Digital Earth AFRICA

Unlocking the promise of Tomorrow from the patterns of the past

5th International conference on the use of space technology for water resources management - Accra

May 10, 2022

Omar Seidu

Head, Demographic Statistics & SDGs

Coordinator, Ghana Statistical Service

Agenda

1. Introduction - DE Africa
2. Use Cases
3. Questions and Open Discussion

01

What is Digital Earth Africa?

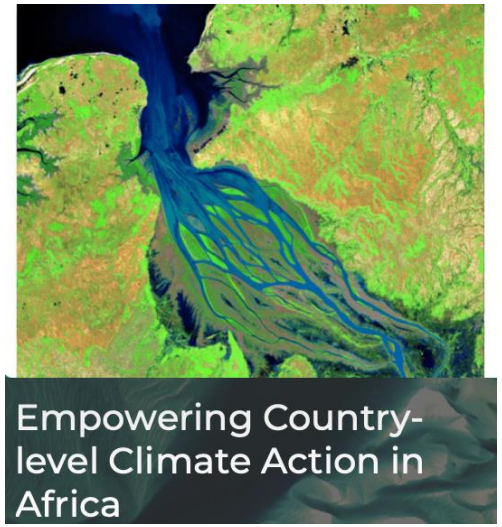
What is Digital Earth Africa?

Digital Earth AFRICA

Our platform and services provide free, open and accessible analysis ready satellite data.

Users, including African governments, industry and decision makers can use the Digital Earth Africa Map and Sandbox to track changes across the continent in unprecedented detail. This provides valuable insights for better decision making across many areas, including:

- Flooding
- Drought
- Soil and coastal erosion
- Agriculture
- Forest cover
- Land use and land cover change
- Water availability and quality
- Changes to human settlements



Empowering Country-level Climate Action in Africa

37 years' of Earth observation data available for the African continent

EO for conservation: rehoming giraffes on Lake Baringo, Kenya

Our Vision

DE Africa will provide a routine, reliable and operational service, using Earth observations to deliver decision-ready products enabling policy makers, scientists, the private sector and civil society to address social, environmental and economic changes on the continent and develop an ecosystem for innovation across sectors.

Land degradation

Coastal erosion

Urbanisation

Water resources and flood risks

Agriculture and food security

Eye of Sahara: Credit: Contains modified Copernicus Sentinel data 2021, processed by Digital Earth Africa.

Added value of satellite data and products available through Digital Earth Africa

Space agencies → Analysis ready Data

- Free access, even for commercial purposes, to 3.1 petabyte of optical and radar data captured by 7 satellite missions, centralised on the African continent, at Cape Town AWS Hub
- Analysis-ready data optimised for remote research, discovery and analysis, updated regularly. no need to download data.
- Continental derivative services ready for decision-making and adapted to the challenges of Africa, for monitoring water, land and the coastline
- Full visibility into the generation of continental services
- Data available through interactive or programmatic interfaces in French and English, or via GIS software
- Complex analyses on a specific topic supported by a large library of open source SDG-oriented tools
- A large network of institutional partners in Africa and experts allowing capacity building and the dissemination and use of services
- Free learning and support platforms in FR and ENG

