# Digital Earth Africa

## Quarterly program update: June - August 2020

*Sentinel 2 Image - Bazaruto Archipelago, Mozambique (May, 2020)*
*(True colour composite)*

# About Digital Earth Africa

## Our vision

Digital Earth Africa (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.

## Program goals

The long-term goal for DE Africa Phase II is to improve the lives of Africans through access to tailored information for decision making. This encompasses[1]:

- Livelihood strengthening – Earth observation (EO) data will support more informed decision making at government, sectoral and other levels, contributing to direct and indirect benefits for individuals and communities.
- Development effectiveness – DE Africa will support enhanced understanding of development challenges and solutions, and in so doing, strengthen collective impact and ability to assess progress towards national priorities, Agenda2063 and the SDGs.
- Digital transformation – through industry uptake and innovations, DE Africa will help fuel ongoing evolution of the digital economy in Africa.
- Economic development and job creation – through access to data for commercial products and services development, DE Africa will support new business development and employment opportunities.

## Report purpose

This Quarterly Report provides a snap-shop of DE Africa Phase II progress made between June and August 2020, as aligned with DE Africa's Investment goals.

[1] These align with the 5 Outcome areas identified by the Governing Board, as per the Governance Framework Document

# Progress summary

## Technical highlights

**Data validation collaboration using the Collect Earth Online (CEO) tool**

DE Africa hosted a virtual two-day workshop to kick-start the data validation of our first continental-scale product, Water Observations from Space (WOfS). CEO is the image viewing and interpretation tool that the DE Africa implementing partners will use to conduct robust assessments collaboratively, providing an effective solution to assess accuracy and validate DE Africa products and services.

CEO is also a community of developers who actively share best practice and support for continued maintenance. It enables experts with minimal background in remote sensing to consistently locate, interpret and label reference data of any area and provides easy to use features for rigorous data analysis.

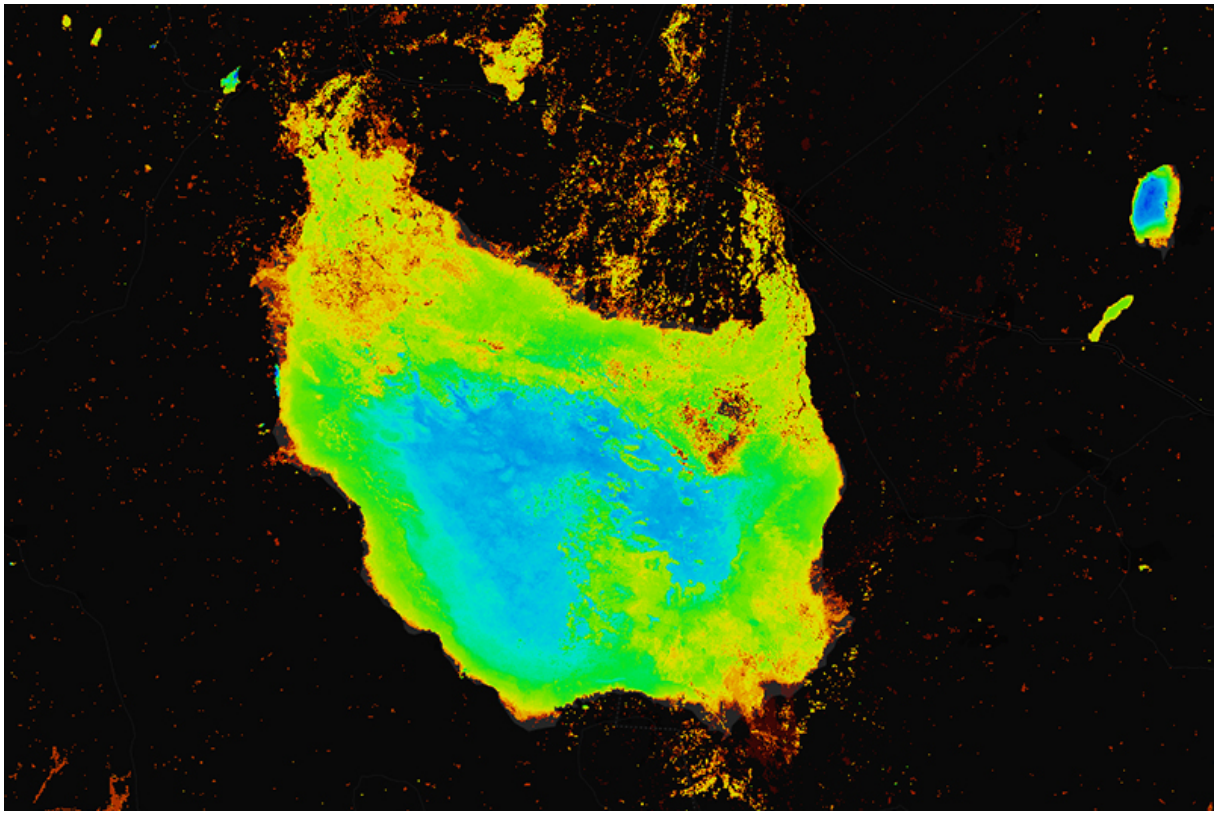
The validation of WOfS using CEO is currently underway. The results of this effort will provide a rich temporal dataset to assess the accuracy of WOfS at the continental-scale and will allow WOfS to become a fully operationalized product.

