THE SUEZ CANAL GLOBAL POWERS LOCAL CONSEQUENCE

https://www.egypttoday.com/Article/4/109988/Paintings-that-highlighted-the-historical-opening-of-Egypt's-Suez-Canal

painting by Albert Ziegler, 1864

150 YEARS NEW WATERWAY - PAST, PRESENT AND FUTURE OF SHIPPING CHANNELS / Rotterdam, Oct 13, 2022 Cornelia Redeker Umeå School of Architecture / cornelia.redeker@umu.se

64° latitude sub-arctic / Umea, SE

48-52° temperate / Cologne, Rotterdam, Delft, Munich

31° arid / Cairo, Egypt

https://solarsystem.nasa.gov/resources/694/earth-at-night/



Shortest sea route between the Atlantic and Indian ocean via the Red Sea Cutting a 24-day transit time to just 16 hours One of the most heavily used ocean lanes, with more than 100 ship passes daily The canal is so narrow that it cannot regulate two-way traffic Wait-time of vessels can be up to a week

see https://www.container-xchange.com/blog/shipping-routes/



EGYPT 94% DESERT **6% ARABLE LAND HOUSING 95% OF POPULATION**





Solar Radiation, summer and winter kWh/m²/day



Mean Annual Rainfall

0 - 5 mm 5 - 10 mm 10 - 25 mm 25 - 50 mm 50 - 100 mm 100 - 200 mm



Potential Evapotranspiration

125 -	- 150 mm
150 -	175 mm
175 -	- 200 mm
200 -	225 mm
225 -	- 250 mm

Photo: NASA Beck, H.E., Zimmermann, N. E., McVicar, T. R., Vergopolan, N., Berg, A., & Wood, E. F. - "Present and future Köppen-Geiger climate classification maps at 1-km resolution". Nature Scientific Data. DOI:10.1038/sdata.2018.214. Köppen-Geiger climate classification map for Egypt (1980-2016)



POPULATION INCREASE



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Egypt's booming population hits

100 million

The figure released by the statistics agency shows an increase of seven million since last census results in 2017.

12 Feb 2020 🛛 🥤



The North African country retains its position as the most populous Arab nation [EPA]

In 2014, Egypt's Central Agency for Public Mobilization (CAPMAS) and Statistics announced that over a quarter of the Egyptian population is illiterate; 18.5 percent of males and 33.6 percent of females cannot read or write.

Egypt's fast-growing population has hit 100 million, its statistics agency said on Tuesday, presenting a pressing problem for an already overburdened country with limited resources.

The figure is an increase of 7 million since the publication of the last census results in 2017. Egypt's population has tripled since 1960, with the annual growth rate peaking in 1987 at nearly 2.8 percent.

The North African country retains its position as the most populous Arab nation and Africa's third most populous country behind Ethiopia and Nigeria. (...) A baby is born in Egypt roughly every 17.9 seconds, the statistics body calculated.

Prime Minister Mostafa Madbouly told a cabinet meeting last week that "population growth is the single largest challenge facing the state ... and affects national security".

The vast majority of the country's population is crammed in urban areas around the Nile, some 7 percent of Egypt's territory. The lifeline, which Egypt shares with Sudan and Ethiopia, critically provides around 97 percent of Egypt's water needs.

Young population: As with the majority of Arab countries, Egypt has a youthful population with just over 60 percent under the age of 30.

Around 10 million Egyptians live overseas, most of them in the Gulf in search of better economic opportunities. Their remittances have become an important source of income for Egypt.

Nearly a third of Egyptians live below the poverty line, according to CAP-MAS figures released last year.

The unemployment rate is hovering around 10 percent, with millions leading precarious lives often without social protection in the informal economy.



WATER SCARCITY

Water challenges in Egypt result from the limitation of water resources, high losses from agricultural and domestic sectors, high population growth and increasing demands, climate change uncertainties, construction of dams on the Nile tributaries, inequitable water access, and the insufficiency of financial resources.

