Digital Earth
AFRICA

DE Africa Quarterly Progress Report

April - June 2021

Contents

About Digital Earth Africa

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.

Our mission

DE Africa will process openly accessible and freely available data to produce decision-ready products. Working closely with the AfriGEO community, DE Africa will be responsive to the information needs, challenges and priorities of the African continent. DE Africa will leverage and build on existing capacity to enable the use of Earth observations to address key challenges across the continent.

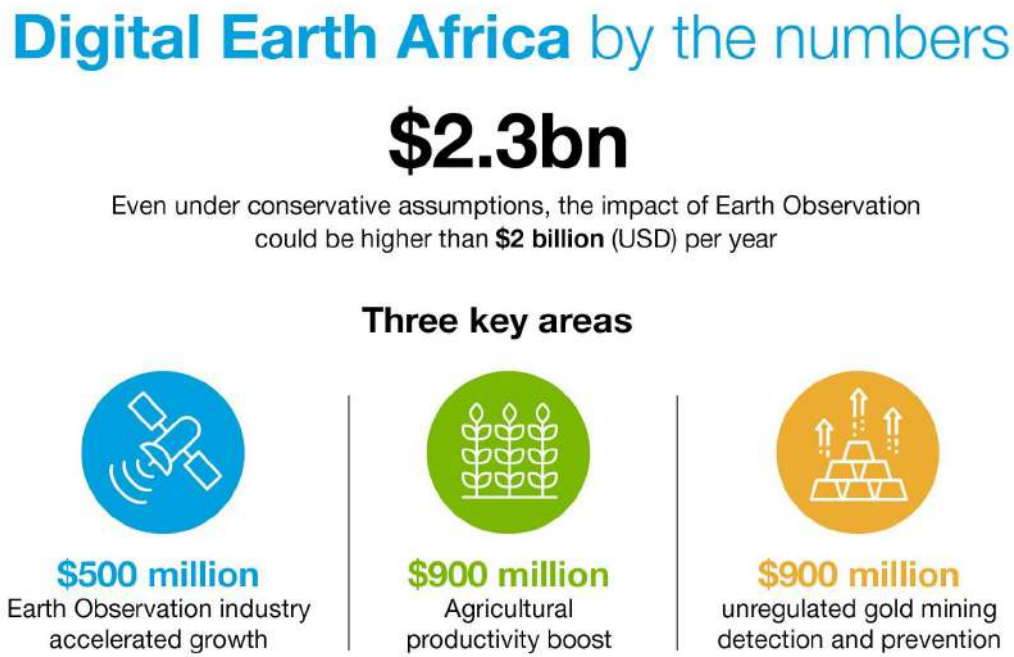
About this report

This Quarterly Progress Report provides a snapshot of DE Africa Phase II progress made between April and June 2021, as aligned with DE Africa's 2021 Annual Work Plan.

The governance of DE Africa is guided by several key principles

DE Africa outcomes - our work has impact

- **Countries are empowered**, with Earth observation data about land, water resources and human settlements enabling them to make evidence-based policy decisions.
- **Lives are improved**, through access to information that empowers governments, individuals and communities to make informed choices.
- **Development activities are more effective** through access to information that provides insights to better understand the root cause of issues and develop impactful solutions. Development of decision ready products, and analysis ready services to support African Union Agenda 2063 and the UN SDGs.
- **Digital transformation is advanced** through industry uptake and innovation using products and services from Digital Earth Africa. Increased economic development and job creation, through access to data for commercial products and services development.
- **Over $2bn of benefits to the African continent*** are possible through accelerated industry growth, improvements in agricultural productivity and the detection and prevention of unregulated mining.

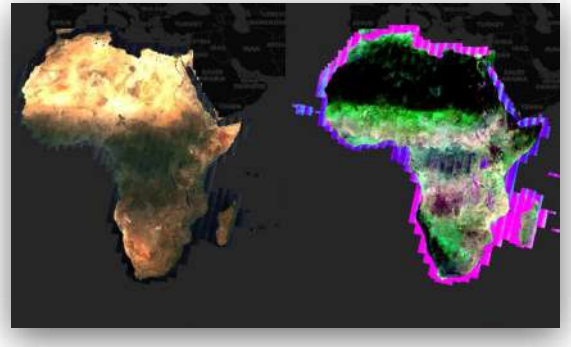


*USD
*Source; World Economic Forum Report 'Unlocking the Potential of Earth Observation to Address Africa's Critical Challenges'

April-June 2021 highlights

Technical successes

- Platform now hosted in Cape Town including 2.7 PB of data
- Landsat and Sentinel-1 data pipelines operational
- Landsat derivatives in progress



Data in Cape Town & GeoMAD Launch

Strong partner support

- Good progress on operational model
- Partner awareness raising meetings
- DE Africa named GEO Initiative

GEO Initiative

Growing user capacity and engagement

- Train the trainers program underway
- Increase in user community engagement
- New use case development

Lake Baringo Use Case

Increasing engagement & awareness

- Excellent comms metrics; Muse creative award
- Event participation, including Ghana Parliament Data Fair
- Open Data Cube conference

Ghana Data Fair

DE Africa Video

In June, we were excited to launch our new DE Africa promotional video. This is available on our YouTube channel at the following link:

Digital Earth Africa YouTube channel

Governance

The DE Africa 2021 Annual Work Plan was published 2nd April. This report includes a summary of program outcomes and high level activities for 2021, highlighting strategic context, key challenges and risks, and an activity schedule overview.

We held the 8th Technical Advisory Committee (TAC) meeting on 10 June. The meeting covered progress against the annual work plan, technical roadmap updates and program sustainability. A separate 'deep dive' on Industry Engagement was held on 11 June.

Preparation for the first DE Africa Governing Board meeting is well underway and pre-meeting briefings have been held with all the Board members, except for one.

The DE Africa Governance Framework is currently being updated prior to the inaugural DE Africa Governing Board meeting to reflect the move to a more distributed operational model. This will include Board composition, governing principles and accountability.

The GEO trust fund financial steering committee continues actively to help deliver the DE Africa program.