**Food Security Product development**

The Cropland Product co-development team was established this quarter to support development and uptake of a continental cropland map product to address food security issues. The project plan with agreed scope of works was endorsed and training and validation documentation was completed and is currently being reviewed. A crop mask validation image library was completed for Eastern and Western regions, and the Southern, Northern, Sahel regions are underway with partners.

The Cropland Task team members include the Regional Centre for Mapping of Resources for Development (RCMRD, Kenya); Group on Earth Observations Global Agricultural Monitoring (GEOGLAM, representative based in Uganda), Global Partnership for Sustainable Development Data (GPSDD, Kenya) African Regional Institute for Geospatial Information Science and Technology (AFRIGIST, Nigeria), AGRHYMET (Niger) and the Ghana National Disaster Management Organisation (NADMO).

Benefits of the completed product will include national statistical agencies being better able to target their crop sampling strategies for estimating annual food/fibre production, allowing historical and future trend analysis through annual calculations of maximum cropland extent, highlighting how agricultural production is shifting in the context of a changing climate, and enabling seasonal crop performance comparisons with neighbouring countries to assist in forward decision making on the importation of food should their own production fall short of demand.



*All time water summary (2013-2019) of Lake Sulunga, Tanzania*

**Use Case Study**

The National Bureau of Statistics (NBS) Tanzania worked with DE Africa on three use case studies this quarter focussed on mangrove mapping, a regional environmental assessment and drought effects on Lake Sulunga.

Lake Sulunga is situated in a semi-arid and drought prone region and is relied upon by many surrounding settlements for drinking water, fishing, agriculture, livestock farming and salt production. NBS Tanzania are now using DE Africa analysis-ready satellite data to conduct analysis on the lake's water extent over time after the Establishment Team transitioned the use case from the African Regional Data Cube into the DE Africa platform. They have been among the first advanced users to transition to the new DE Africa continental-wide infrastructure.

The DE Africa Water Observations from Space (WOfS) product was then used to conduct further analysis of Lake Sulunga using the DE Africa Map portal and DE Africa Sandbox interface for advanced analysis. This enabled a time-series analysis over a six-year period from 2013 to 2019 in order to plot the minimum and maximum water extents. This type of analysis helps to monitor when the lake experiences variations in volume and depth to understand and plan for those times throughout the year in the future.

## Governance implementation

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. Planning for the first meeting is now underway, which is tentatively scheduled for October.

The 5th Technical Advisory Committee meeting was held virtually on 14th July. 16 TAC members were present, including representatives from South Africa, Senegal, Niger, Kenya, Tunisia, Ghana, Benin and Tanzania. A range of government, academia, private sector and international donor organisations were also present, including those based in the USA and Australia. The meeting focussed on an update to the governance strategies and operational model implementation, an update of the DE Africa platform implementation including highlights and progress, an update on food security work; and the Establishment Team's proposed approach to the development of use-cases. The TAC also discussed and endorsed the Gender, Equality, Diversity and Social Inclusion Strategy for the program.


The DE Africa Stakeholder Community Group continues to grow and now has 671 subscribers (+57 since May 2020).

