

Addressing water-related challenges in Egypt

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Space for climate action:

Space applications and technologies for sustainability on Earth

Importance of Water to Egypt

The Arab Republic of Egypt is a developing country in Northern Africa.

- Concentration of the population and infrastructure along the Nile delta and the Mediterranean coast
- Vulnerability of the infrastructure due to the impacts of sea level rise and saltwater intrusion
- Around 97% of Egypt's renewable water resources, are received from of water that falls inside the Nile Basin
- The remaining supply comes from groundwater, residential wastewater, rainfall, lakes and water recycling.
- **The Ministry of Water Resources and Irrigation (MWRI)** is in charge of development and management of water resources

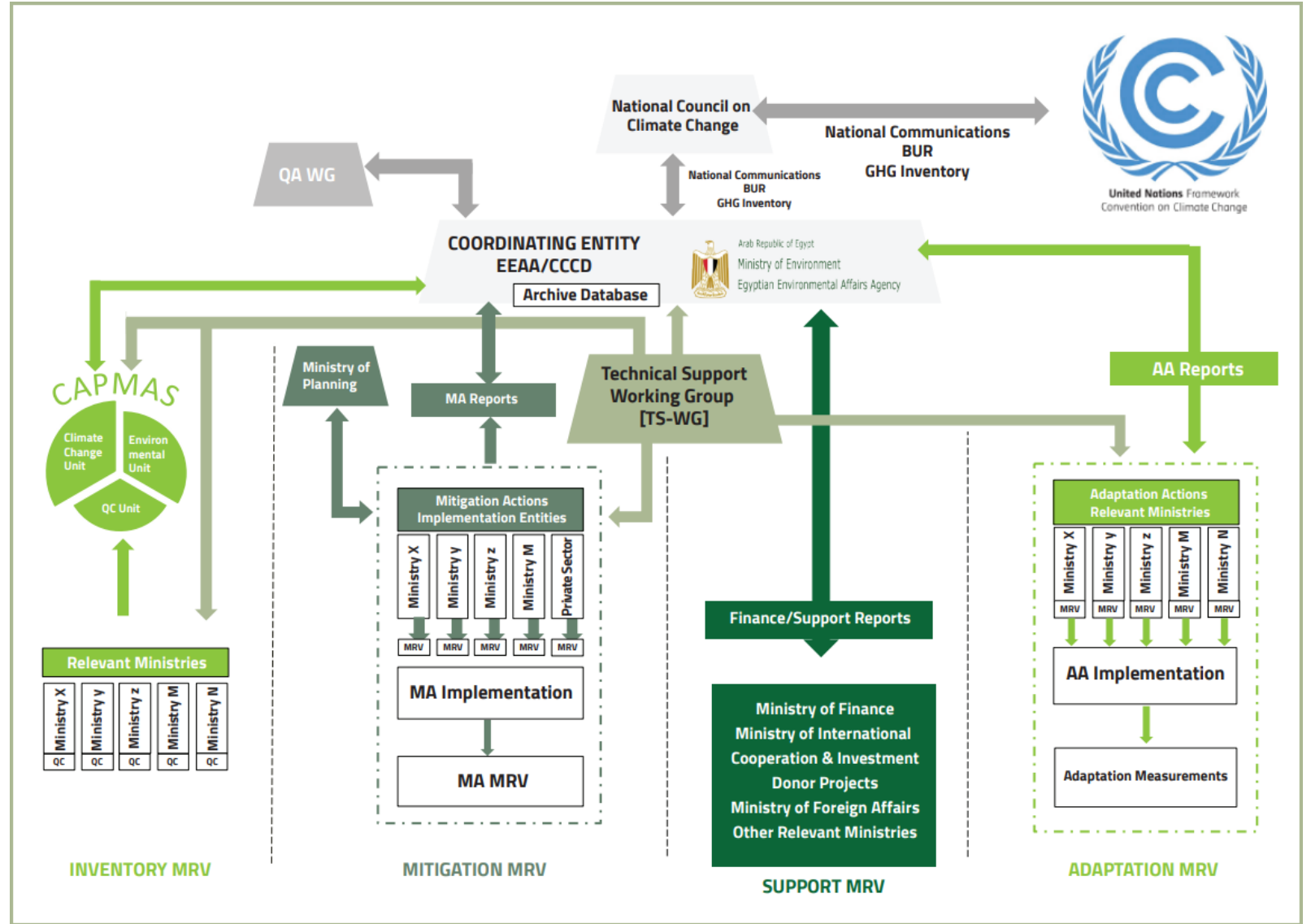


Source: NASA Images

Egypt Initiatives

Egypt's National Climate Change Strategy NCCS

To support the move to a greener, climate-resilient economy, the Egyptian government recently launched the National Climate Change Strategy.



