

## Policy Brief 28

# Water Security in Egypt: Issues and Perspectives

Prepared by:

**Kareem Mostafa**  
**Mariam Allam**  
**Sarah El-Fiky**  
**Seba Issa**  
**Sherif Mohyeldeen**

Under the supervision of:

**Dr. Shahjahan Bhuiyan**

June 2021

## What is Water Security?

Water security is a multidimensional concept that involves the protection of already existing water supply, in addition to the creation of alternative sources of water. It is defined as:

*“The capacity of a population to safeguard sustainable access to adequate quantities of and*

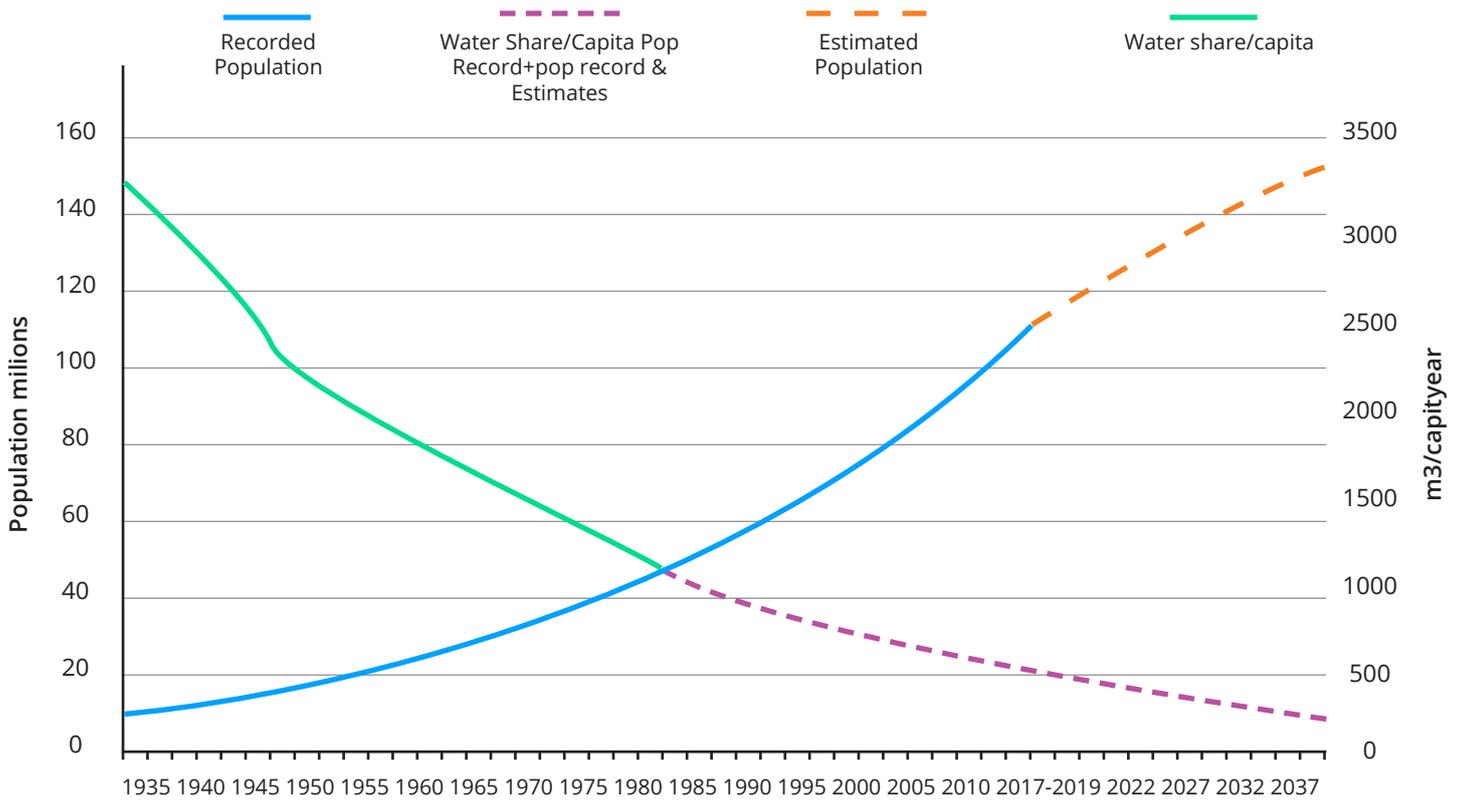
*acceptable quality water for sustaining livelihoods, human well-being, and socio-economic development, for ensuring protection against water-borne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and political stability” (UN-Water, 2013).*