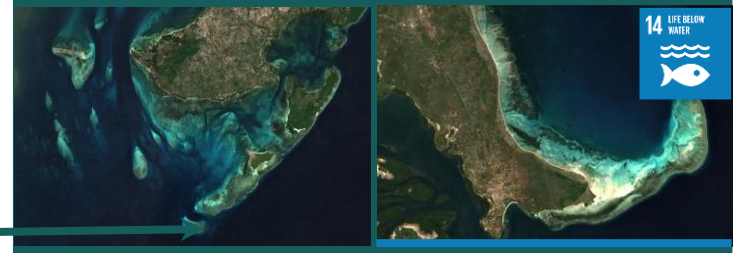
OPEN DATA CUBE

STAC

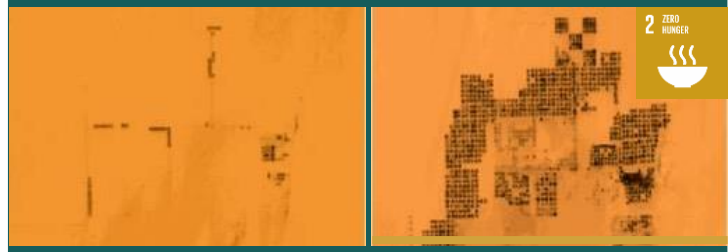
COG

Digital Earth AFRICA

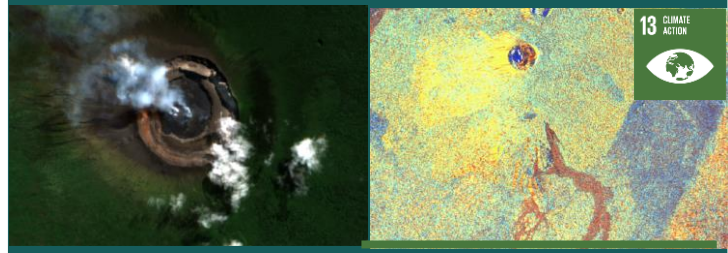
Find out more technical detail in Digital Earth Africa Docs



Study of the coast of Tanzania with GeoMAD, 2019, RGB



Crop monitoring in Egypt 2001-2020, Landsat, RGB



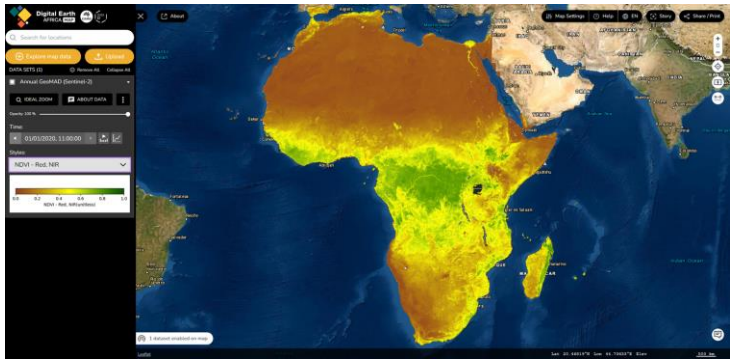
Mount Nyiragongo monitoring, 2018 Sentinel-2 RGB and 20 Sentinel-1

Measuring water extent on rangelands in Etosha National Park, Namibia 1992-2021, Landsat, False Color

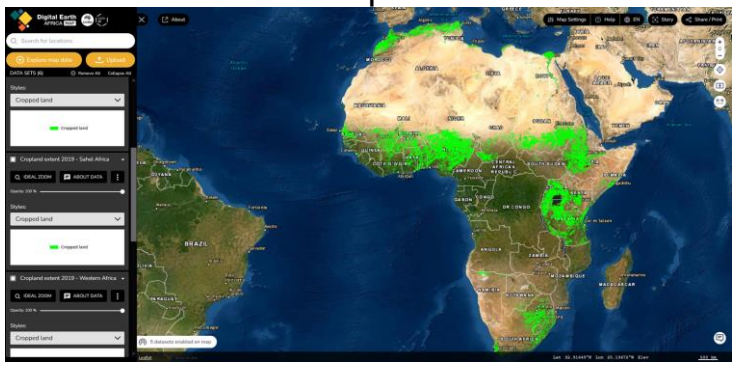
DE Africa Dataset and Services

Digital Earth AFRICA

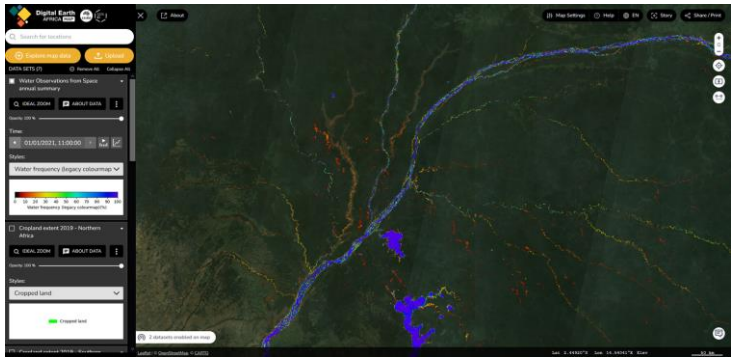
Geomedian



Crop mask



WOfS



(i) **Geomedian annual images** provide seamless, cloud-free coverage over the whole continent, useful for characterising landscape changes, monitoring crops, etc.