Source: Egypt National Climate Change Strategy (NCCS) 2050

Egypt Initiatives

SCALA supports Egypt with integrating agriculture into the National Adaptation Plan

SCALA programme in Egypt (Scaling up Climate Ambition on Land Use and Agriculture through NDCs and National Adaptation Plans)

- Funded by the German Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMUV) through the International Climate Initiative (IKI), SCALA in Egypt is dedicated to the integration of climate-resilient agricultural practices into National Adaptation Plans (NAPs).
- The goal is to enhance institutional and technical capacities, effectively manage and respond to climate-related risks and disasters and stimulate private sector investments in innovative and adaptive agricultural production systems.

| Adaptation Programs and Projects | | |
|--|--------------------|------------|
| Sector | Cost (Billion USD) | Time Frame |
| Agriculture | 52.4 | 2022/2050 |
| Transportation | 1.27 | 2021/2024 |
| Aviation | 0.1 | 2022/2024 |
| Water Resources & Irrigation | 59.1 | 2022/2037 |
| Biodiversity | 0.2 | 2022/2030 |
| Total 113 billion dollars | | |
| The financing gap is about 94.7 billion dollars | | |

*(Out of a total of about \$113 billion for adaptation programs, there is about \$18.3 billion in funding, so the funding gap is about \$94.7 billion)

Source: Ministry of Environment in Egypt.
National Climate Change Strategy 2050.

Egypt Initiatives

AWARe (Action on Water Adaptation or Resilience) initiative in partnership with World Meteorological Organization (WMO) during the activities of the climate conference COP27

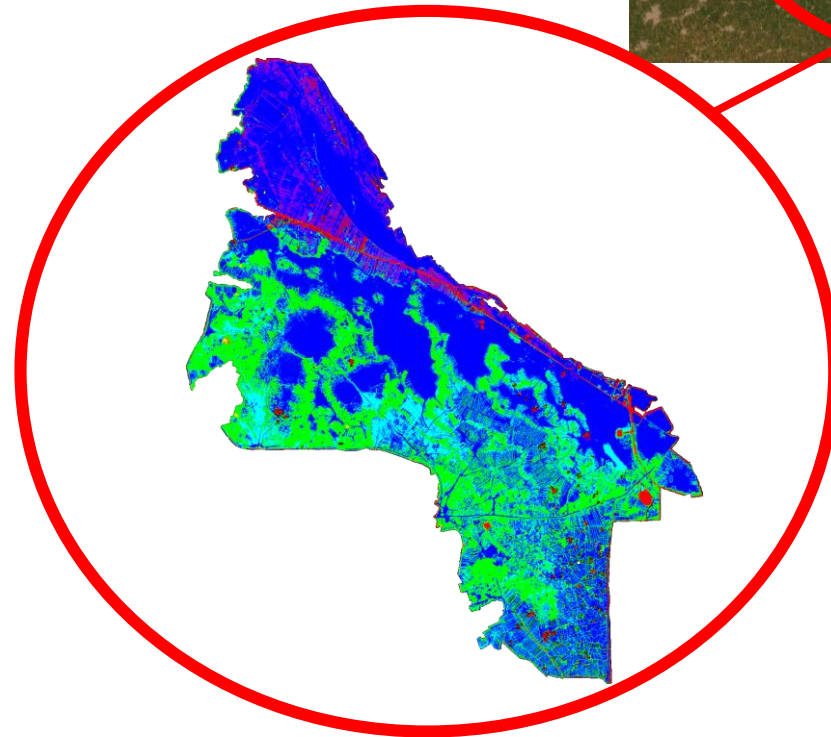
- The initiative seeks to enhance global cooperation to address water related challenges and solutions across climate change adaptation and offer transitional adaptation solutions.
- The initiative focuses on three priorities for action, including decreasing water losses worldwide, improving water supply, and supporting the implementation of mutual policies and cooperative climate adaptation action.