ElDin Omar, Mohie (2020). 'Water Conditions in Egypt' in: Redeker, C. Jüttner, M. (forthcoming). Landscaping Egypt - From the Aesthetic to the Productive. Jovis Publishers, Berlin: pp. 46-51

Egypt's annual water supply dropped to an average of 663 cubic metres per person in 2013, down from over 2,500 cubic metres in 1947. Egypt is already below the United Nations water poverty threshold, and by 2025 the UN predicts it will be approaching a state of "absolute water crisis" with a predicted annual quota dwindling to 582 cubic meters per person.

see https://www.theguardian.com/world/2015/aug/04/egypt-water-crisis-intensifies-scarcity [accessed 18 August, 2017

LARGE-SCALE HYDRO 1903 ASWAN LOW DAM ASWAN EGYPT 1970 ASWAN HIGH DAM ASWAN EGYPT GRAND RENAISSANCE ETHIOPIA under construction

As Egypt faces a decrease in its water share as a result of the Grand Renaissance Dam construction in Ethiopia, parliament is now focusing on reducing the domestic use of water through laws and awareness campaigns. https://www.al-monitor.com/pulse/originals/2020/03/renaissance-dam-effects-egypt-water-rationalization-use.html

VULNERABILITY TO CLIMATE CHANGE



Rising sea levels and land reclamation: Cornelia Redeker, Hassan El Ghayesh adapted by Eman Farouk

DESERTIFICATION SEA LEVEL RISE

LAND RECLAMATION IN THE DESERT





(..) Beginning in late-1861, tens of thousands of peasants used picks and shovels to dig the early portions of the canal by hand. Progress was painfully slow, and the project hit a snag after Egyptian ruler Ismail Pasha abruptly banned the use of forced labor in 1863. The canal was first dug manually by forced labor. Faced with a critical shortage of workers, Lesseps and the Suez Canal Company changed their strategy and began using several hundred custom-made steam- and coal-powered shovels and dredgers to dig the canal enabling rapid progress during the last two years of construction. Of the 75 million cubic meters of sand eventually moved during the construction of the main canal, some three-fourths of it was handled by heavy machinery.

see https://www.history.com/news/9-fascinating-facts-about-the-suez-canal

2023 PLANNED EXPANSION

The SCA announced accelerated plans to extend a second channel of the canal and to enlarge an existing channel after the Ever Given container ship ran aground and blocked the waterway for six days last year. "The project will be completed in 24 months. We started in July 2021 and God willing we will finish in July 2023," Chairman Osama Rabie said on the sidelines of an event in Dubai. Reuters January 16, 202212:21 PM

2015 BYPASS

For years the canal was hampered by its narrow width and shallow depth, which were insufficient to accommodate two-way traffic from modern tanker ships. In August 2014, Egypt's Suez Canal Authority announced an ambitious plan to deepen the canal and create a new 22-mile lane branching off the main channel. The expansion opened in 2015. The improvements, however, were not enough to prevent a 1,300-foot container ship from becoming wedged—and stuck—in the canal as it traveled from China in March 2021. The ship blocked more than 100 ships at each end of the vital shipping artery for nearly a week, causing major disruptions to global commerce.

1967 6-DAY WAR

During June 1967's Six Day War between Egypt and Israel, the Suez Canal was shut down by the Egyptian government and blocked on either side by mines and scuttled ships. At the time of the closure, 15 international shipping vessels were moored at the canal's midpoint at the Great Bitter Lake. They would remain stranded in the waterway for eight years.

1956 SUEZ CRISIS

In what became known as the Suez Crisis, a combined British, Israeli and French force launched an attack on Egypt in October 1956. The Europeans succeeded in advancing close to the canal, but later withdrew from Egypt in disgrace following condemnation from the United States and the threat of nuclear retaliation from the Soviet Union. The Suez Canal was left under Egyptian control previously under the control of a Franco-British company. The Suez Canal Zone was restored to Egyptian sovereignty, following British withdrawal of about 90,000 troops and years of negotiations.

BANKRUPCY / TAKEOVER BY BRITISH

British Empire continued to criticize the canal during its construction, but it later bought a 44 percent stake in the waterway after the cash-strapped Egyptian government auctioned off its shares in 1875.

CONSTRUCTION OF SUEZ CANAL FERDINAND LESEPS

After conquering Egypt in 1798, Napoleon Bonaparte sent a team of surveyors to investigate the feasibility of cutting the Isthmus of Suez incorrectly concluding that the Red Sea was at least 30 feet higher than the Mediterranean. Any attempt to create a canal, they warned, could result in catastrophic flooding across the Nile Delta. Until 1847, when a team of researchers finally confirmed that there was no serious difference in altitude between the Mediterranean and Red Seas.