(ii) **Median Absolute Deviation** to characterise and measure change in the landscape. This service can be used in machine learning for change detection, land cover mapping, and environmental monitoring. Detecting seasonal variation supplements long-term decision-making by policy makers and industry with short-term, cyclical environmental management considerations.

(iii) **Water Observations from Space (WOfS)** allows users to understand the location and movement of water present in a landscape. This product can be used for environmental monitoring, flood mapping, monitoring planned water releases, and management of water resources in highly regulated systems.

(iv) **Food Security - cropland extent map** identifies areas that have been cropped in a given year. A consistent, up-to-date cropland extent map for the continent would assist in implementing the GEOGLAM crop monitor program.

(v) **Seasonal fractional cover** allows users to understand large scale patterns and trends and inform evidence based decision making and policy on topics including wind and water erosion risk, soil carbon dynamics, land surface process monitoring, land management practices, vegetation studies, fuel load estimation, ecosystem modelling and rangeland condition.

(vi) **NDVI anomalies** - demonstrating monthly anomalies going back to 1980s using the Landsat archive to allow effective monitoring of seasonal and long-term changes in cropping patterns across the African continent, allowing farm-level action.

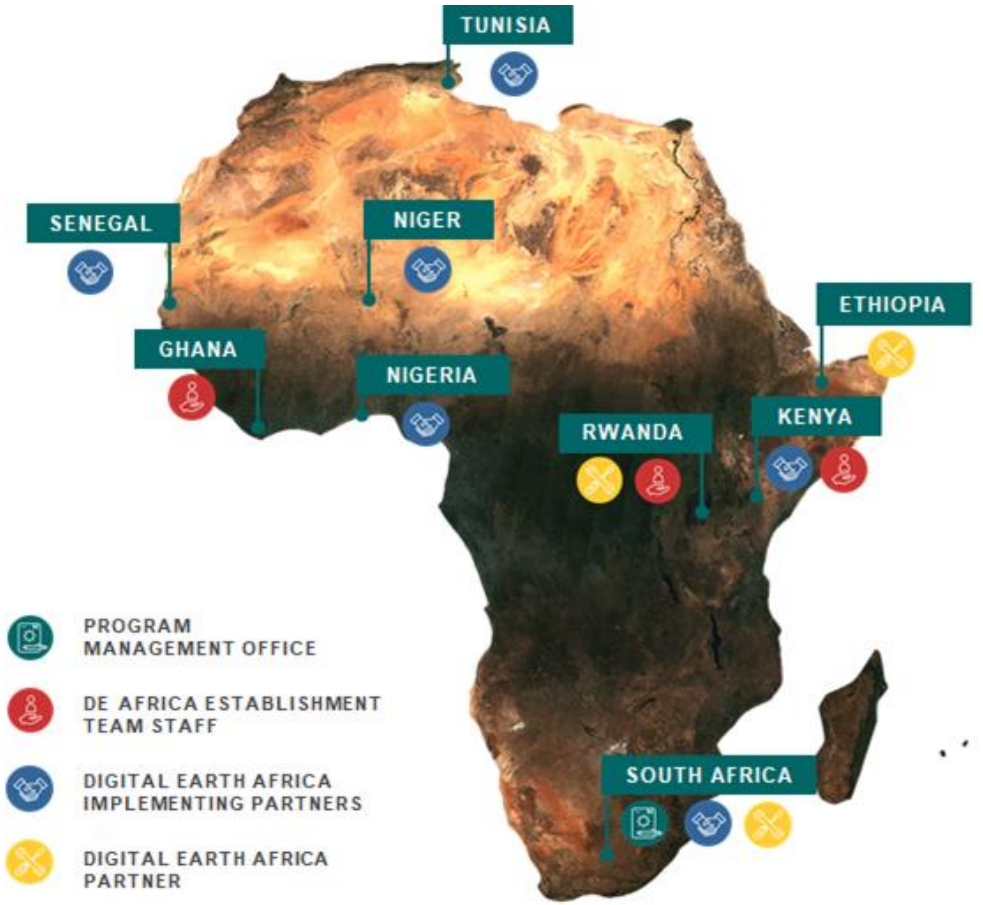
How do I access the data?