8th Technical Advisory Committee Meeting

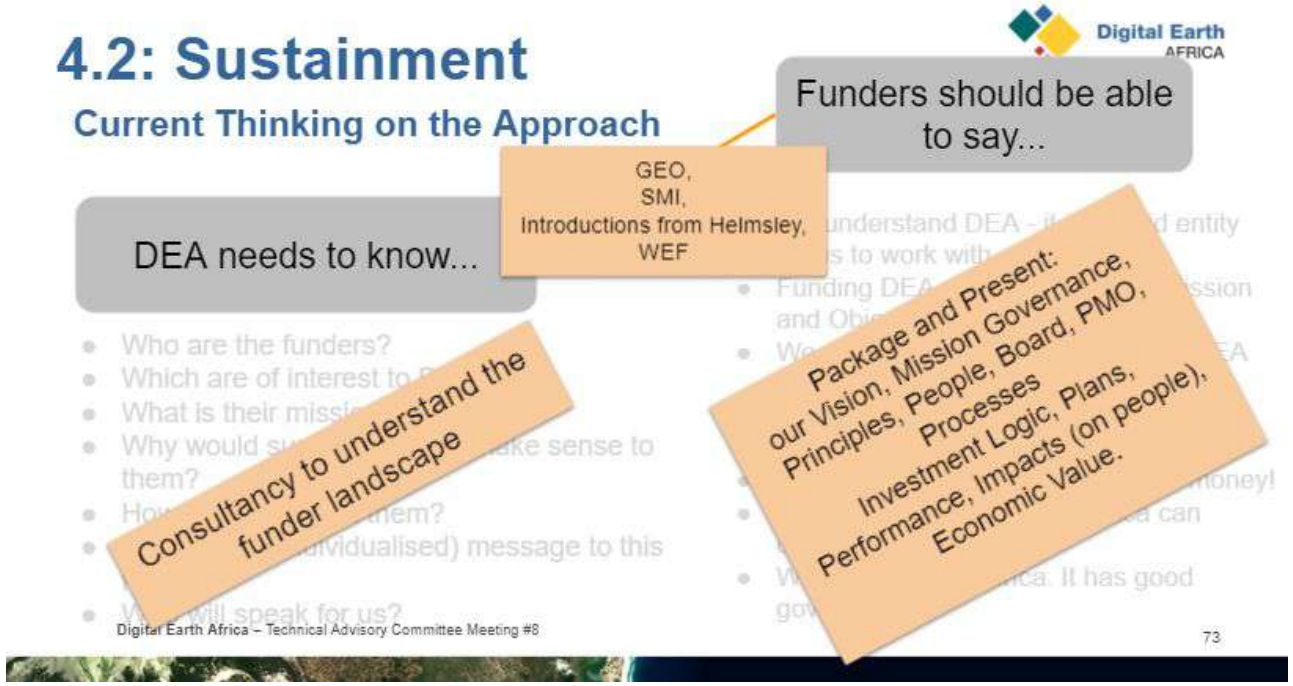
DE Africa Sustainment Plan

Sustainment of DE Africa beyond the current round of funding is a high priority task for 2021.

Five years from now, we expect DE Africa to be fully embedded at the country level, in key institutions as a functional infrastructure delivering high value outcomes to Africa

Several sub-tasks are currently underway in support of the DE Africa sustainment plan. We have shared our initial thinking on the proposed approach with TAC members at the last meeting in June 2021 seeking feedback.

Through GEO, we have established contact with the Sustainable Markets Initiative (SMI) which is a digital hub connecting impactful sustainable projects with SMI investor community. DE Africa will be featured in the first round of 20 projects to be showcased starting from July 2021

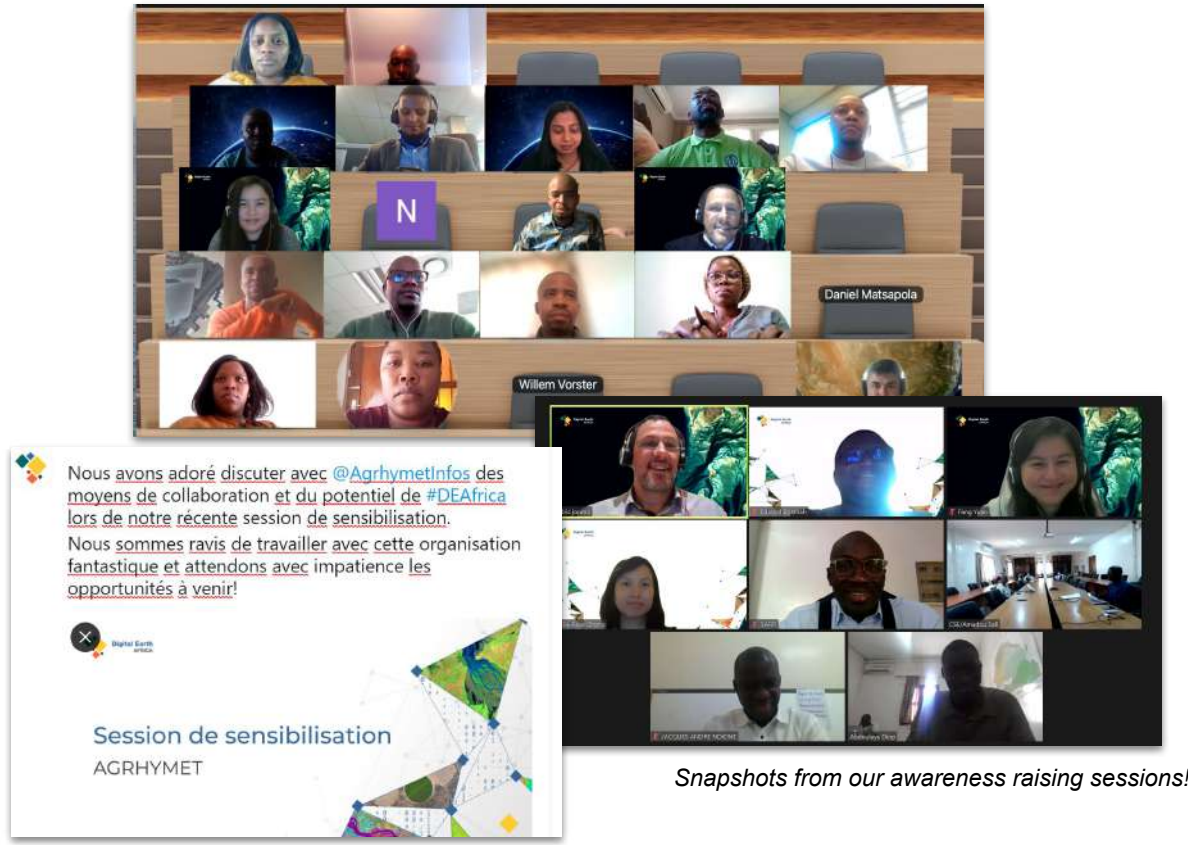


Program Delivery Transition

The selection process for the Program Management Office (PMO) is concluded and negotiations with a preferred partner are well advanced. In addition, we established formal partnership Agreements with AFRIGIST, Nigeria and CSE, Senegal.

We developed Terms of Reference (TORs) for our Product Development, Communications and GEDSI working groups, to ensure consistency with the program governance framework and principles. The TORs were endorsed by the TAC and will be available on the DE Africa website soon.

This quarter we held 6 successful awareness raising sessions with our Implementing Partners. These events were held in both English and French, with more than 80 participants in total. These meetings have led to significant discussion on further areas of collaboration around use cases, aligned programs and capacity development.



Snapshots from our awareness raising sessions!

Implementing GEDSI

DE Africa is committed to ensuring our work promotes gender equality, and the inclusion of youth and people with disabilities. Our Gender Equality, Disability, and Social Inclusion (GEDSI) strategy outlines how we will have an impact in GEDSI areas.

Our GEDSI Collaborative Working Group is now established and the group's Terms of Reference are endorsed by the Technical Advisory Committee.. The inaugural working group meeting was held in May.

We are developing a GEDSI-specific module for the train-the-trainers program to ensure our diversity and inclusion principles are incorporated into all aspects of our training program.

We are continuing our involvement in the Group on Earth Observations' (GEO) Equity, Inclusion and Diversity working group. DE Africa's Dr Ken Mubea was a moderator for GEO Symposium session "Building the foundation for success: Equality, diversity and inclusion in GEO" scheduled for 21st June.

DE Africa helped to organise the 2021 Open Data Cube conference women's sprint on the 22-25 June. Themes included a beginners' project, Sentinel-1 and collaboration with NASA-SERVIR.