PHARAONIC LINK BETWEEN RED SEA AND NILE

Egyptian Pharaoh Senusret III may have built an early canal connecting the Red Sea and the Nile River around 1850 B.C., and according to ancient sources, the Pharaoh Necho II and the Persian conqueror Darius both began and then abandoned work on a similar project. The canal was supposedly finished in the 3rd century B.C. during the Ptolemaic Dynasty





MILITARY SAFETY ZONE



TUNNELS CONNECTING SINAI TO EGYPT's MAINLAND

February 22, 2019

The four new vehicle tunnels — two of them are north of Ismailia and the others are south of Port Said — are set to open in March or April, Ahmed El Abd, board chairman of Egypt's Concord for Engineering and Contracting, which is in charge of constructing the north Ismailia tunnels, told local media on Nov. 24, 2018. Building the four tunnels is part of the Suez Canal Area Development Project, which was launched in August 2014 by President Abdel Fattah al-Sisi. The project aims at transforming the Suez Canal from being a mere waterway to an integrated development zone that includes commercial, industrial, logistic and residential areas, which contribute to supporting the Egyptian economy. **URBAN FOUNDATIONS**

PORT SAID 1859 PORT FOUAD ISMAILIYA 1863 SUEZ 1869





PORT SAID

PORT SAID ARCHITECURAL HERITAGE



https://rawi-publishing.com/articles/portsaidverandas/



1956 GAMAL ABDEL NASSER





2015 ABDELFATAH EL SISI



1869 ISMAEL PASHA, NAPOLEON BONAPARTE III, PRINCESS EUGENIE

https://www.egypttoday.com/Article/4/109988/Paintings-that-highlighted-the-historical-opening-of-Egypt's-Suez-Canal https://decemus.livejournal.com/9577.html

https://www.sis.gov.eg/Story/116049/New-Suez-Canal-anniversary-?lang=en-us https://english.alarabiya.net/variety/2015/08/06/Who-is-the-boy-who-inaugurated-the-new-Suez-Canal-with-Al-Sisi-

1975 ANWAR SADAT





NEW URBAN COMMUNITIES IN THE DESERT





THE SUEZ CANAL LAKES MANZALA / TIMSAH / BITTER LAKES

Raphael Chipault, Benjamin Soligny (second half of the 19th century) Engraving an air view from the Red Sea, with the Bitter Lakes and Lake Timsah, to the Mediterranean coast.



LAKE MANZALA



Mohamed E El Raey (1999). Geomorphological map of the northeastern part of the Nile delta, showing the mouth of the Nile Damietta Branch, spit and Manzala Iagoon. in: Vulnerability Assessment of Sea Level Rise Over Port Said Governorate, Egypt

LAKE MANZALA

Lake Manzala is long but quite shallow. Though Lake Manzala's unaltered depth is only four to five feet, alterations to the depth were made during the construction of the Suez Canal to allow the Canal to extend 29 miles lengthwise along the lake. Its bed is soft clay.[Rogers, J. R. and G. Owen (2004). Water Resources and Environmental History. ASCE Publications. p. 124. ISBN 978-0-7844-0738-7.] Before construction of the Suez Canal, Lake Manzala was separated from the Mediterranean Sea by a strip of sand 200 to 300 yards wide.

Port Said was established adjacent to Lake Manzala during the nineteenth century to support canal construction and related travel. The lake's location directly south of the Port Said Airport restricts the city's capacity for growth.[Melady, J. (2006). Pearson's prize: Canada and the Suez Crisis. Toronto, Lancaster, New York: Dundurn Press Ltd. p. 207. ISBN 978-1-55002-611-5.] Lake Manzala is the northernmost of three natural lakes intersected by the Suez Canal, the other two being Lake Timsah and the Great Bitter Lake. Construction of the canal proceeded from north to south, reaching Manzala first. Due to the lake's shallowness, it was necessary to dig a banked channel for ships to pass. Fishermen at Lake Manzala

Lake Manzala served as a significant source of inexpensive fish for human consumption in Egypt, but pollution and lake drainage have reduced the lake's productivity. In 1985, the lakes fishery was an open area of 89,000 ha and employed roughly 17,000 workers.[1] The government of Egypt drained substantial portions of the lake in an effort to convert its rich Nile deposits to farmland. The project was unprofitable: crops did not grow well in the salty soil and the value of resulting produce was less than the market value of the fish that the reclaimed land had formerly yielded. By 2001, Lake Manzala had lost approximately 80 percent of its former area through the effects of drainage efforts.[7]



Photo: Peter Blodau

Lake Manzala, Alexandria

"A SUCCESS STORY: Lake Manzala is a shallow brackish lake on the northeastern edge of the Nile Delta, separated from the Mediterranean Sea only by a sandy beach ridge. The lake has high inputs of pollutants from industrial, domestic, and agricultural sources. Other problems include a substantial reduction in both fish and bird species as well as absence of irrigation water for crops cultivation. The Lake Manzala Engineered Wetland Project is a constructed wetland facility to treat 25,000 cubic meters per day of wastewater from the Bahr El Baqar Drain and demonstrates a low-cost innovative water treatment solution. Treatment of wastewater via engineered wetlands is a new low-cost technology to the Middle East. The success in reducing water pollution has led national authorities to explore the reuse of treated water via engineered wetlands in irrigation, fish farming, and decentralized wastewater treatment technology in remote areas."