There are many ways to access DE Africa data:

View data	**DE Africa Map**		http://maps.digitalearth.africa/
Analyse data	**DE Africa Sandbox**		https://sandbox.digitalearth.africa/
Other platforms include:			
Access in GIS software	OWS Map Services		https://ows.digitalearth.africa/
Learn how to access & analyse data	Digital Earth Africa Learning Platform		https://learn.digitalearthafrica.org/

Who are we working with?

Technical Advisory Committee

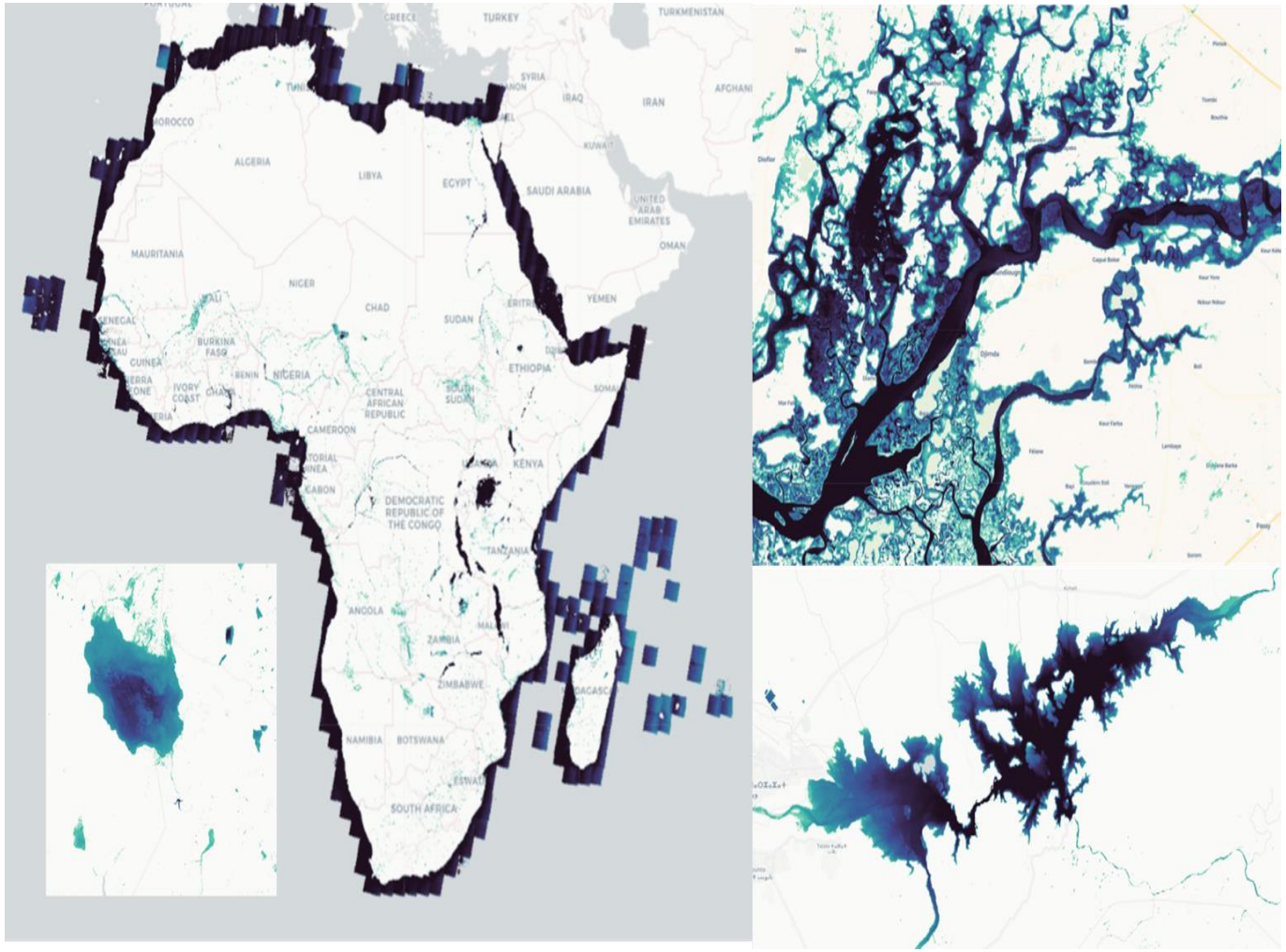


PMO - lead, manage, oversee, ensure delivery