GEDSI working group inaugural meeting

ODC conference flyer, featuring women's sprint

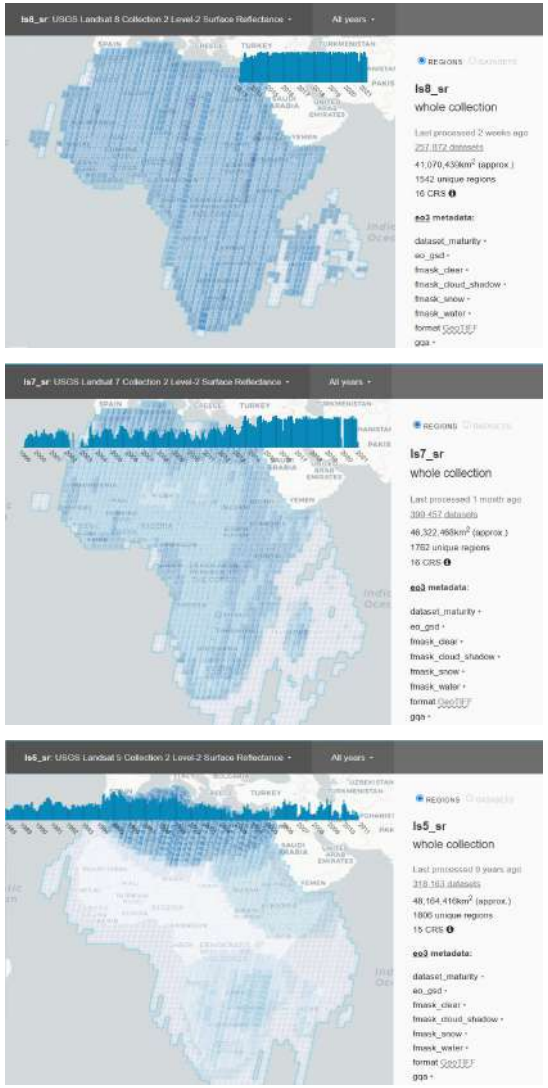
Platform and data

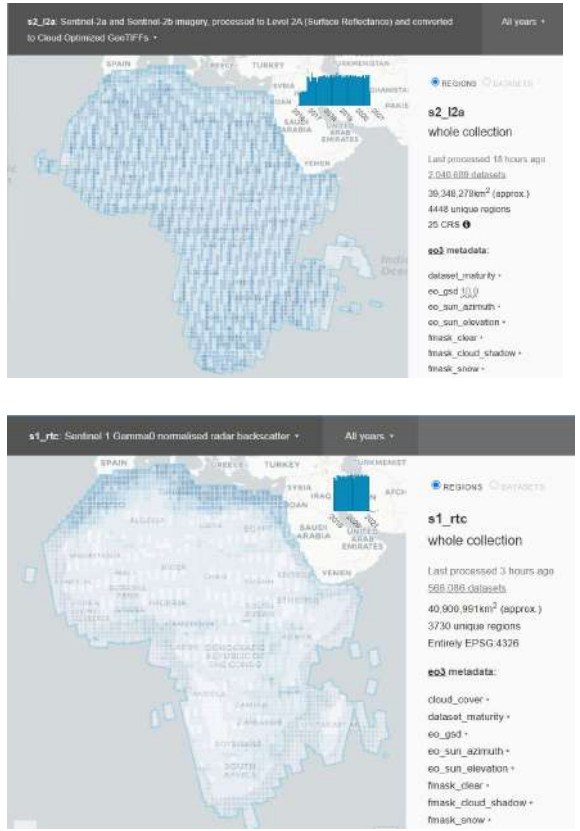
All DE Africa platform and services are now hosted in Amazon Web Services in Cape Town. A total of 2.7 PB of data is now available across our key Input Datasets and Services, including the following operational ‘data pipelines’ for all of Africa:

- Copernicus Sentinel-2 data, with nearly 2 PB of data available from 2017 onwards.
- Landsat data, with 1 million scenes and 540 TB of data available from 1984 through to the present day. Available measurements include both surface reflectance and surface temperature.
- Copernicus Sentinel-1 data, measuring radar backscatter. Data are available from 2019 and with updates as new data become available.

See AWS Public Dataset technical documentation for more information: https://registry.opendata.aws/collab/deafrica/

The DE Africa Map interface has now been upgraded to Terria version 8, which includes a French version.





Coverage of operational data pipelines now available through DE Africa

Technical transition

DE Africa's new annual Sentinel-2 GeoMAD service was released in April 2021. This is a powerful new information source for visualisation and analysis of changes across the African landscape and is available for 2017-2020.

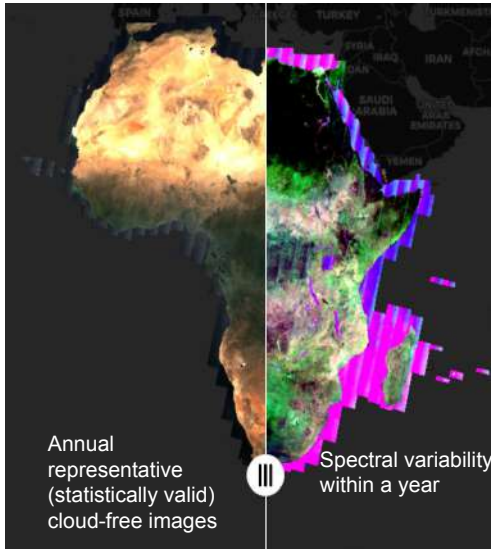
Now that Landsat data is operational, the team is working on operationalising Water Observations from Space with delivery in the coming months.

Crop Mask - A prototype for Eastern Africa will be released soon; and RCMRD and OSS teams are working to extend the prototype to Western and Northern regions. The crop mask is at 10 metre resolution.

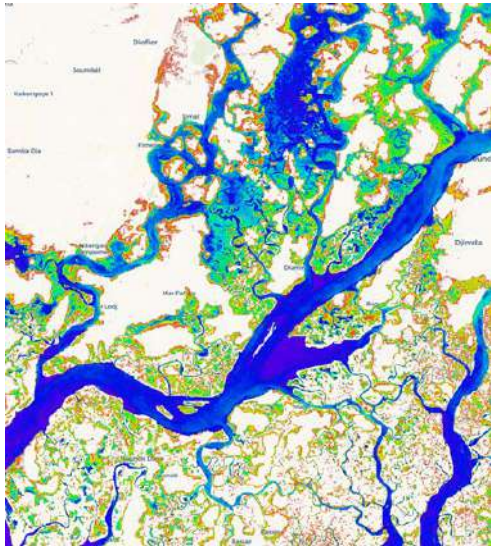
The following continental products are now planned for 2021:

- NDVI anomaly
- Annual Landsat GeoMAD
- Fractional Cover

We are continuing to improve the content of the DE Africa User Guide (Read the Docs) and the DE Africa notebook repository, to include new datasets and use cases.