Ahmed Rashed, National Water Research Center, Ministry of Water Resources and Irrigation

Redeker, C. Jüttner, M. (2020). Landscaping Egypt - From the Aesthetic to the Productive. Jovis Publishers Berlin

GREAT BITTER LAKE

GREAT BITTER LAKE AND THE SIX-DAY WAR

GREAT BITTER LAKE ASSOCIATION 1967-1974





INVASIVE SPECIES

(...) Of nearly 700 multicellular non-indigenous species (NIS) currently recognized from the Mediterranean Sea, fully half were introduced through the Suez Canal since 1869 (Galil et al. 2014). This is one of the most potent mechanisms and corridors for invasions by marine species known in the world. Further, molecular methods demonstrate high levels of gene flow between the Red Sea and the Mediterranean populations (Golani and Ritte 1999; Hassan et al. 2003; Bariche and Bernardi 2009). Most of the NIS introduced via the Suez Canal have established thriving populations along the Levant, from Libya to Greece, and several spread in the Western Mediterranean. The individual and cumulative impacts of these NIS adversely affect the conservation status of particular species and critical habitats, as well as the structure and function of ecosystems and the availability of natural resources.

@ Reuters/M. Abd El Ghany

https://www.dw.com/en/ecologists-concerned-over-suez-expansion-impacts/a-18631415 https://link.springer.com/article/10.1007/s10530-014-0778-y

2015 BYPASS



72 km total: 35 km parallel channel / 37 km expansion of current canal

DEVELOPMENT OF CROSS-SECTIONAL AREA 1956-2010



2015 BYPASS



Allows two-way traffic for 45 miles of the canal's 120-mile length, creating room for more ships, and potentially more revenue (...) The project has been warmly received by many Egyptians, who contributed 80% of the 64bn Egyptian pounds (£5.6bn) raised to build the new canal, after the government promised them a 12% annual yield on their investment.

https://www.theguardian.com/world/2014/nov/30/suez-canal-scheme-threatens-mediterranean-ecosystem-economic-activity

(Jacoba States)

Built in one year instead of three without according engineering, economic and environmental studies costs more than doubled from 4 to 8.5 billion USD see Carnegie Middle East Center (2019). A Military Unbound: Transformation in the Sis era

© picture-alliance/dpa/K. Elfiqi

nttps://www.dw.com/en/ecologists-cc cerned-over-suez-expansion-im-

SUEZ CANAL REVENUES

1 minute read · July 5, 2022 9:01 AM GMT+2 · Last Updated 3 months ago

Egypt's Suez Canal revenue hits \$7 billion record peak

Reuters



A shipping container passes through the Suez Canal in Suez, Egypt February 15, 2022.



EVICTIONS+NEW CITIES

Thousands of Egyptians evicted without compensation for Suez project

Inhabitants of two villages, Abtal and Qantara, a few hundred metres east of the existing channel, say they are the bypass's first victims: 1,500 homes have been destroyed and 5,000 are under threat to make way for bypass.

https://www.dw.com/en/ecologists-concerned-over-suez-expansion-impacts/a-18631415



NEW ISMALAIA / 57,0000 HOUSING UNITS

BLOCKAGE OF THE SUEZ CANAL MARCH 2021

Wind appears to be the main culprit for the grounding of the ship, however, with the sandstorm's strong and variable winds making it more difficult to navigate the passage. For now at least, it's speculative whether climate change may have increased the odds of the strong wind event on March 23. However, the large-scale weather pattern responsible for the sandstorm was quite extreme, and climate change could have contributed to make this event more extreme. Observations of the upper-level air patterns at 500 millibars (about 18,000 feet) on that date showed a very amplified and wavy jet stream pattern, with a strong ridge of high pressure over the Middle East and a strong trough of low pressure just to its west over the central Mediterranean Sea. Both features were about two standard deviations from the mean.

Jeff Masters, Yale Climate Connections

https://yaleclimateconnections.org/2021/03/suez-canal-shutdown-shows-vulnerability-of-global-economy-to-extreme-events/

COP 27 CLIMATE CONFERENCE SHARM EL SHEIKH NOV 22





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