CASE STUDY 1: MANZALA LAKE

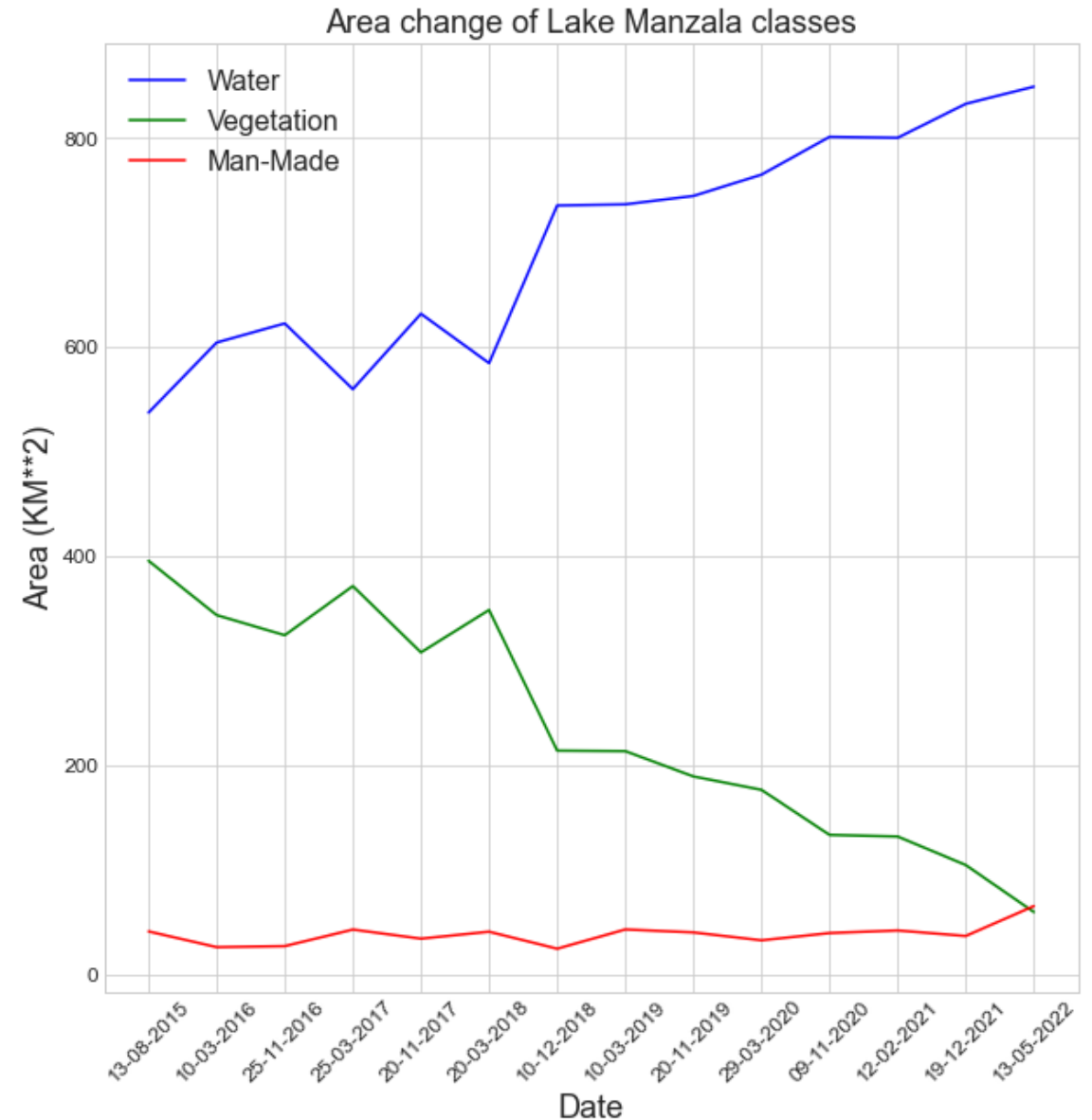
The lake faces a lot of environmental challenges as vegetation which affect its water quality status.