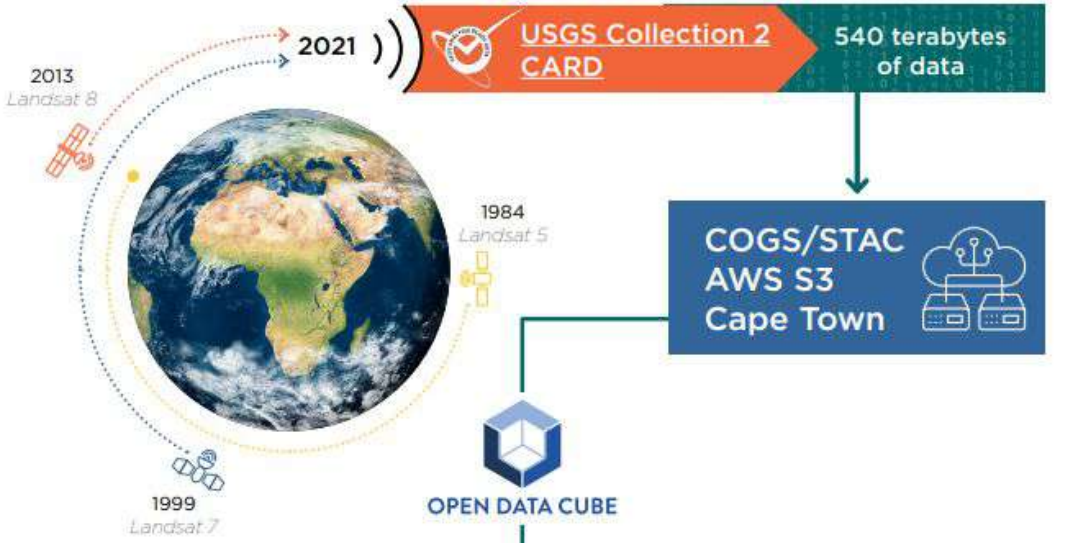
Sentinel-2 annual GeoMAD



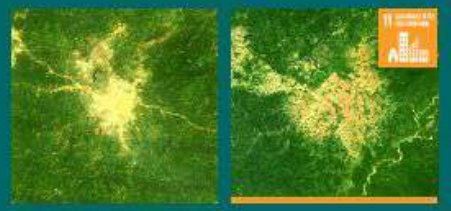
Operational WOFs - coming soon

Prototype cropland area map for West Africa. This product will help to accurately define farmland areas and the change to crops over time.

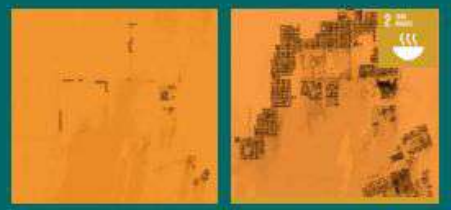
Landsat data available through Digital Earth Africa



Find out more technical detail in Digital Earth Africa Docs

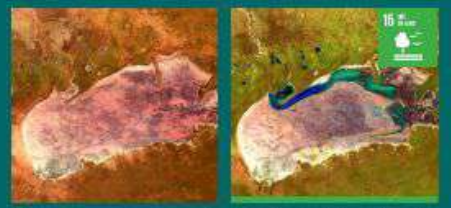


Urbanisation in Ife, Nigeria from 1986 - 2020, Landsat, RGB



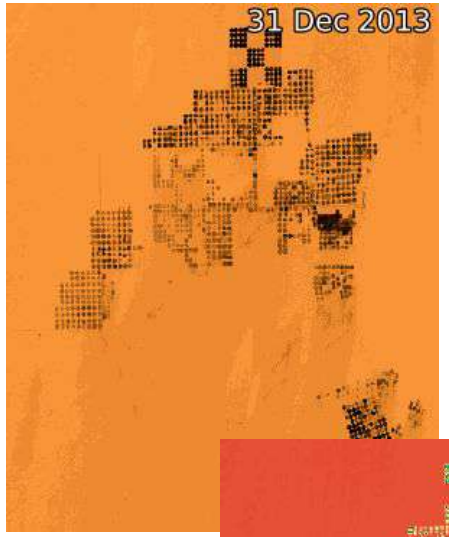
Monitoring crops in Egypt 2001-2020, Landsat, RGB

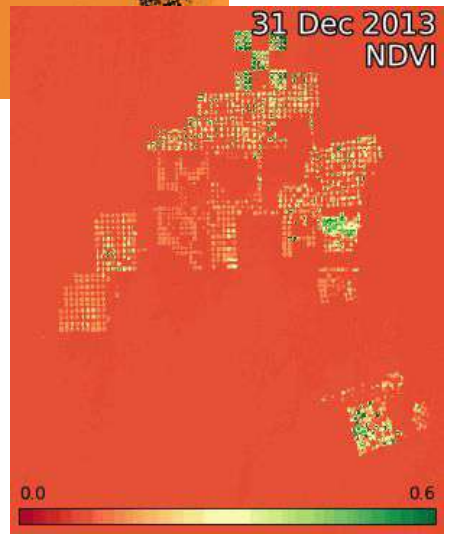
Measuring water quality and extent in Lake Elmenteita and Lake Nakuru, Kenya 1985-2021, Landsat, RGB



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

Digital Earth AFRICA





Capacity development

The DE Africa help desk is now live and accessible through the website and sandbox at helpdesk.digitalearthafrica.org.

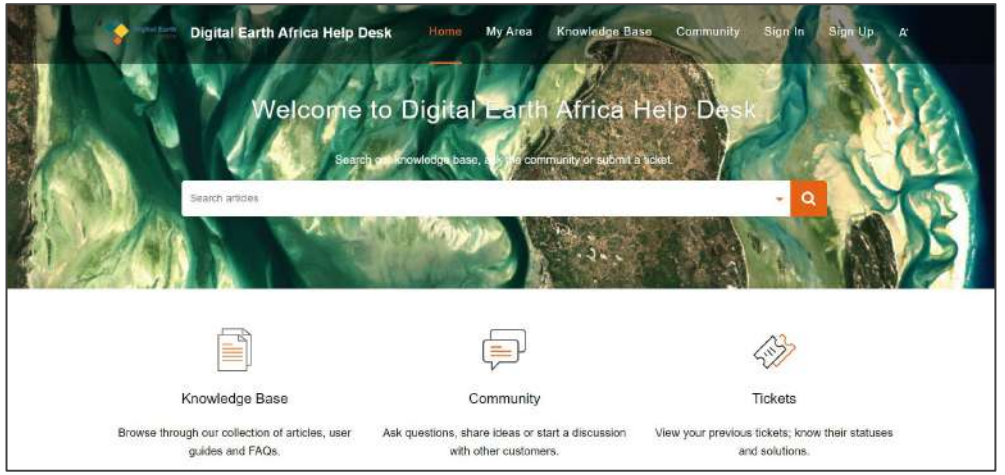
Our Train-the-Trainers program commenced in June and will run through until September. The group includes 11 facilitators and 32 candidates from 5 Implementing Partner organisations.

Our online 6-week self-directed training program, which supports new users to engage effectively with DE Africa data and products, remains very popular. We now have over 120 training course graduates, an increase of 330% over the last 6 months.

We are continuing to run our increasingly popular weekly 'live sessions' along with tailored user communication and responsive support to active DE Africa platform users; for example via WhatsApp discussion groups. This is supporting user engagement with DE Africa products to address real-world development challenges.

Metrics on our growing use community are shown here.

Train-the-trainers program timeline



Our new DE Africa help desk

Growing user community

Weekly live sessions are continuing!

Diverse, active participation
> 15 people on average per session
max number 26 people
10+ countries represented.

New user facing platform and sites

- Docs.digitalearthafrica.org is live
- Helpdesk.digitalearthafrica.org is live, accessible through website,sandbox and soon through a portal

Online training success confirmed!

126 awardees
↑**330%** since end Dec 2020

Improving map interfaces

TerriaJS map
4843 users in two years across 97 countries;1140 new users since 1st April
TerriaJS map improvements on-going
version 8 released inc. French

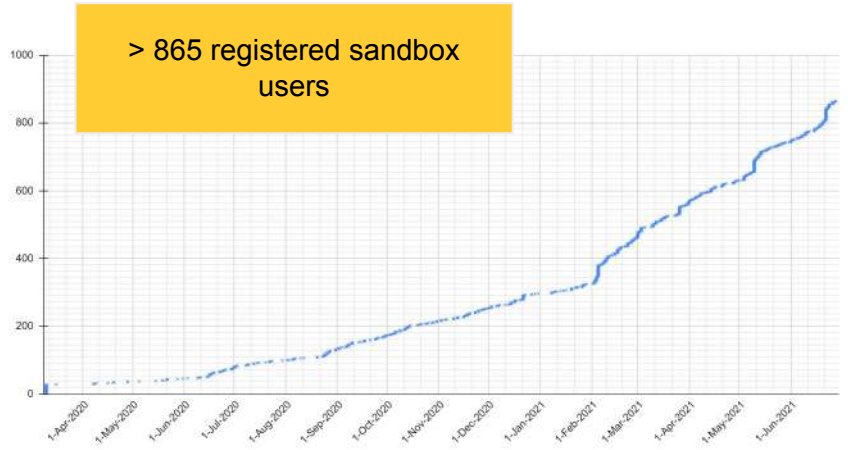
ESRI Geoportal
Upgrade staffed and data indexing is underway!