## Program establishment in Africa

In July we welcomed Dr Kenneth Mubea to the Digital Earth Africa (DE Africa) Establishment team who joins us through secondment from the Global Partnership for Sustainable Development Data (GPSDD). Kenneth is our User Engagement Manager based in Kenya and brings a wealth of knowledge in Earth observation (EO).

To accelerate the establishment of the program we are moving forward with establishing a distributed model that draws on regional partner institutions in Africa. Negotiations with key implementing partner institutions are now underway according to this new framework. We are also close to signing a trust fund agreement with the Group on Earth Observations (GEO) to allow for recruitment of staff and distribution of funds to partner institutions.

The Digital Earth Africa Monitoring, Learning and Evaluation framework was finalised in July and is now being implemented to track and report progress against key program outcomes.

## Gender, Equality, Diversity and Social Inclusion Strategy

The DE Africa Phase II Gender, Equality, Diversity and Social Inclusion (GEDSI) Strategy was endorsed by the Technical Advisory Committee in July and will frame DE Africa's GEDSI-related activities until the end of Phase II in 2022.

DE Africa will embed GEDSI considerations across DE Africa's systems, activities and organisational culture, primarily focussing on African geographic diversity, gender equality, youth and disability inclusion. DE Africa recognises that there are opportunities to advance GEDSI outcomes across all of its work and that concerted efforts are required to ensure these opportunities are realised. GEDSI considerations will be mainstreamed into all DE Africa's existing work areas and additional targeted activities will be undertaken to advance GEDSI outcomes under each of DE Africa's outcomes.

The strategy provides the foundation for DE Africa to advance GEDSI outcomes beyond Phase II.

## Strengthening partnerships

The number of DE Africa partners actively supporting establishment and implementation continues to grow with two MoU's signed this quarter – the South African National Space Agency (SANSA); and the International Water Management Institute, and four MoU's are in final negotiations - Centre de Suivi Ecologique (CSE), Senegal; African Regional Institute for Geospatial Information Science and Technology (AFRIGIST, Nigeria); Observatory Sahara Sahel (OSS); and the Ministry of ICT & Innovation of the Government of the Republic of Rwanda. These MoU's and other strategic partner negotiations will form the basis of future partnership agreements to further regional capacity, technical development and program alignment.

These new partnerships add to the international and technical partnerships that we already have, such as with the Group on Earth Observations (GEO) that provides a global mandate, with Amazon Web Services who are hosting 2 Petabytes of DE Africa data in their Public Data Store, with ESRI who have developed and maintain the Africa Geoportal, and the US-Aid and NASA funded SERVIR program which is providing vital technical tools to support validation work.

## Growing capacity and uptake in Africa

**Use cases**

This quarter saw a focus to increase uptake of the DE Africa platform through use case studies. High-impact use cases offer an opportunity for highlighting the value of DE Africa and by demonstrating impact it ensures additional users, funders, governments and industry are attracted to the platform and to become an indispensable tool for addressing some of the core challenges across the continent.

Use case studies by topic this quarter included:

- Mangrove conservation (June) - The first use case study was published as a joint article with GEO, highlighting a use case of Mangrove conservation in Zanzibar using DE Africa.
- Water extent and policy improvement (June)- DE Africa supported the Government of Tanzania to assess water extent and improve policy to protect Lake Sulunga and the communities who depend on it for water, food, and income (see Technical Highlights). The Tanzania National Bureau of

Statistics presented the results during a webinar event as part the World Day to Combat Desertification and Drought organised by the United Nation Convention to Combat Desertification.

- The MV Wakashio oil spill off the coast of Mauritius (July) - A notebook has been developed for users to demonstrate how images can be used to measure and monitor the impact of the oil spill by providing a pre-event baseline and highlighting changes in the area potentially resulting from the spill.