02

Use cases

Water Observations from Space

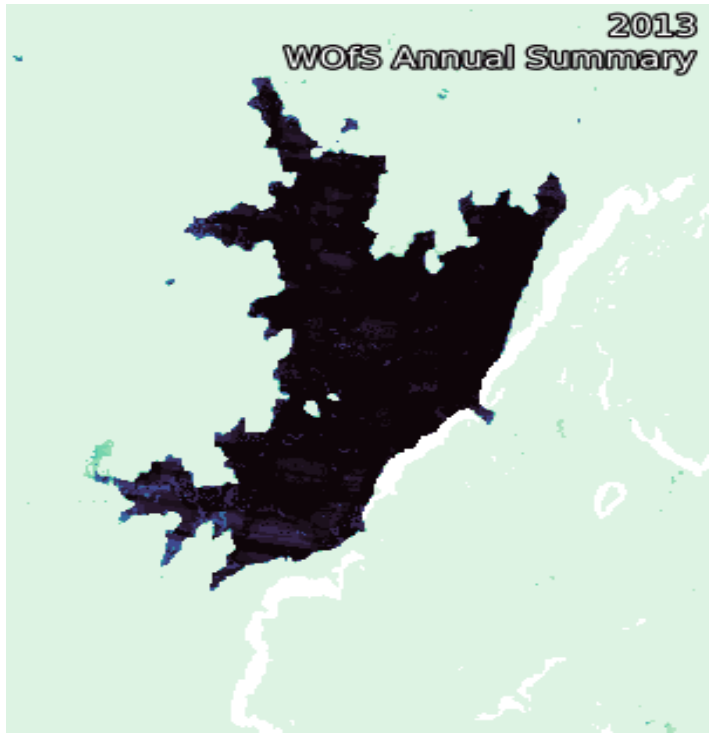


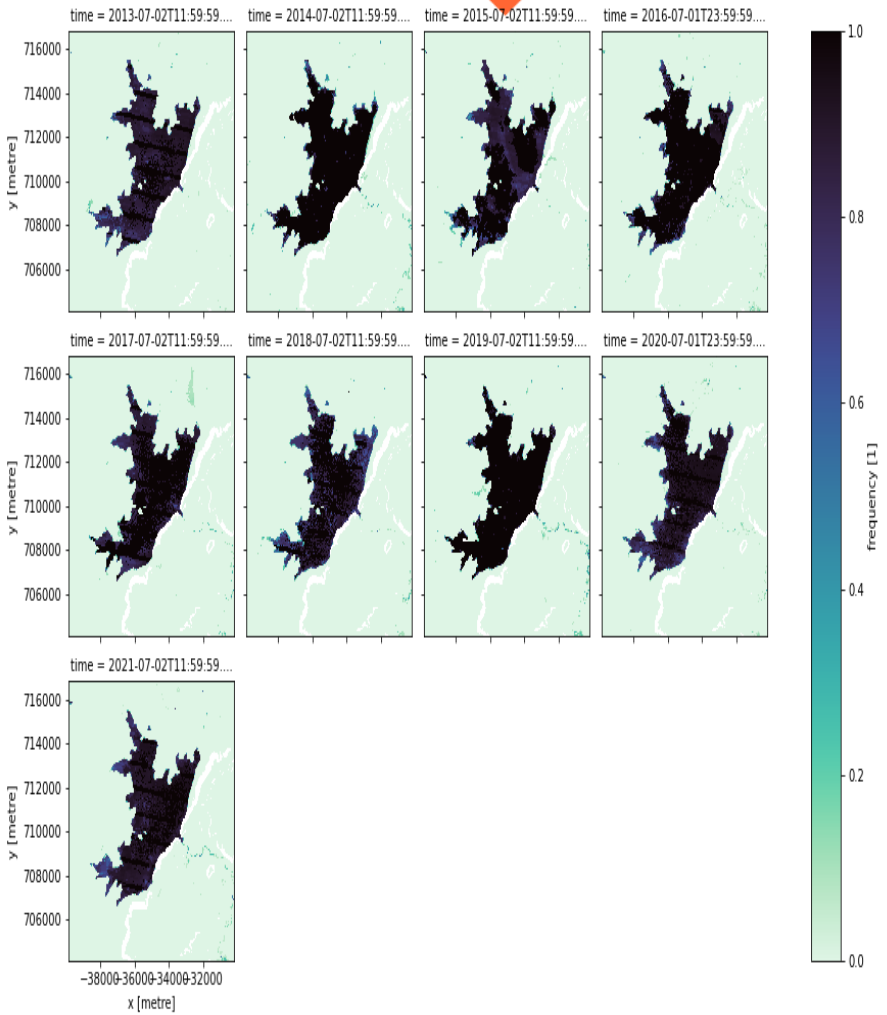
Water Observations from Space (WOfS) allows anyone to better understand water availability anywhere in Africa. It translate years of satellite imagery of surface water into easy to consume information on the presence, location and recurrence of water within Africa. This allow users across the Continent to map, assess, visualise, and manage water resources and understand trends over time.