Our Stakeholder Community continues to grow

SCG latest statistics
~ 1500 stakeholders from >50 countries

Rapid increase in sandbox usage

> 865 registered sandbox users



Drive and demonstrate impact

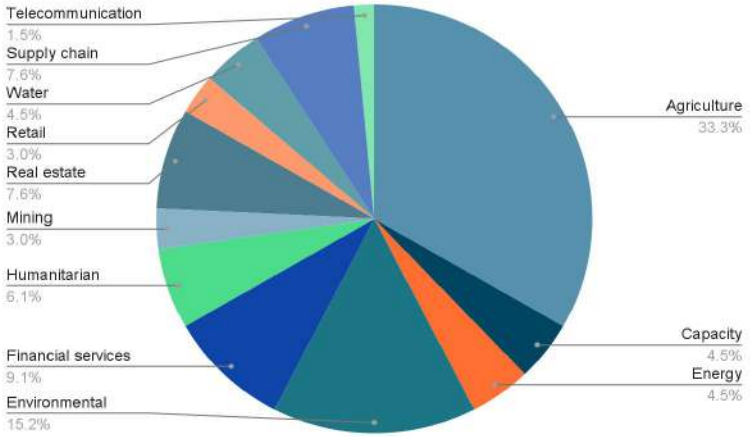
In collaboration with GEO, DE Africa has engaged Panaglobo Geospatial Consultancy and Disal Consulting to undertake further work on the economic value proposition of Earth Observation data for Africa. This builds on the previous World Economic Forum (WEF) report and includes:

1. An in-depth study of the value of EO and Analysis Ready Data across four sectors - agriculture, forestry (including carbon market), mining, urban and regional planning.
2. A study assessing the impact of EO data more broadly across 6 sectors that are not covered in the WEF report.

This quarter, 4 user-driven case-studies, including one example from the private sector, have been published on our blog, with many more in the pipeline. See further details here.

DE Africa, FrontierSI, COOi Studios and NGIS have partnered to undertake an Industry Engagement Study in Africa. To date, 24 industry interviews & 8 written surveys have been completed, focusing on understanding both the barriers and opportunities to using EO data for businesses and a draft report circulated to the TAC meeting in June.

Industry engagement interviews and surveys to date



Latest User Case Studies

Developed by users only

- Environmental Statistics for Tanzania, NBS, multiple SDGs
- Water extent variation Lake Bosomtwe, Ghana, Water resource commission
- Mining screening, EPA Ghana

Published

- Mapping forest in Mount Kenya, Blog
- Monitoring Chlorophyll in Lake Elmenteita, Kenya, Blog
- EO for conservation: rehoming giraffes on Lake Baringo, Kenya, blog, video
- Private sector: Water quality monitoring by Lentera

Example cases in development

- Forestry department, Botswana - evolution of water/ water scarcity, Okavango Delta
- Forest degradation, Benin (Afrigist)
- Lake Chad (Agrhymet)
- Prosopis invasive species in Lake Baringo
- Lava flow extent, DR Congo

EO for conservation, Kenya

Rehoming giraffes on Lake Baringo

Threatened wildlife, shrinking habitats, strong partnerships, technological excellence and local expertise - this story has it all. Most importantly, it demonstrates the power of Earth observation to enable genuinely life-changing decisions.

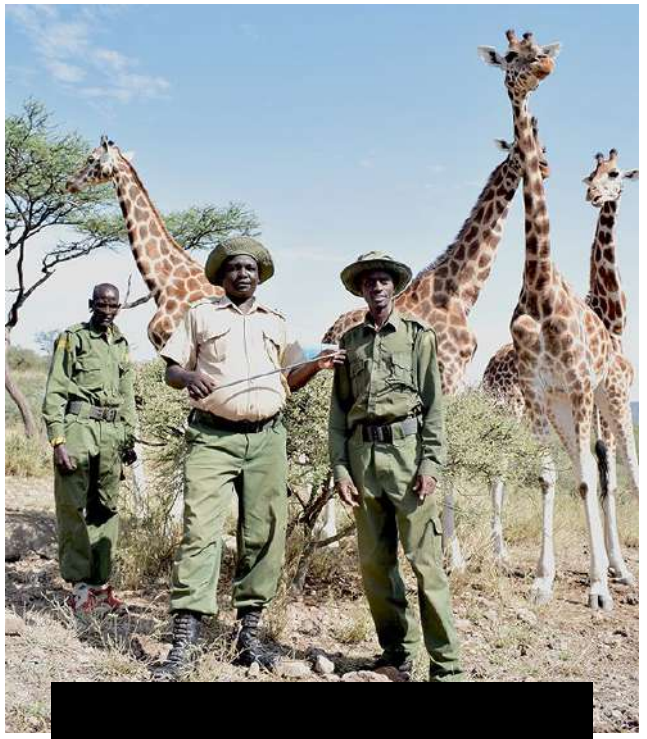
It all starts with Lake Baringo. Situated in the Great Rift Valley of Kenya within the Ruko Conservancy, Baringo has been subject to increasing amounts of rainfall in recent years, with localised flooding causing all manner of issues for those living and working around its shoreline.

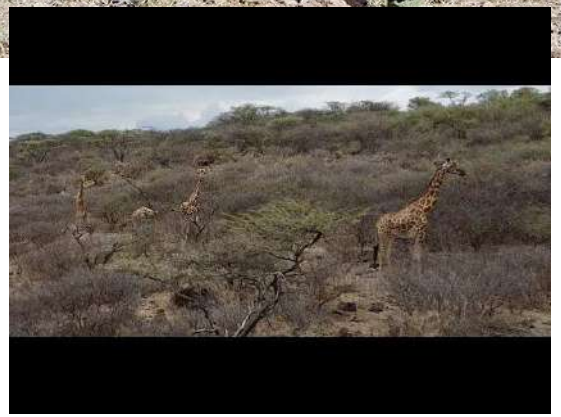
One community that found itself particularly vulnerable to the rising water was a family of highly endangered Rothschild giraffes. Nine of the gentle giants became marooned on Longicharo, once a peninsular and now an island towards the centre of the Lake.

Earth observation imagery, combined with the local knowledge of the communities and conservancy experts, recognised the steady shrinking of the island - the giraffes were fast running out of space. In addition, an invasive species was taking over, threatening the giraffes' primary food source. Living on the island was no longer sustainable for the giraffe population, leading to a complex and careful rescue operation. Over the course of months, the giraffes were moved by raft to a safe location on the shores of the Lake.

Research is ongoing into how the varying extent of Lake Baringo might impact upon the local environment.