## The Problem of Water Security in Egypt

According to the World Bank, a water-scarce country falls beneath a benchmark of 1000 cubic meters per capita - a point of reference identified by the Internal Benchmark Network (IBNET). Egypt, whose pure water production reached an all-time low of 555 Cubic meters in 2018, is considered one of the water-scarce

countries despite its strategic location and its ease of water accessibility (World Bank, 2018). The gap between the water share per capita and the population signals an imminent catastrophe of water security and its future in Egypt.

**Population Records / Estimates (Million) & Water Share (m<sup>3</sup>/Capita/yr)**

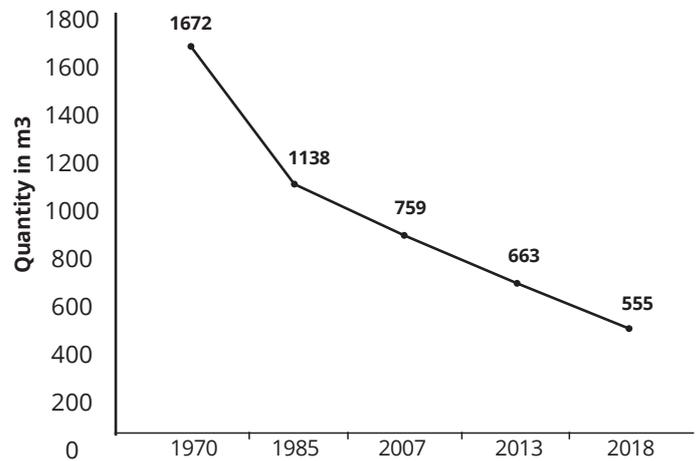


**Figure 1:** Population vs water records and estimates (1935-2037)  
**Source:** Ministry of irrigation and water resources, 2020

**What are the root causes of Water Scarcity?**

**1. Population growth and its impact on water consumption**

The population of Egypt has reached 101 million in 2020. The problem does not only have to do with the large population but rather with the rate by which the population increases. It is estimated that Egypt will reach 110 million in 2025. The average per capita share of freshwater is decreasing by about 11% due to the population increase. In 2050, the per capita share of freshwater is expected to reach below 450 cubic meters.



**Figure 2:** Per capita from quantity of pure water produced per year in cubic meter (1970-2018)  
**Source:** CAPMAS, 2020

