

Clean Water and Sanitation

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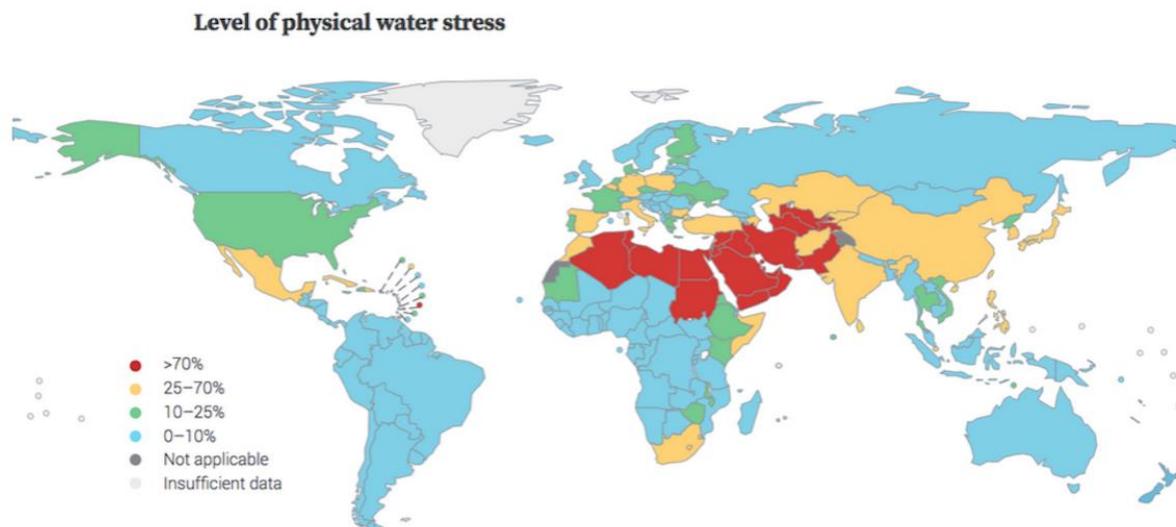
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Overview

Water is an essential commodity. It is called the liquid of life. Water crises rank in the top 10 risks in terms of impact according to the [2018 Global Risks Report](#) by [World Economic Forum](#). This indicates that there will be a significant decline in the availability of quality and quantity of fresh water resulting in harmful effects on human health and/or economic activity.

UAE is at a natural disadvantage owing to it being a desert country with an arid climate and limited availability of underground water. There is a huge dependency on other water resources such as desalinated seawater and rains created by cloud seeding.