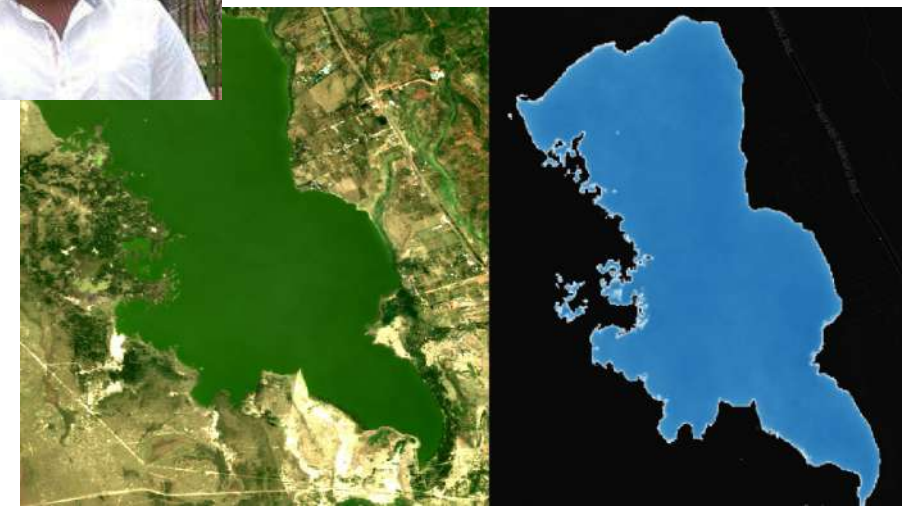
Read more here and explore the story in action via the Story Map.





Water quality - Flamingoes

Monitoring Chlorophyll in Lake Elmenteita



As home to such a delicate ecosystem, seasonal changes in the lake's water levels, water quality and salinity can have huge impacts upon the wildlife populations that live there.

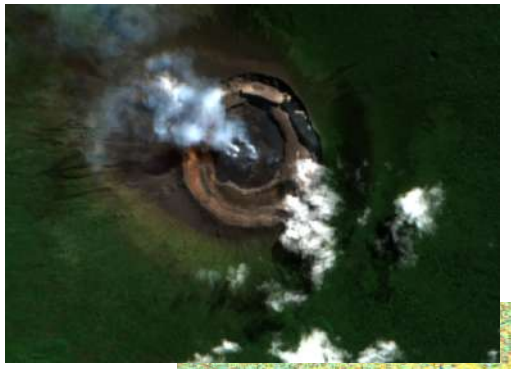
Eric Lawrence Nganga, a Data Analyst at one of Digital Earth Africa's Partners - the Regional Centre for Mapping of Resources for Development (RCMRD) noticed that increased rain during the wet season was causing a number of problems for the flamingo population around the lake, including:

- The destruction of potential breeding grounds by rising waters, reducing the number of flamingos.
- Reduced salinity of the lake water which hinders the growth of blue-green algae – a key food source for these flamingos and, incidentally, the reason that the birds are pink.

A rise in human activity around Lake Elmenteita was also contributing to changes in habitat.

Eric wanted to look deeper into these issues. First, he wanted to establish the extent of the water in the lake. To achieve this, he used Digital Earth Africa's Modified Normalised Difference Water Index (MNDWI).After measuring the water extent, Eric wanted to map the water quality of the lake. Read more on our blog here.

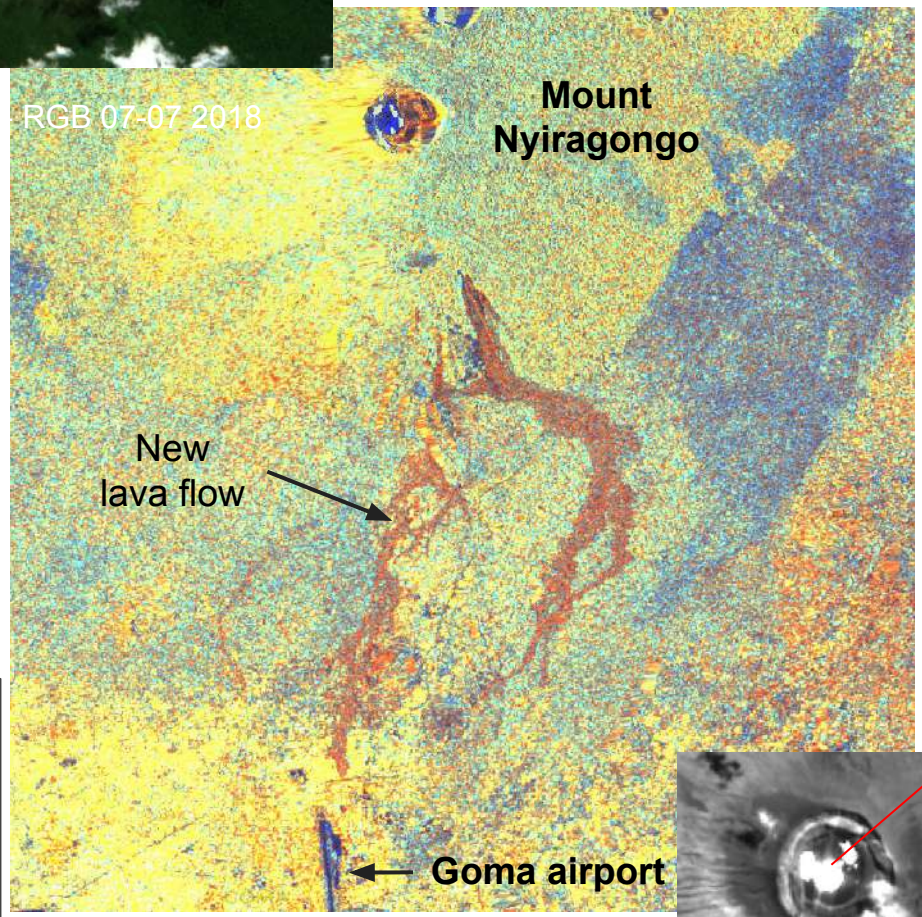
DR Congo - Volcano



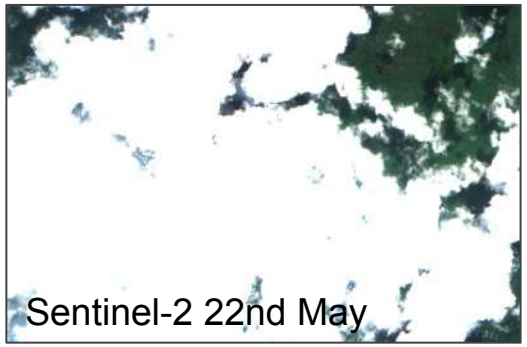
Cloud covered areas and Sentinel-1

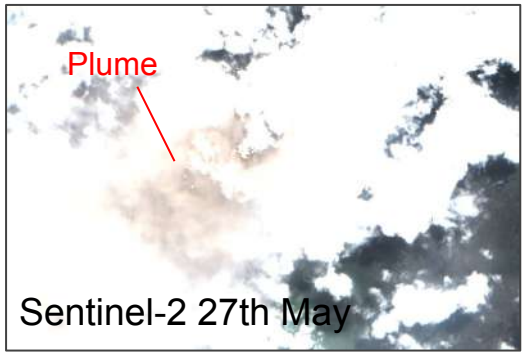
Mount Nyiragongo is an active stratovolcano with an elevation of 3,470 m in the Virunga Mountains associated with the Albertine Rift in DRC. On 22 May 2021, around 17:00 GMT, the volcano erupted. Lava approached the Goma airport and moved towards the city centre of eastern Goma. A highway to Beni was cut off by lava, and authorities urged residents from the city of Goma to evacuate, causing thousands of people to leave their homes.