This has the potential to inform and support the Sustainable Development Goals - SDGs, and African Union's Agenda 2063 goals.

Monitoring the extent of Water Bodies

Digital Earth Africa shows that change of extent of the **Weija Dam**. This shows that earth observation supports monitoring of water bodies, and inform policy makers to make informed decision. DE Africa used the Water Observation from Space(WOFS) – shown on the right (from 2013 and 2021).

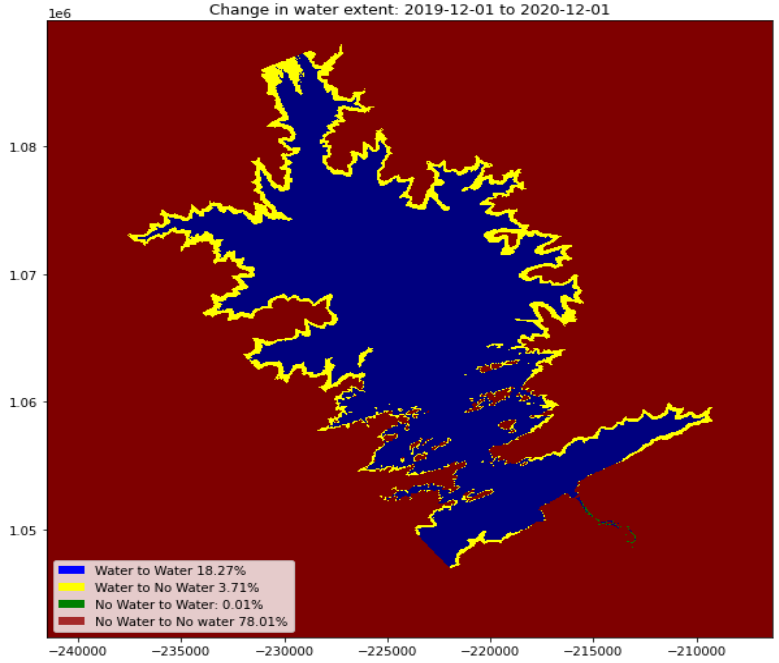




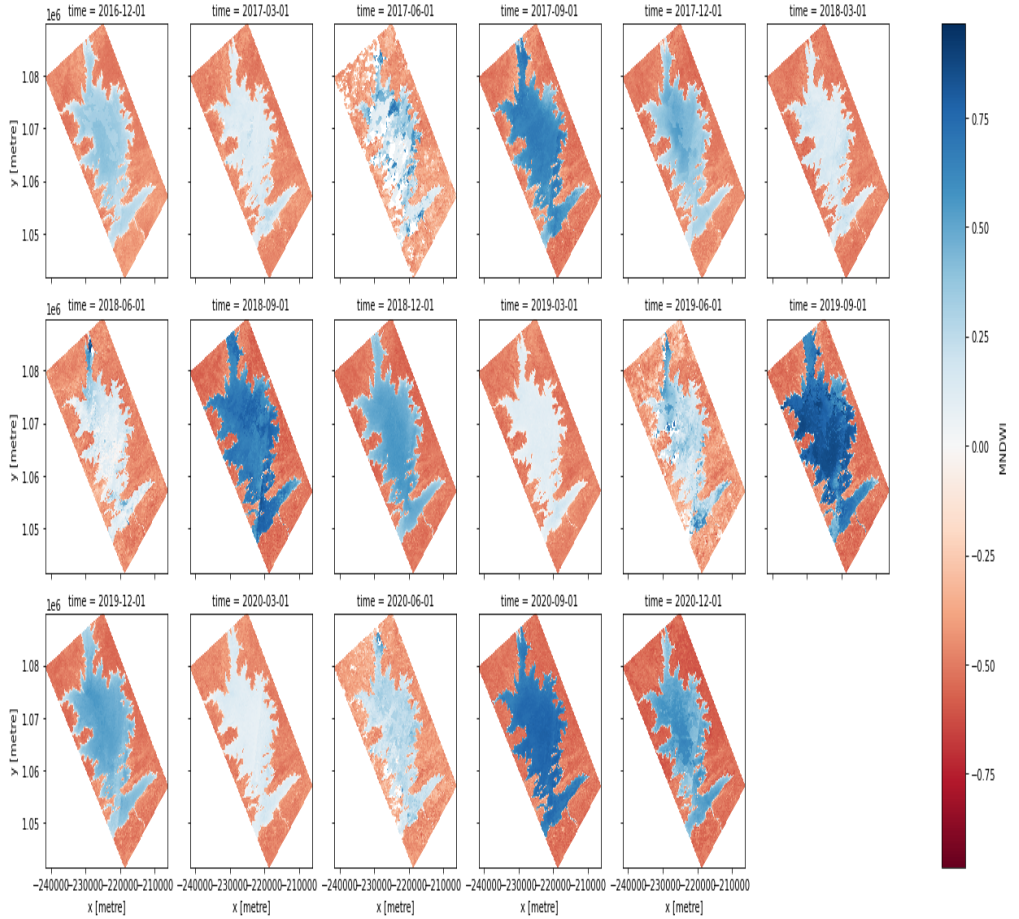
Animation showing the extent of Weija Dam 2013 and 2020(left)

Monitoring the extent of Water Bodies

Digital Earth Africa shows that change of extent of the **Bui Dam**. This shows that earth observation supports monitoring of water bodies, and inform policy makers to make informed decision. DE Africa used the Modified Normalised Difference Water Index (MNDWI) – shown on the right (from 2016 and 2020-12 from Sentinel 2).



Modified Normalised Difference Water Index (MNDWI) shows changes on the right in the year 2019-12 and 2020-12.



How can I learn more about DE Africa?

- Website https://www.digitalearthafrica.org
- The opportunity to subscribe to the DE Africa community to receive quarterly newsletters and invitations to attend events https://helpdesk.digitalearthafrica.org and user guide https://docs.digitalearthafrica.org/