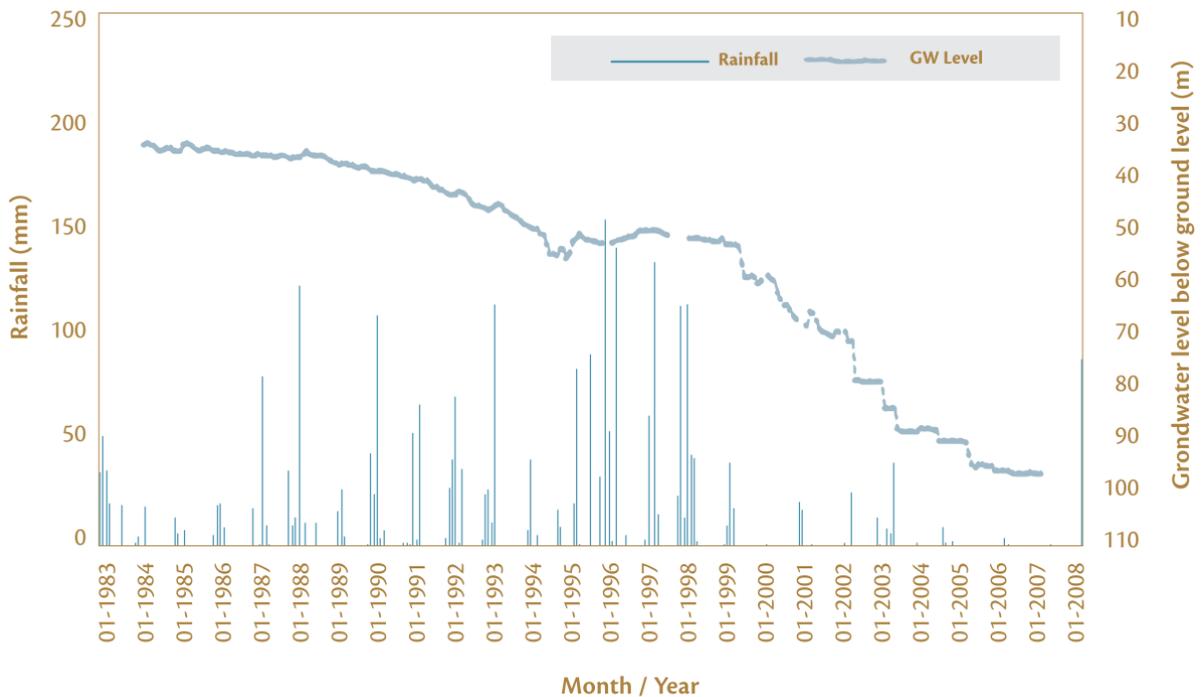
Source: UN (2018a, p. 72, based on data from AQUASTAT). © 2018 United Nations. Reprinted with the permission of the United Nations.

His Highness Sheikh Mohamed bin Zayed Al Nahyan, Crown Prince of Abu Dhabi and Deputy Supreme Commander of the UAE Armed Forces has expressed that more than oil, water is an important resource directing the country to pursue an ambitious agenda towards sustainable water security over the past decades. As a result, the government of UAE has been consistently driving efforts and initiatives to address the issue of water scarcity in UAE and abroad.

Issues

The UAE is one of the most arid countries in the world. The annual precipitation of UAE is around 4 inches only. There is an increase in the demand for water considering the growth of UAE population from less than one million people in the 1970's to well over

nine million people in 2018. Adding to this is the expansion of economic and agricultural activities. Surface water resources do not exceed 1% annually of the available water resources. The chart below shows the decline in the underground water level in Al Hamraneia area in Ras Al Khaimah from 1983 to 2008.



Source: [The State of Environment Report, 2015](#)

According to the [Ministry of Climate Change and Environment](#), currently in the UAE we use water at the rate of 550 liters per capita per day. The recent crisis in South Africa put a limit on water consumption to just 50 liters per day. The global average for daily water consumption per capita is around 17-300 liters per day. This puts an alarming need to educate people and raise awareness on how to conserve water.

Initiatives and Impact

The UAE government is proactive and has taken several initiatives to ensure water security in the country.

UAE Water Security Strategy 2036

The [UAE Water Security Strategy 2036](#) brings together federal and local authorities to collaborate and create sustainable means to conserve water by:

- Ensuring continuous sustainable water supply

- Developing adaptability for future demands of water
- Reducing the usage of average per capita consumption
- Increasing the reuse of treated water
- Enhancing the efficiency of the water network.

The three strategic action programs of the UAE Water Security Strategy 2036 to address all high priority risks related to water consumption are:

- Water Demand Management Program
 - Promote environmental and economic sustainability in urban water consumption
 - Reduce the loss in the water network
 - Rationalize individual consumption
 - Reduce the demand for desalinated water
 - Raise the efficiency of water use in agriculture
 - Reduce pressure on groundwater used in agriculture.

- Water Supply Management Program
 - Provide future water needs sustainably
 - Increase the use of membrane desalination technologies
 - Increase use of renewable energy sources
 - Expand the use of treated wastewater
 - Promote water harvesting
 - Reduce groundwater extraction.

- Emergency Water Production and Distribution Program
 - Ensure effective prevention of water emergencies
 - Ensure immediate response to water emergencies.