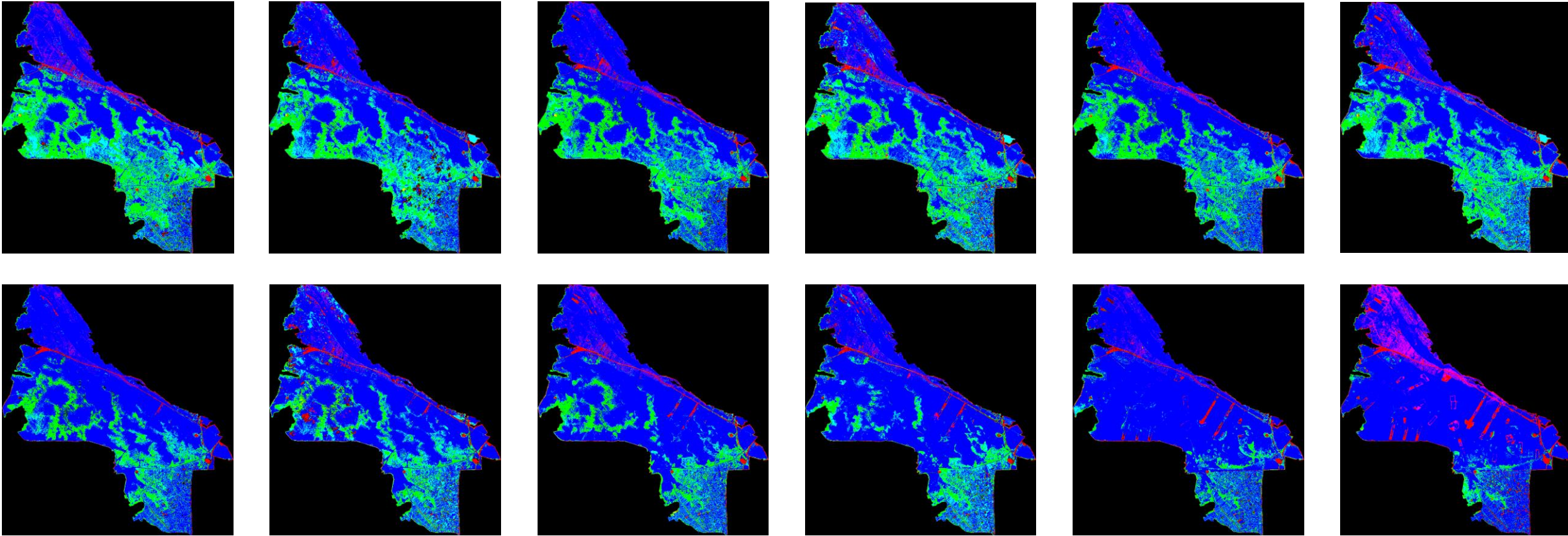
- Located in the northeastern part of the Nile River Delta of Egypt.
- One of the largest fresh lakes in the world
- Area of about 948.5 square kilometers.
- Suffered from different disasters such as the natural vegetation that appears inside water.
- All of these disasters decreases water quality and water flow.
- Until the Egyptian lake development project which started in 2018, it aim to transformed the Egyptian lakes to a clean and sustainable lakes via different development projects.



Results

- Manzala lake suffered from natural vegetation for a long time
- There was a little man-made features till 2021
- The start of actual lake development started in 2018 with natural vegetation removal
- Currently, there are some man-made features under development such as roads, factories, homes, hotels, ...
- The area of water increased from 537.7 to 849.4 km²
- The vegetation area decreased from 395.99 to 60.08 km²
- The man-made areas increased in 2021 from 37.2 to 65.8 km²

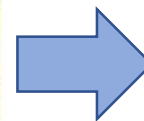




The Ministry of Irrigation is one of the state agencies participating in the efforts to develop the lakes, and it has a role in improving the condition of the canals and drains whose waters reach these lakes. In order to achieve this, several projects have been implemented.

CASE STUDY 2: Hammam Water Treatment Plant

High-salinity and drainage water from a problem to a development opportunity.