- Digital Earth Africa online learning https://learn.digitalearthafrica.org/
- How to sign up to the DE Africa weekly Live Learning Sessions: every Wednesday at 11am, GMT zero) - ask questions and connect:

  https://zoom.us/j/5890793425

- Email address info@digitalearthafrica.org

Acknowledgements

Australian Government
Geoscience Australia
The Leona M. and Harry B. Helmsley Charitable Trust
GEO Group on Earth Observations
United Nations Economic Commission for Africa
RCMRD
CILSS AGRHYMET
sansa South African National Space Agency
Global Partnership for Sustainable Development Data
Ghana Statistical Service
AFRIGIST
Sahara and Sahel Observatory
Université d'Antananarivo
Thunderbird School of Global Management
CSE Centre de Suivi Ecologique
Bill & Melinda Gates foundation
esri
aws
dLab Tanzania Data Lab
COOi studios
World Economic Forum
CEOS Committee on Earth Observation Satellites
Open Data Cube
ITC
IWMI International Water Management Institute

Thank you Meda mo ase Merci

Omar Seidu

TAC Co-Chair

Digital Earth Africa

omar.seidu@statsghana.gov.gh

Dr. Kenneth Mubea

User Engagement Manager
Digital Earth Africa
kenneth.mubea@digitalearthafrica.org

Edward Boamah

Technical Manager
Digital Earth Africa
edward.boamah@digitalearthafrica.org