The recommendations of the UAE Water Security Strategy 2036 has led to signing of [MOU for creating a strategic water interconnection](#) between Dubai and Abu Dhabi that aims to create a sustainable environment and preserve water resources.

[UAE Research Program for Rain Enhancement Science](#)

The [UAE Research Program for Rain Enhancement Science](#), popularly known as cloud seeding, is an initiative to incorporate innovative methods to try to increase the ground water level by rain enhancement in arid and semi-arid regions throughout the world thereby helping to achieve water security. Launched at the beginning of 2015, this

program has positioned UAE in the forefront of scientific research and innovation globally. This program offers a grant of \$5 Million USD to promote innovation and research in this field.



Source: [UAE Research Program for Rain Enhancement Science](#)

Rain enhancement aims to provide drought relief, a potential replenishment of ground water, create fertile soils that in turn provide food and economic security.

An [International Rain Enhancement Forum](#) is organized annually by the UAE Research Program to encourage dialog and ideas about rain enhancement technology.

Water Research and Learning Center

The [Water Research and Learning Programme](#) is a public-private partnership initiative by Emirates Wildlife Society-WWF, Fujairah Municipality, Earthwatch Institute and the HSBC Bank. It provides a venue for training and conducting awareness activities about freshwater resources in the Wadi Wurayah National Park in Fujairah. Wadi Wurayah is one of the few locations in UAE replete with freshwater resources. Permanent streams and pools of fresh water support a wide range of rich biodiversity which is also fragile.

A monitoring program focusing on the parameters to maintain the quality of the fresh water in Wadi Wurayah has been setup. Citizen scientists were encouraged to participate in this activity of monitoring the freshwater parameters.

WATER
QUALITY
TESTING

Two new parameters were measured this season: biological oxygen demand (BOD) and the redox potential (ORP). This will help us to further understand the water chemistry.



1,536

Tests on 18
parameters
Conducted

Source: [Annual Report Water Research and Learning Programme](#)

Water desalination plants

Desalination is an important process for arid countries to rely on sources other than rainwater for continuous supply of water. Way back in 1977, UAE introduced 3 different ways of water distillation. The Multiple-Effect Distillation (MED), the Multi-Stage Flash Distillation (MSF) and the Reverse Osmosis (RO) Technique.

		Process	Capacity
UAE*	1977	Jazirat Abu Mousa	0.02
		Abu Dhabi Vapor Plant	15
		Al Barbarat	1

*the UAE introduced three different processes in one year.

Source: [Desalination in the GCC](#)

80% of total drinking water in the GCC region is dependent on desalinated water. UAE uses thermal desalination to convert seawater into fresh water. 70 desalination plants all over UAE supply 42% of the country's total requirement of water which is around 14% of the world's total production of desalinated water.

A water pumping and desalination station at the Mohammed bin Rashid Al Maktoum Solar Park uses photovoltaic solar panels to power the plant that desalinates water with Reverse Osmosis (RO) technology. It boasts of a production capacity of [50 cubic metres \(around 11,000 gallons\) a day](#). This project is in cooperation with the UAE Water Aid Foundation (Suqia), under the umbrella of the Mohammed bin Rashid Al Maktoum

Global Initiatives. The aid focuses to provide clean and safe drinking water for people in needy countries, through funding and supporting water technology projects that help combat drought.

Over 33 desalination plants have been established to meet the water requirement in the country. An ambitious [150 million gallon per day desalination plant](#) that uses Reverse Osmosis (RO) technology is being planned by the Federal Electricity and Water Authority in collaboration with ACWA Power and MDC Power Holding Company in Umm Al Quwain.

Dams

With efforts to increase rainfall, it is vital to store the water and feed it to the underground water table. Water resources need to be integrated and managed efficiently to meet the increasing demands. Building dams is one of the important actions toward sustainability in water resources management. In UAE, the types of dams can be classified into earth and concrete dams. Most of the dams built by the [Ministry of Climate Change and Environment](#) are concentrated in the eastern and the northern parts of the country.