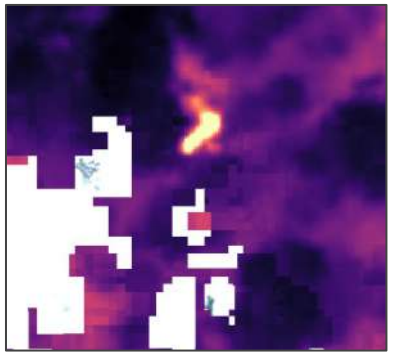
The area is frequently covered by clouds and only limited ground surface can be discerned by optical (Sentinel-2 or Landsat) or thermal imagery (Landsat) at any given time. Nevertheless, extensive new lava flow is clearly identified with Digital Earth Africa Sentinel-1 Radar data that “sees through” clouds .



Mount Nyiragongo volcanic eruption seen on Sentinel-1







Landsat 8 temperature 16th May

Unsustainable agriculture, Lake Naivasha

Impact of pesticide overuse on water quality

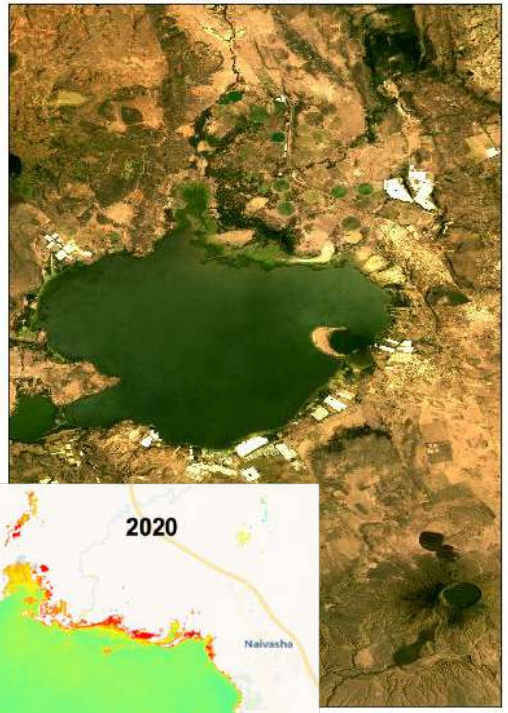
Pesticides overuse is a serious problem in Kenyan farms with wide-reaching consequences for human health and the environment.

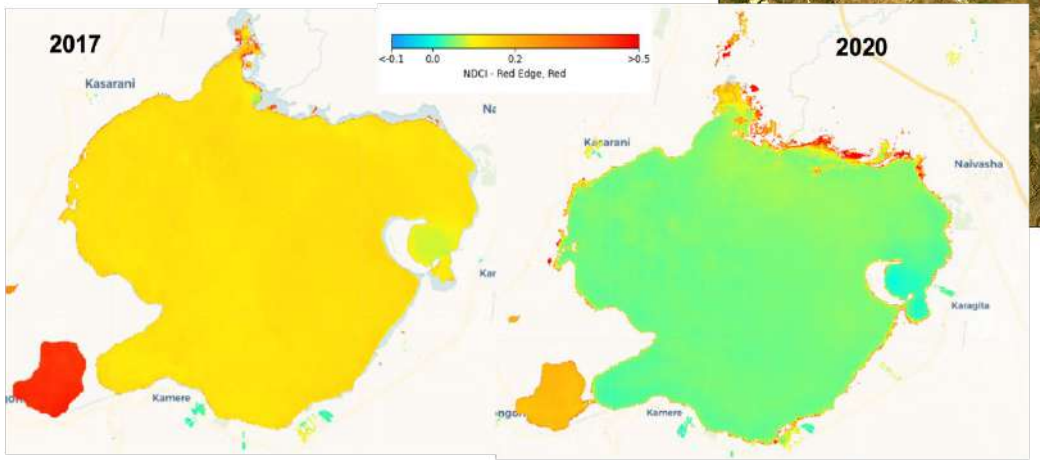
Lentera (AgriTech company) are working with the World Wildlife Fund to raise awareness on the negative impacts of bad farming practices.

Joyce Siundu used DE Africa to demonstrate impact on water quality and quantity in Lake Naivasha, Kenya through time and help encourage use of organic farm inputs as a substitute for chemical fertilizer.

Read more on our blog here.

Joyce Siundu





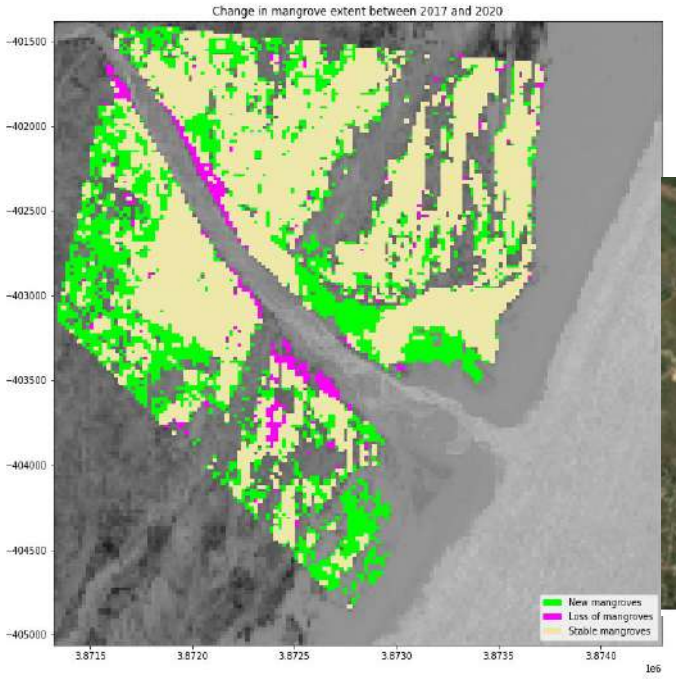
Earth observation to protect wetlands

Preservation of mangroves in Sabaki Estuary, KEFRI

Wetlands, including river deltas, peatlands and mangroves are a crucial part of the Kenyan landscape and biodiversity. The Kenya Forest Research Institute (KEFRI) has been supporting the monitoring and protection of wetlands in the country, taking part in World Wetlands Day to celebrate the six Ramsar sites across Kenya.

Dr. Stanley Nadir, a research scientist in Soil Science and Water Management with KEFRI recognised the need to protect this important ecosystem against further degradation. After going through the Digital Earth Africa training program, he began to provide assessments of the changing vegetation.

Read more on our blog here.




Sabaki Estuary, Kilfili County

Partnerships and community

Partnership is at the heart of the Digital Earth Africa program and we are proud to be collaborating with a range of influential organizations from across the African continent and the globe.

DE Africa continues to work very closely with the Group on Earth Observations (GEO), and in May we were upgraded to GEO initiative status.

DE Africa is currently in active discussion with the following programs whose objectives and interests intersect align with our own:

- NASA- SERVIR
- International Water Management Institute (IWMI)
- FAO land cover algorithm, porting to DE Africa
- FAO crop classification algorithms from Sen2agri

DE Africa helped organise the 2021 Open Data Cube (ODC) community conference (22-25th June), featuring Dr Adam Lewis as a keynote speaker. DE Africa continues to actively contribute to the Committee on Earth Observation Satellites (CEOS).

Establishment of a DE Africa community of practice is being discussed as part of the Capacity Development Implementation Plan development.

