



1. Overview satellite image of the Nile Valley. Data: Sentinel-2.

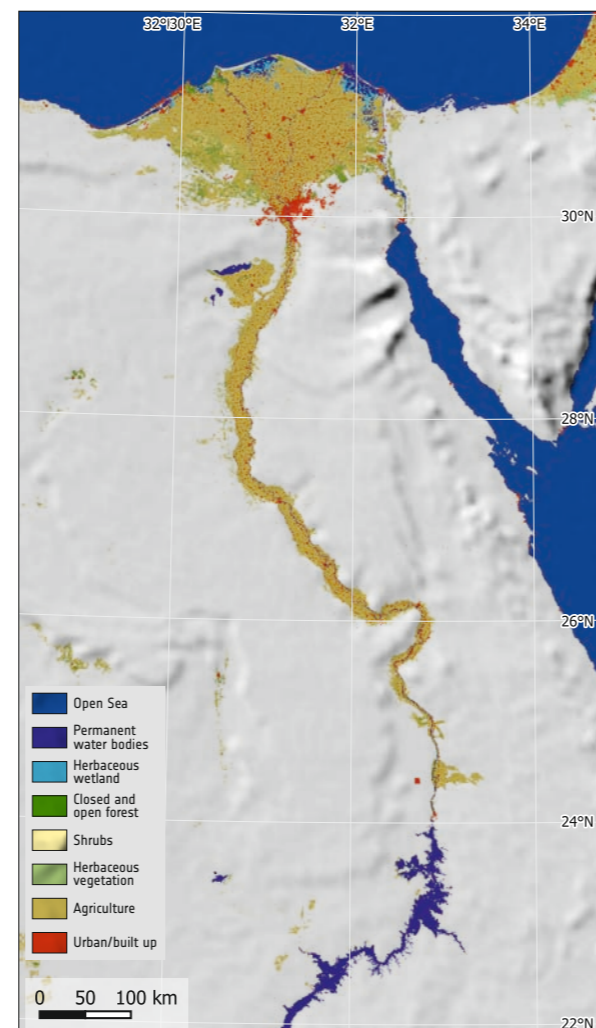
The Nile River

The coastline at the Nile mouth near Alexandria is defined mainly by the balance of sediment deposition by the Nile River and its removal by the Mediterranean Sea.

The sediment load of the Nile River was significantly reduced by the Aswan High Dam located about 1000 km upstream, which was completed in 1970. Before the construction of the dam, the Nile Delta received an annual sediment load of approximately 130 million tons. Today, this figure has dwindled to around 16-20 million tons, leading to reduced natural replenishment of the coastline.

Over the past century, the Mediterranean Sea has seen an average sea level rise of about 3.4 millimetres per year due to global warming. This leads to an additional substantial increase in coastal erosion and vulnerability to storm surges.

Based on satellite data, coastal erosion around Alexandria has been estimated at around 1 metre per year in certain areas. This rapid rate of erosion threatens infrastructure, coastal communities, and agricultural lands. Alexandria is Egypt's second-



2. Land use map of the Nile Valley.



3. Nile Delta, Egypt, near Rosetta in 1985. Data: Landsat 5, 1985-06-10.

largest city and home to over 5 million people. Many of the residents rely on agriculture, fisheries, and tourism, all of which are directly or indirectly affected by changes in the coastline. Therefore, Egypt combats coastal erosion around Alexandria and has, for example, spent 21 million Euro in 2018 for this task.

Large Scale Projects along the Nile River

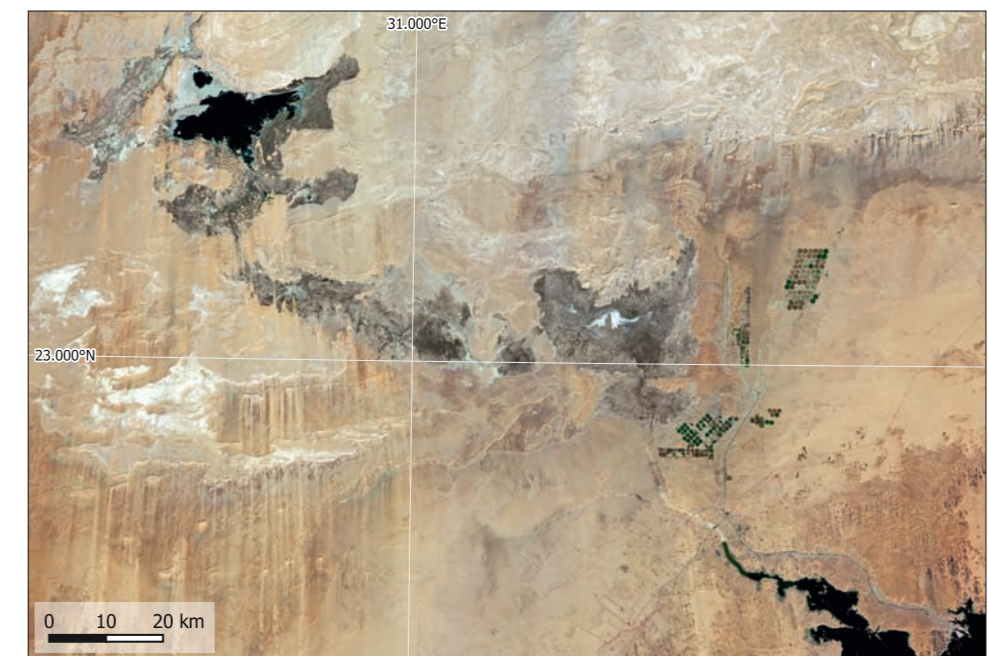
The New Valley, covering an area of around 440,000 square kilometres, has undergone a significant agricultural development. Encompassing the Toshka Depression and adjacent lands along the Nile River, the valley was the focus of the Toshka Project, which was initiated in the late 20th century.