The importance given to dams and rainwater harvesting projects in UAE have led to 130 dams being built with a total storage capacity of 120 million cubic metres of water. It is vital to note that around 600 million cubic metres of water has been captured in dams since 1982 till December 2013. This has greatly improved flow risks and feeding rates of groundwater.

Global Initiatives and Impact

Suqia- UAE Water Aid

The [UAE Water Aid Foundation](#), Suqia was established in 2015 by the [Mohammed bin Rashid Al Maktoum Global Initiatives foundation](#) (MBRGI). It is a non-profit organization aiming to provide clean and accessible water aid and relief to countries all over the world through innovative sustainable solutions. The foundation focuses on implementing cost effective solutions in the form of:

- Water Purification Stations
- Water Stations
- Artesian Wells
- Surface Wells

- Mountain Springs
- Water Distribution Network
- Sanitation Facilities
- Charitable Aid.

Across 34 countries, with 1,000+ projects, Suqia has impacted over 9+ million lives in the world.

The [Mohammed bin Rashid Al Maktoum Global Water Award](#) recognizes and encourages talent all over the world to promote innovative and sustainable ideas in water conservation.

[MBRGI](#) aims to target 130 million people focusing on the program of the Arab world to drive innovation and product solutions for sustainable water supply. The Suqia Initiative will conduct research on water supply until 2025.

In 2018, the Year of Zayed, 100 projects for safe drinking water in different communities of the world was implemented by Suqia in collaboration with the [Mohammed bin Rashid Al Maktoum Humanitarian and Charity Establishment](#) and the [Emirates Red Crescent Authority](#).

[Mohammed bin Rashid Al Maktoum Humanitarian and Charity Establishment](#) and Suqia have signed a Memorandum of Understanding (MOU) to strategically partner and implement water aid throughout the world. Further to the signing of this MOU, 10 different projects were implemented in various countries such as Somalia, Tajikistan, Afghanistan, Ghana, Yemen and Benin benefitting more than 60,000 people.

Sanitation in UAE

Waste and Sewage management is vital to ensure that the sewage generation of an ever-rising UAE population is disposed in a sustainable way. Treatment and disposal of sewage is decentralized and each emirate is tackling the issue in proactive ways.

In Abu Dhabi, [The Abu Sewerage Services Company](#) (ASSC) was established in 2005 to monitor, collect and treat wastewater generated in the residential and commercial sectors of the emirate.

ASSC is currently managing the [Strategic Tunnel Enhancement Programme](#) (STEP) which is an ambitious huge gravity-driven hydraulic wastewater network. STEP will help

to eliminate the 34 existing pump stations in Abu Dhabi. It will potentially reduce overflows in the sewer systems and eliminate bad odor. This tunnel will be 41 kilometers deep and one of the longest descending waste tunnels in the world. It will have a network of 43 km of smaller diameter link sewers that will transfer waste to the treatment plants.

With this program the country aims to create a successful sewer system that will provide ecological benefits, sustain long term demands and needs effectively.

A new deep tunnel sewerage system is being planned for Dubai expected to be completed around 2025. With a budget of AED 12.5 billion, it is expected to replace 21 sewerage pumping stations. In addition to this, the Jebel Ali sewerage plant is expanding at the cost of AED 1.3 billion hoping to serve 1.35 million people by doubling its current capacity to 675,000 cubic metres daily.

An AED 227 million sewage treatment plant in Sharjah is expected to produce 5,000 cubic metres of high-quality water every day for the use of the citizens.

One of the first public private partnerships in the country was the sewerage treatment network built for Ajman by the Ajman Sewage Company in 2009.

Conclusion

One of the most valuable natural resources is water and even though UAE is naturally at a disadvantage with producing water, the country has made great strides in incorporating innovative methods and implementing various strategies to not only conserve fresh water and utilize seawater but also use techniques to generate more water. Sanitation has been in the forefront of UAE projects in providing safe and clean water.

References

[MBRGI](#)

[Suqia Water Aid](#)

[ADSCC](#)