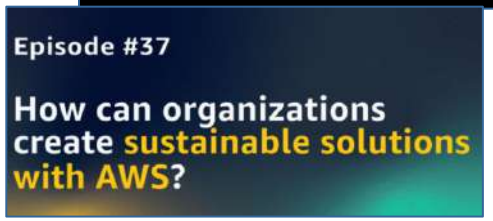
Building awareness

To continue to build a communication approach that is tailored to the needs and preferences of African stakeholders, a Communications Network has been established with our Implementing Partners. The first meeting was held in late February, and included active participation from communications leads from all 6 Implementing Partners. Meetings, which allow for collaborative discussion, sharing of ideas and distribution of materials, are now being held monthly and working group Terms of Reference are being finalised.

Our communications metrics demonstrate that we are building an engaged community on social media, drawing a greater audience to our website and grabbing the media's attention. In addition, we continue to engage in a wide range of international and Africa-based events.

This quarter, there have been a number of communication opportunities with technical partner AWS including a podcast, blog, thought leadership and a climate series documentary which is currently in production. We have had coverage in a variety of African media - including an article produced for Nation in collaboration with the Australian High Commission in Kenya (link here).

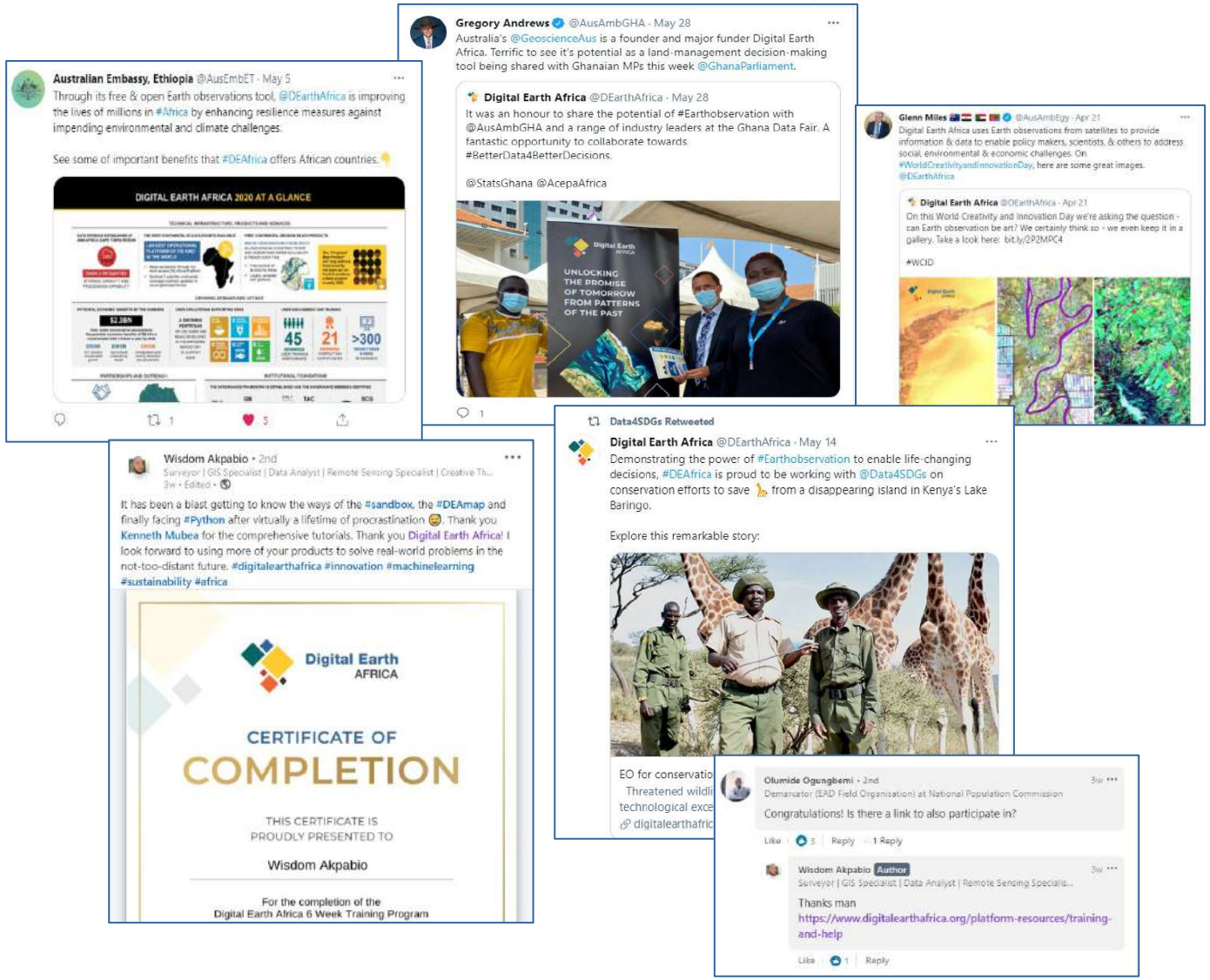
We also worked closely with Global Partnership for Sustainable Development Goals to produce a case study about the rehoming of a troupe of giraffes from a shrinking island in Lake Baringo. The video shown on the right is coverage that we received from the BBC.



Social media engagement

Our links and relationships with the Australian Department of Foreign Affairs and Trade have gone from strength to strength over the past quarter, with tailored social media content proving a particular hit. The DE Africa Program has been mentioned by Heads of Mission or Embassies in Ethiopia, South Africa, Egypt, Kenya, Ghana and Nigeria. One example is the tweet from Gregory Andrews seen on the right. It features Establishment Team member Edward Boamah who attended the Ghana Data Fair and met the Head of the Ghana mission as well as many other dignitaries.

A community of training program graduates is also emerging through social media. Training certificates were updated with the new brand and all graduates of the training have been provided with bespoke with social media tiles, encouraging them to promote their completion of the training with their networks. These posts are regularly attracting a great deal of engagement on social media, particularly encouraging are the posts that recommend the training to graduates' networks, helping us to reach new audiences with news of the program.



Communication metrics

Digital Earth AFRICA

April- June 2021

Website engagement is increasing

Average session duration increased by **79.4%**

Bounce rate decreased by **24.1%** - meaning that more users are finding the content they need on the site

Our website user base in Africa is growing

379 users from Kenya

202 users from South Africa

The Twitter community is engaged

Likes increased by **85%**

Impressions increased by **71%**

Retweets increased by **63%**

438 new followers

*All statistics compare Jan-March ‘21 with April-June ‘21

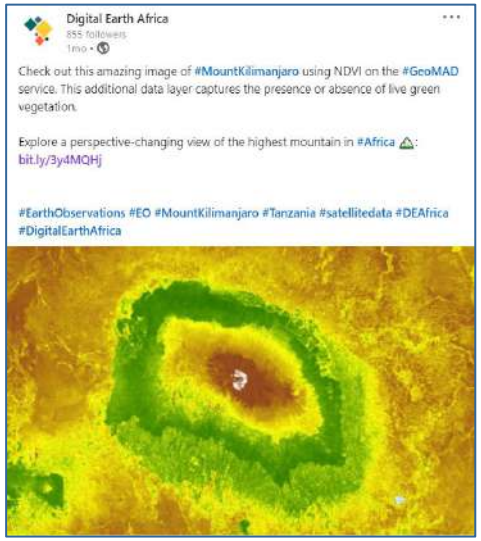
LinkedIn

Shares increased by **85%**

258 new followers

127 visitors from the Business Development field

Our top update received **1821** impressions



Our top tweet received **14,567** impressions

GOLD: Muse Creative Award

Communications and Marketing

DE Africa's Communications and Marketing campaign has won a Gold at the Muse Creative Awards. we're very proud of this achievement and would like to thank all those who had an input into creating the brand and strengthening the communications campaign.

Digital Earth AFRICA

Acknowledgements

THANK YOU