*True and false colour images showing the spread of the MV Wakashio oil spill off the coast of Mauritius, created using DE Africa's operational Sentinel-2 data pipeline.*

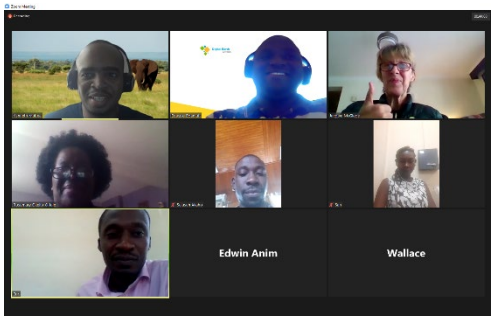
- Water quality (August) - active water quality and water extent notebooks have been finalised and tested. Possible users for these notes books are being investigated, including: Water Resource Commission, UN World Water Quality Alliance, UNEP, University of Energy and Natural Resources, University of Ghana

- Illegal mining (June – August) - An active use case is being developed in Ghana with two in-country partners, and includes engagement from both researchers and policy makers. Process Notebooks have been developed and the next step is to train users. In the long term the Notebook will be publicly available.

**ARDC Transition**

Successful workshops to on-board advanced users to the DE Africa platform were held for Tanzania, Sierra Leone, Ghana, and Senegal. As the on-boarding context was different for Kenya the program shifted to bringing on new users from the Kenyan Ministry of Water, Agriculture and ICT and other groups.

ARDC-DE Africa user training began this quarter and forms the start of the capacity development program, providing training to advanced users as well as establishing a focus group for continued feedback on product and service development. The training material that has been developed in both English and French will be made public for all to access and will form the first tranche of the capacity development work.



**Capacity development**

DE Africa progressed work on the implementation of its Capacity Development Strategy (which was endorsed by the TAC in March) by engaging ITC at the University of Twente in August to establish and operate the Capacity Development Task Team. ITC will provide guidance, advise and co-develop the Capacity Development Strategic Pathways, provide a Needs and Capability Assessment of Implementing Partner's to deliver Capacity Development programs and broader DE Africa programs and oversee development of the implementation and monitoring plan by the CD Task team.

Implementing partners in Africa will report on success and lessons learned as part of the implementation.

## Continued outreach and engagement

The DE Africa Communications Strategy which was endorsed by the TAC in March, is providing the framework and overarching direction for all communication activities and stakeholder engagement activities.

DE Africa continued to be regularly profiled across a range of mediums and audiences:

- DE Africa participated in the virtual GEO Symposium (June). Presentations on behalf of DE Africa included the program's approach and success in achieving funding in the Resource Mobilization session; the technology behind DE Africa; and a presentation from the Resource Centre for Mapping for Resource Development (Kenya) on Water and Coastal Observations.
- The Tanzania National Bureau of Statistics (NBS) presented at the Simiyu Agriculture Show (August) on how Earth observations (EO) using DE Africa, can help tackle environmental problems.
- The Spatial Temporal Asset Catalogue (STAC) Sprint (August), hosted by Radiant Earth and sponsored by Digital Earth Africa, connected with the technical community in Africa to drive innovation using satellite data provided by Digital Earth Africa.
- To launch the opening of Amazon Web Services Africa (Cape Town) Region, DE Africa featured in the AWS Podcast (July) alongside Andiswa Mlisa from SANSA. The Podcast discusses the program and AWS's support as part of the Amazon Sustainability Data Initiative: https://podcasts.apple.com/md/podcast/379-a-digital-earth-journey/id1122785133?i=1000485440177

Since June 2020, DE Africa has been featured in seven online articles, has 489 new twitter followers (total 1637) and has had 8625 unique website views.

The DE Africa LinkedIn page (199 followers) continues to build stakeholder support and drive thought leadership.

## Implications of the COVID-19 global pandemic

Whilst the evolving situation presents challenges for the investment DE Africa is well placed to respond to recovery efforts in Africa. DE Africa will pivot its focus onto food security and promote regional collaboration which, alongside water mapping products, will provide governments with data to tailor and evaluate their COVID-19 responses. DE Africa will engage with industry to encourage

innovation and uptake of the system to produce new value-added products and services for local users, whilst contributing to the growth of Africa's technically skilled workforce.

DE Africa have also been asked by a consortium of agencies to provide input, support and collaboration including Fraym.io, which is developing data packages including risk profiles for a select number of countries funded by the Gates Foundation. Sharing of this data through the DE Africa platform may be possible and we are exploring how to extend the risk profile work to additional countries. GRID3 is a program funded by Gates and Department for International Development (UK) providing settlement, population and infrastructure data. Within the context of COVID-19, there is an increased motivation to evaluate food security where DE Africa may collaborate.