Source: Sentinel 2
Sentinel Hub EO browser

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AL HAMMAM WASTEWATER TREATMENT PLANT

An agricultural wastewater treatment plant in the Al-Hamam area on the North Coast.

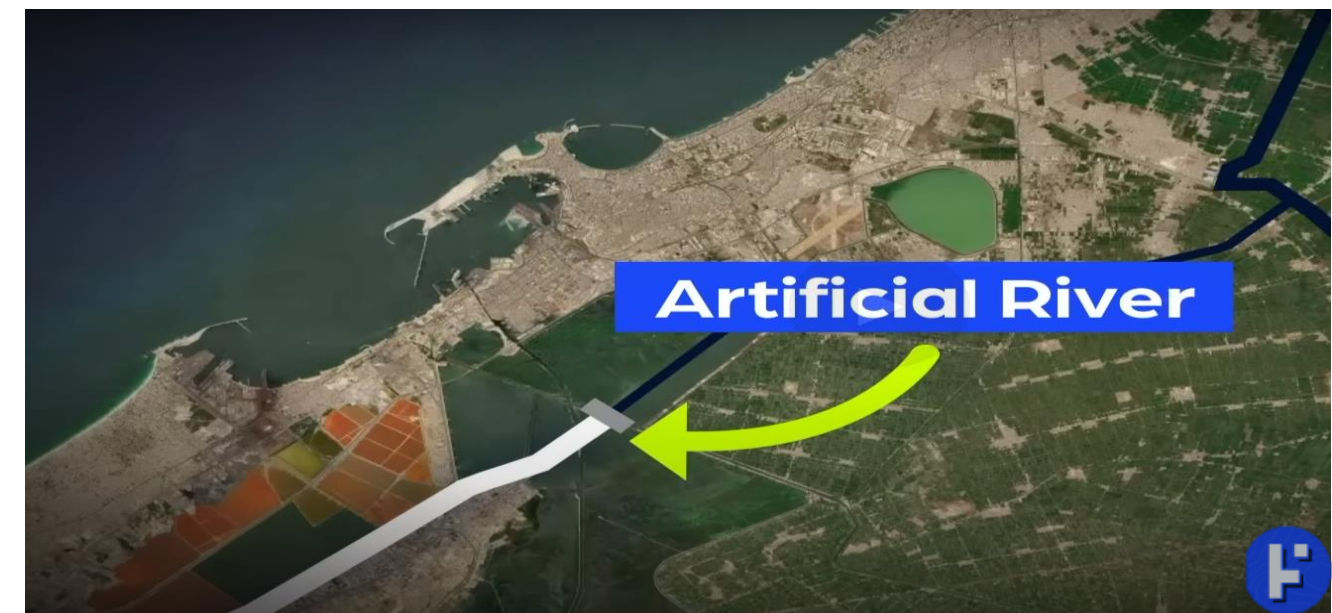
- Most Massive Agricultural Waste Water Treatment Station
- 6 Million Cubic Meters per day capacity
- 120-kilometre-long path
- cultivating about 500,000 acres west of the Delta.



Sentinel-2 L2A, 04-08-2023



Underground pipes transporting agriculture wastewater from the Rosetta branch to a new artificial river

