR TOMORROW

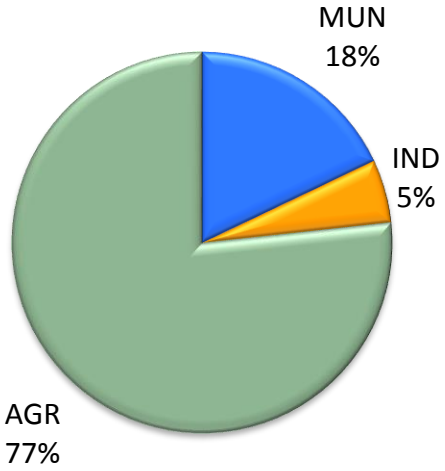
ACWUA

The League Of Arab States
Arab Organization For Agricultural Development

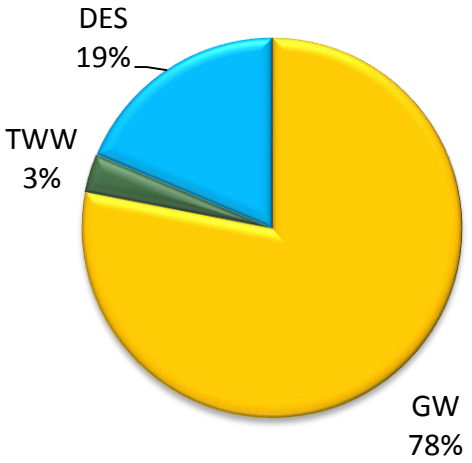
# The GCC Water Scene

- Unprecedented and sustained economic and social transformation in the past five decades
- Rapid increase in sectoral water requirements;  beyond available capacity of conventional water resources
- GCC done well in providing water supply to rapidly increasing population by relying on desalination technology; substantial financial, economic and environmental costs
- Agricultural water demands are met by heavy groundwater abstraction; majority are non-renewable
- Low rate of treated wastewater reuse; major lost opportunity
- Increase in extreme events of floods and drought (CC)

## GCC Water Uses




## GCC Water Resources



- Water challenges are being address by both supply-side engineering and demand side management approaches; technology has played major part in these efforts (desalination/wastewater treatment technology, modeling to support decision making, …)
- New generation of technologies, driven by ICT are emerging and will fundamentally alter and transform entire systems of production, management, and governance of all sectors, including the water sector
- They provide powerful enabling tools for effective water management, e.g.: **Smart urban water supply system, Smart agriculture**
- WSTA 15th Gulf Water Conference Theme "**Embracing Technological Progress**"
- **Objectives:** Review current and emerging technologies used in the various water sectors, improve their awareness, and identify their advantages, challenges, and limitations; and present technological solutions to the water sector

# Potential of Artificial Intelligence for Sustainable Water Management

Waleed Al-Zubari
Water Resources Management program
Department of Natural Resources and Environment, College of Graduate Studies
waleed@agu.edu.bh

# Emerging Technologies for Water Resource Management

## Quantum Technologies


- Water Resource Modeling
- Advanced Water Quality Monitoring

## Artificial Intelligence

- Predictive modeling
- Smart irrigation systems
- Leak detection

## Blockchain


- Data Security for Water Infrastructure
- Decision making & optimization

## Internet of Things

- Sensor networks
- Smart meters
- Precision agriculture


## Remote Sensing

- Satellite imagery
- Land use monitoring
- Flood forecasting

## Big Data Analytics

- Data-driven decision making
- Demand forecasting
- quality monitoring


## Robotics

- Automated leak repair
- Desalination automation
- Remote monitoring & maintenance

# Artificial Intelligence

- **Artificial:** human created
- **Intelligence:** thinking power
- **Artificial Intelligence:** capability of machines to emulate human intelligence enabling them to “learn from experience”, “adapt to changing contexts”, and perform tasks that typically require human “cognitive abilities”, such as “problem-solving” and “decision making”