**2. The Grand Ethiopian Renaissance Dam (GERD)**

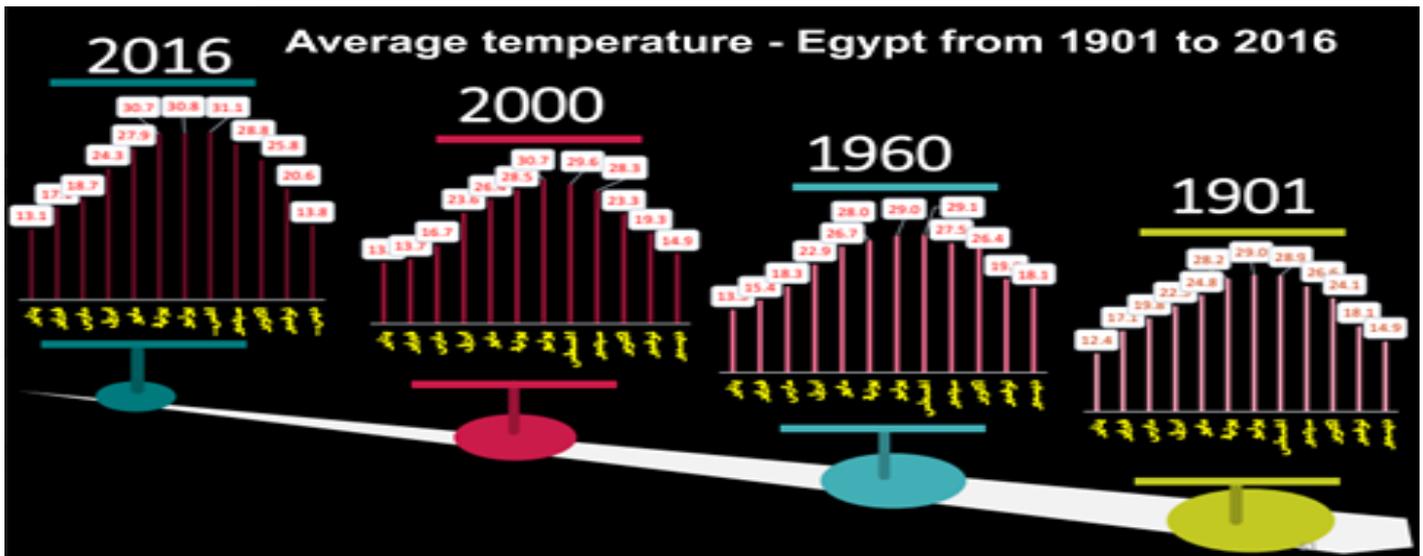
The construction of the GERD has a multifaceted impact on the Nile water as a main source of water in Egypt, as illustrated here (Abdelhaleem & Helal, 2015):

- A. The Nile water levels will decrease.
- B. The Nile water velocities will decrease, affecting the water surface profile.

- C. Agriculture lands in Egypt will decrease drastically, leading to the imminent possibility of land desertification<sup>1</sup>.
- D. There will be a negative impact on safe navigation.
- E. Hydropower losses from the AHD will range between 20–30%.
- F. Evaporation losses will increase by 5.9% leading to an increase in the Nile water salinity.

