

1985-04-15, Landsat5

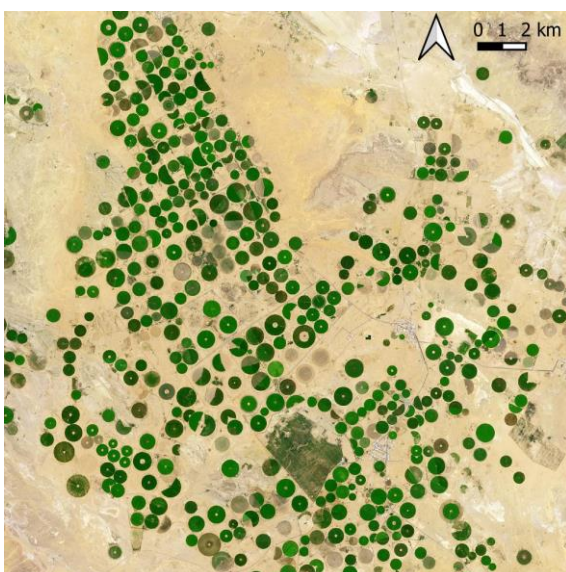
Saudi Arabia is one of the most arid countries in the world and is mostly covered by deserts. This goes hand in hand with a relatively low population density. While the economy of the country largely depends on the export of fossil fuels (oil and gas), it comes as a surprise that Saudi Arabia has been exporting wheat, too. With the exception of oases, agriculture in Saudi Arabia has been mostly based on extensive farming. Only with the exploitation of large fossil groundwater deposits for irrigation it was possible to intensify the production of wheat and other crops.



2023-04-26, Sentinel-2

The area around the town of Ha'il is located above a large groundwater deposit that has been exploited with increasing intensity since the 1970ies. While the originally applied techniques led to the quick evaporation of a large part of the water, combined with a relatively quick salination of the soil, the methods used now are better adapted to this difficult environment. Nevertheless, the use of fossil groundwater will end once the groundwater layers are depleted.

The satellite images show an excellent contrast between vegetation and the surrounding desert, as the numerous centre-pivot irrigation fields show. Therefore, they are very well suited to monitor the development of the irrigated fields and the crops cultivated. This makes it possible to use the data for crop monitoring as well as precision farming, as the analysis of data allows to tell where the supply of water and fertilizers need to be optimised.



2023-04-26, Sentinel-2 - overview



Exercises

- Look at the satellite image from **1985** and compare with the **2023** image. Which land cover classes can you identify? Does the number of land cover classes change?
- Look at the central region of the satellite image from 1985. Can you see a difference in colour compared to the surrounding desert? What could be the reason? Think about humidity.
- Compare between the satellite images from **2023** and **1985**. Where are the changes in the land cover most prominent?
- Try to imagine the reason for the circular shape of the fields. What are typical diameters of the irrigated fields?

Additional Material

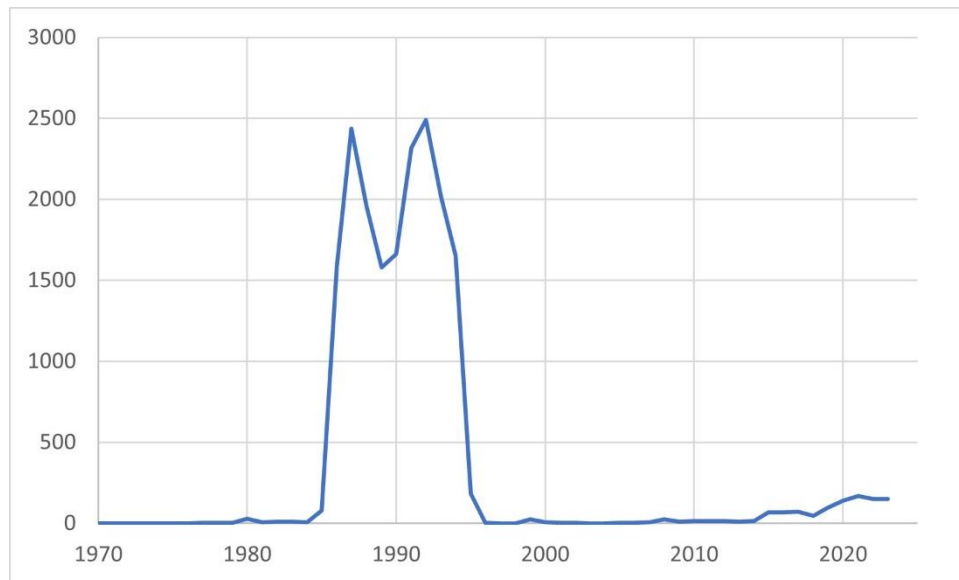


Diagram showing the amount of wheat exported by Saudi Arabia (in 1000 tons) (source: www.indexmundi.com)

Links and Sources

- ESA Video:
[https://www.esa.int/ESA_Multimedia/Videos/2017/10/Sustenance_from_the_sands/\(lang\)/en](https://www.esa.int/ESA_Multimedia/Videos/2017/10/Sustenance_from_the_sands/(lang)/en) - animation for Wadi Sirhan
- ESA Satellite Image:
https://www.esa.int/ESA_Multimedia/Images/2011/12/Saudi_Arabia - Envisat image of central Saudi Arabia
- https://www.esa.int/ESA_Multimedia/Images/2015/07/Agriculture_in_Saudi_Arabia - false colour infrared Sentinel-2 image