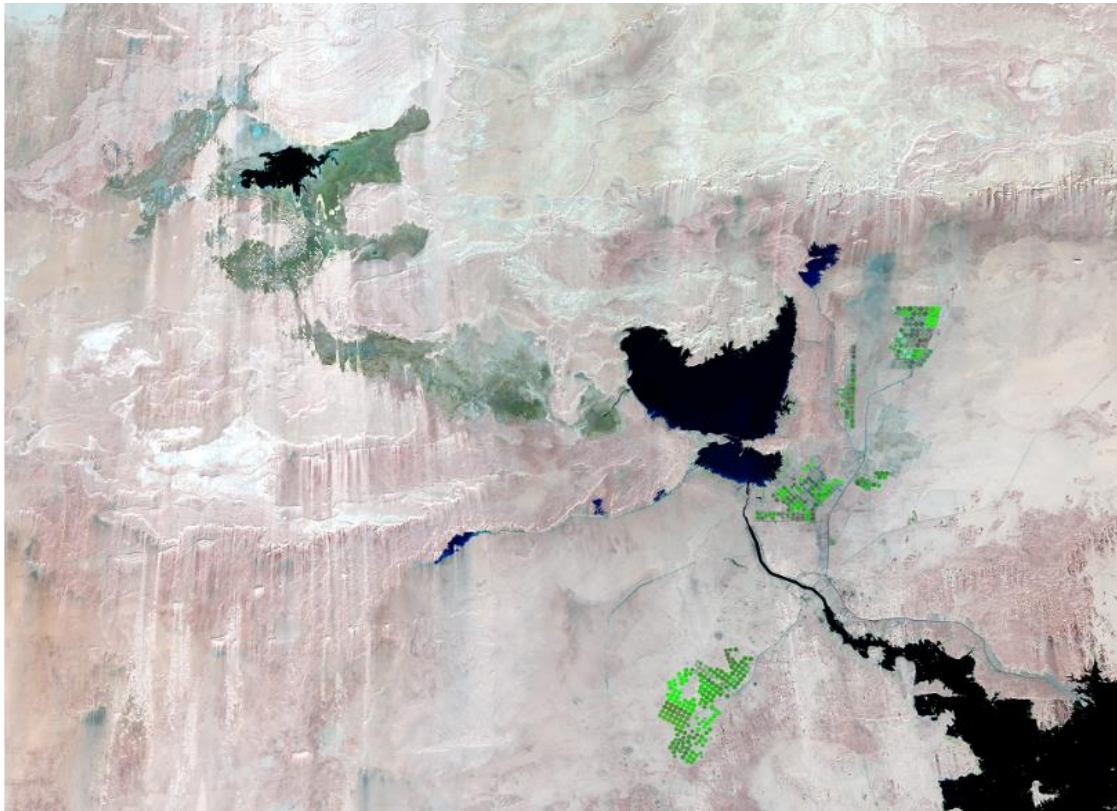


Egypt's government strategy solutions

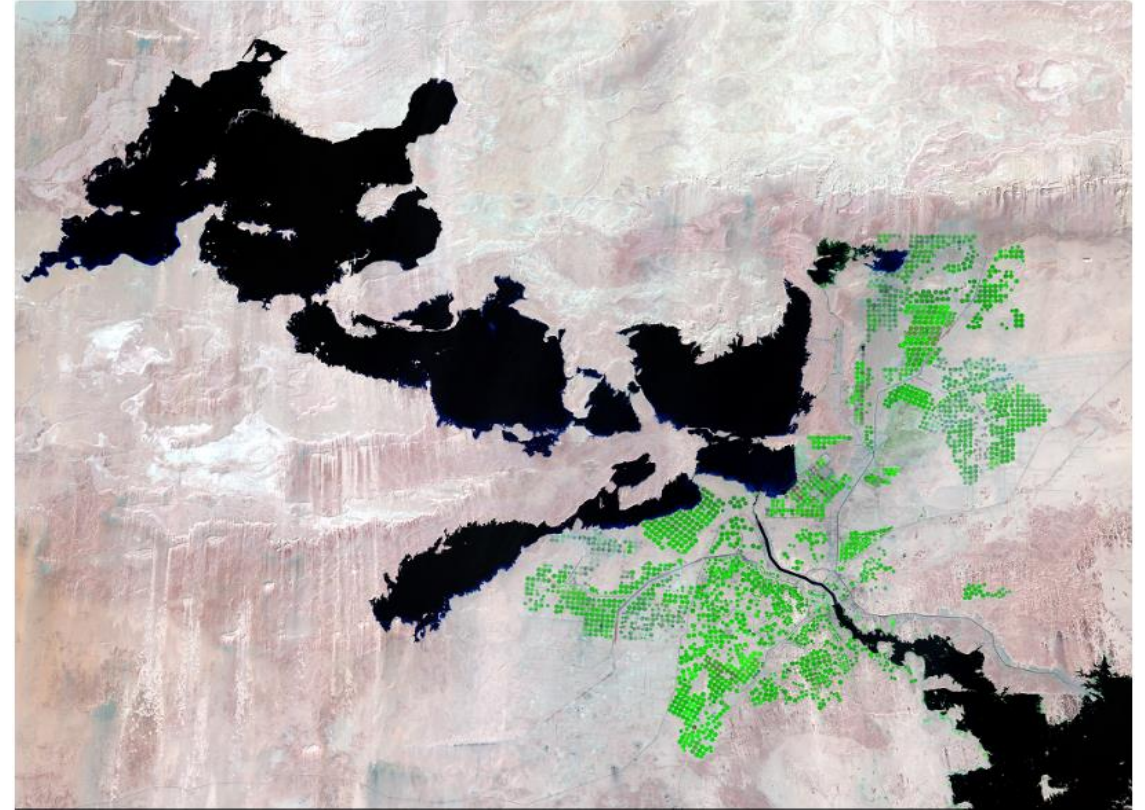
TOSHKA LAKES

Egypt's Toshka Project diverted water from the Nile River to the Sahara Desert. The project's lofty goal was to cultivate a half million acres of land and create a "second Nile Valley."

These images show the progress of the Toshka Project



Nov. 24, 2019, and Dec. 3, 2019, Landsat 8 (path/row 175,176/44) — Toshka Lakes, Egypt

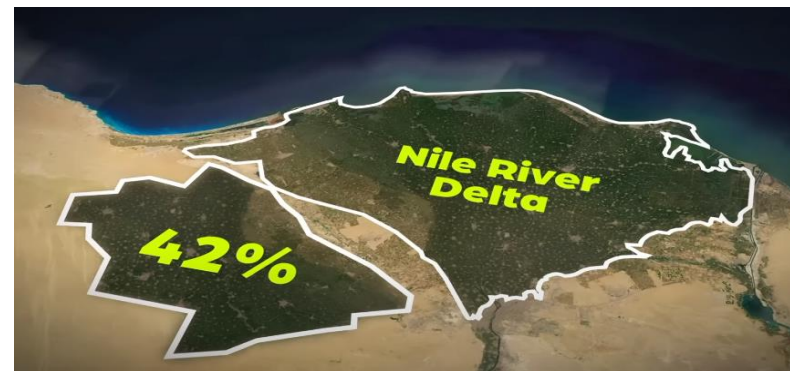


Feb. 12, 13, 2023, Landsat 9, 8 (path/row 176,175/44) — Toshka Lakes, Egypt

Egypt's government strategy solutions

NEW DELTA PROJECT “Artificial River”

The Ministry of Water Resources and Irrigation is implementing a plan to provide water to agricultural and reclaimed lands within the “New Delta” project, and within the framework of the sustainable development strategy “Egypt Vision 2030”, in order to