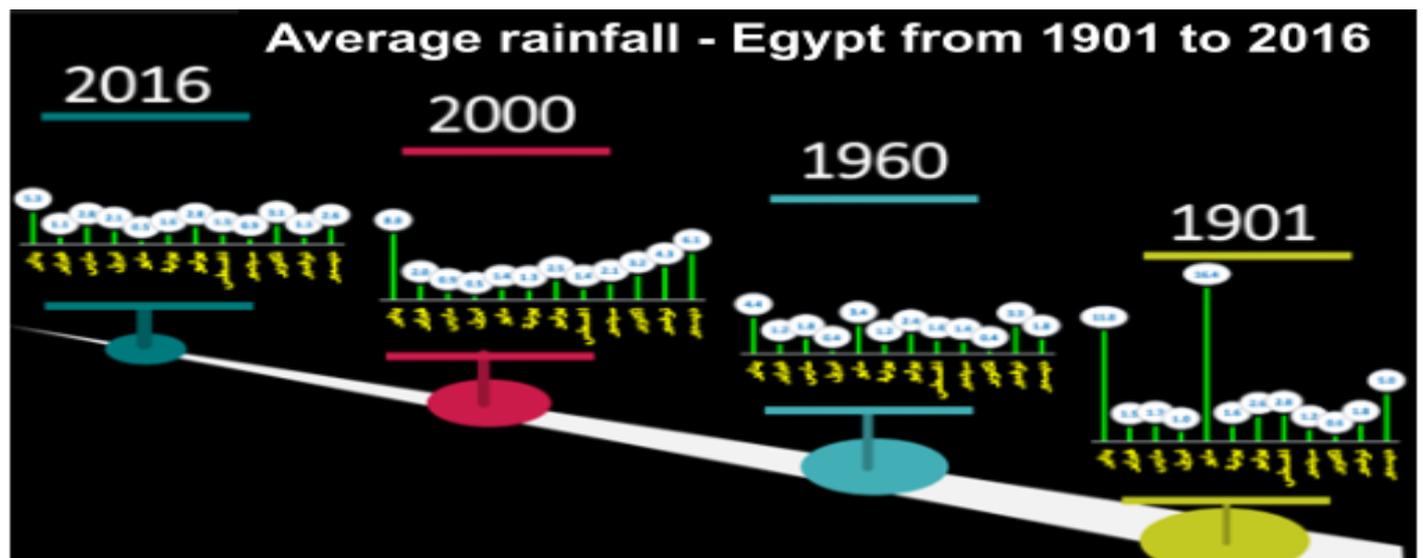
### 3. Climate change

- A. The Nile water is highly sensitive to climate change, both in the amount of rainfall and variations in temperature.
- B. Figures 3 and 4 indicate that there is a general trend towards warming of the air temperature and a possibility of reduction of rainfall.



**Figure 3:** Average temperature - Egypt from 1901 to 2016

### Average rainfall - Egypt from 1901 to 2016

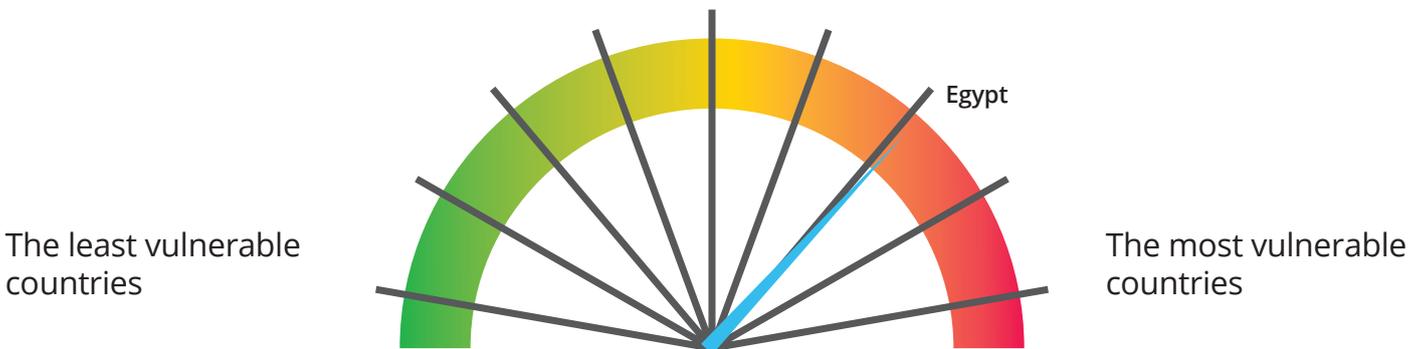


**Figure 4:** Average rainfall - Egypt from 1901 to 2016 (CAPMAS, 2020)

<sup>1</sup> Land desertification is a phenomenon where desert lands increase through the excessive formation of sand dunes, due to the scarcity of water, causing disruptive effects on the quality of soil, vegetation, and cities as a whole (Tsoar & Zohar, 1985).

C. Egypt ranks 87th and 73rd place in the Climate Change Sensitivity Index and is considered one of the most vulnerable countries to climate change, as shown in Figure 5.