This project aimed to divert water from the Lake Nasser storage lake to irrigate approximately 540,000 hectares of desert land in the New Valley, with the goal of creating new agricultural land. The project involved the construction of canals and infrastructure to facilitate irrigation. After initial successes, the Toshka Project faced a series of challenges, and by 2011, it was estimated that only a fraction of the intended area was under cultivation. In the meanwhile, the efforts have been increased again and have led to a significant growth of the cultivated area.

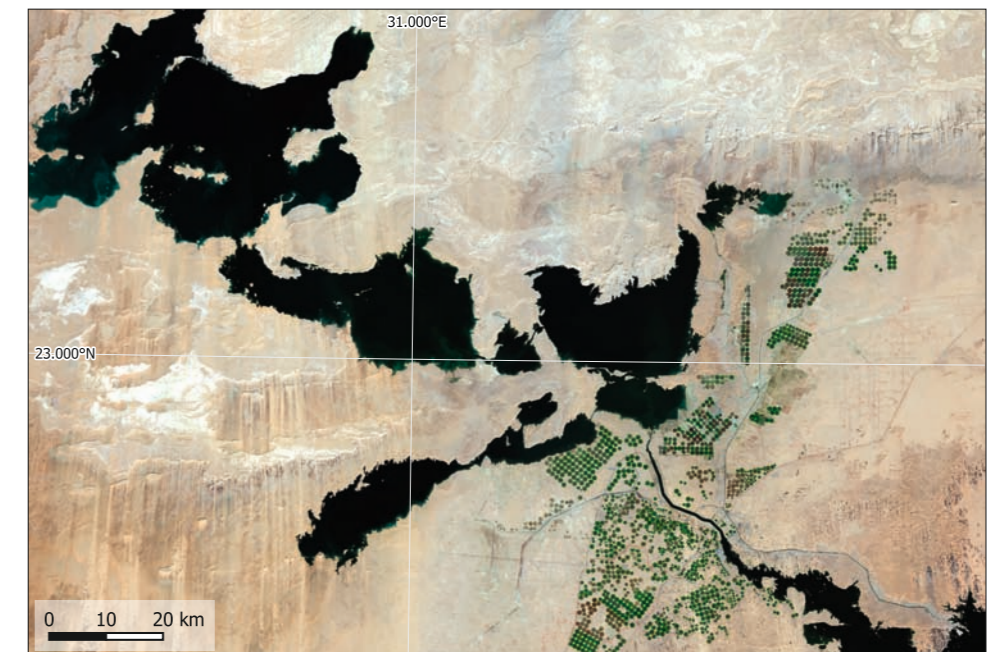
To understand the scale and impact of the project, satellite images are a valuable tool. Over the years, satellite technology has been instrumental in monitoring changes in land use and vegetation. Satellite images are used to analyse how the landscape transforms, providing a visual representation of successes and setbacks of the agricultural initiatives in the New Valley.



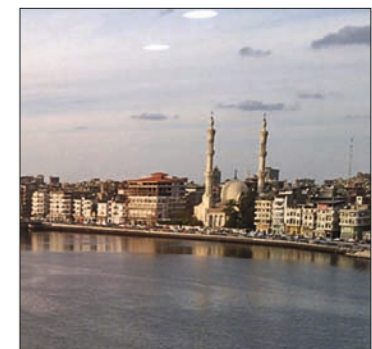
4. Nile Delta near Rosetta. Overlay: Change of the coastline from 1985 to 2023. Data: Sentinel-2, 2023-06-25.



6. New Valley, Egypt, in 2017. Data: Sentinel-2, 2017-11-05.



7. New Valley, Egypt, in 2022. Data: Sentinel-2, 2022-11-14.



5. View of Damiette at the shore of the Nile river.