rationalize water and provide it to various lands to achieve food security, confront the increase in population and confront rates of water poverty through the use of methods New for irrigation



Intro to EgSA and Satellites addressing Egypt resources

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EgyptSat 1
April 2007, 7.8 m (PAN)



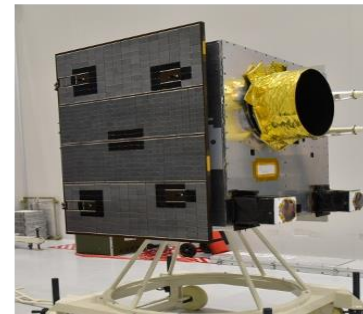
Cube Sat 1,2
(2019)

Misir Sat 2 (Operational Satellite)

Mini Sat (350 Kg)
Launching Date: Q4 of 2023
Resolution:

- 2 m Panchromatic
- 8 m Multispectral

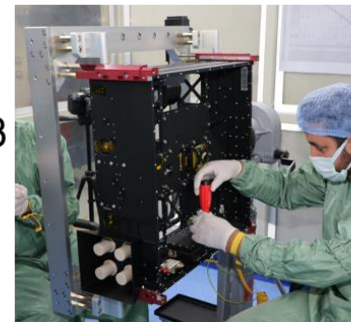
Lifetime: 5 Years



Jointly Developed by Chinese Partner

NEX Sat 1 (Experimental Satellite)

Micro Satellite (68 Kg)
Launching Date: November 2023
Resolution: 5 m Panchromatic
Lifetime: 6 Months



Jointly Developed by German Partner

Launching soon →

**Thank you for
your attention!**



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