### Egypt's vulnerability to climate change



**Figure 5:** Egypt's vulnerability to Climate Change (CAPMAS, 2020)

## Current Policy Environment

Egypt has been developing its 2030 Vision, which sheds light on the importance of reforms on different issues such as the effective management of water resources in Egypt. Therefore, Egypt has been managing its water resources system by developing various policies, legislation, and projects that would help avoid water crisis in the future, including:

- Desalination
- Canal covering and lining
- Use of modern irrigation techniques, like sprinkler irrigation and piped irrigation
- Wastewater treatment

- Water catchment
- Use of underground water

**Nonetheless, the majority of developed policies and legislation did not achieve advancements for many reasons:**

- Ineffective implementation of legislation.
- Lack of buy-in and public awareness.
- Lack of commitment and cooperation across different government agencies and municipalities.
- Water allocation is based on demand overlooking the economic value of water.

## What are the policy alternatives to tackle the negative consequences of water scarcity?

The following alternatives focus on adaptation measures and short-term solutions targeting the current implications of water scarcity rather than mitigation measures and long-term

plans. It is worth noting that these alternatives should go hand-in-hand with solving the issues of population increase, GERD, and climate change.

## Policy Alternatives

1. **The first policy alternative** suggests implementing water governance practices in agriculture since most of Egypt's water share goes to this sector. Economic tools of water governance can effectively help in changing behaviors and attitudes towards the efficient use of water. Such tools should be rigorous and robust to encourage innovation, politically acceptable, in compliance with legal and institutional frameworks, and applicable under low monitoring and implementation costs. Among these economic tools are cost recovery, virtual water, water footprint, and water productivity.
2. **The second policy alternative** suggests improving the institutionalization of water management through establishing a committee that includes representatives from different stakeholders that work on the water scarcity issue in Egypt. This committee will be responsible for coordinating between a large number of relevant stakeholders, setting a plan, implementing projects accordingly, and ensuring the achievement of concrete steps towards solving the problem from its root causes.
3. **The third policy alternative** suggests the effective implementation of existing legislation. The government should work on tightening the penalties to deter violators since previous laws were incapable of meeting the government's needs due to the absence of monitoring and executing penalties and an enabling environment.





## Conclusion and Recommendations

In conclusion, the previously mentioned alternatives have their advantages and limitations. Given the complexity, time, and financial restrictions, the most effective alternative is the second one. The government has enough administrative resources to implement this alternative, especially that it would not entail any technical know-how or additional costs. It will, however, require political approval for its implementation and could be impeded by bureaucracy.

In order for the selected policy option to achieve optimum results, the following aiding strategies are put in place to facilitate the realization of future water security:

- Developing a framework that aligns water security with larger socio-economic goals.
- Depending on crops of high economic value that consume less water.
- Defining policies through the government agencies in cooperation with the beneficiaries on all levels to ensure everyone's participation to improve agricultural production and water productivity.
- Establishing and developing a comprehensive agricultural and climate database for effective irrigation management.
- Developing policies to reduce water footprint through production technologies that require less water to produce a unit of product.
- Using virtual water imports as a tool to reduce pressure on local water resources.
- Improving the governance framework is essential to attract the private sector to participate in water projects.
- Preparing a strategic plan to improve water use efficiency by using economic tools for water governance such as cost replacement, which can be applied to maintenance and operating costs.
- Reforming the subsidy system to guarantee support for the poor.
- Encouraging user participation in water resources management and decision-making processes through capacity building programs and training courses.
- Increasing societal awareness of the water problem and its consequences by conducting awareness campaigns including all relevant stakeholders.
- Improving legal and regulatory tools, increasing the efficiency of institutional management, and forming bodies to implement water and environmental laws at large.
- Implementing regional projects in the field of water governance to exchange experiences and benefits with other countries.

«All the academic references used in this brief are mentioned in the policy paper.»

This brief is published by: The Public Policy Hub - GAPP School (AUC)

<https://gapp.aucegypt.edu/public-policy-hub>

Follow us on:  PublicPolicyHUB  PolicyHub  Public Policy Hub  The Public Policy HUB - AUC GAPP

Water Security in Egypt: Issues and Perspectives