

Digital Earth
AFRICA

DE Africa Quarterly Progress Report

October - December 2022

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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 October and December 2022, as aligned with DE Africa's 2022 Annual Work Plan.

**Open and Free Data**

- Interoperability
- Privacy and Integrity

**Operational Service**

- Continental-scale
- Sustainable
- Domain expertise

**Accountability and transparency**

- Responsive to African priorities
- Agile, nimble and actions oriented

**Diversity and inclusion**

- Multi-sector perspectives
- Span data communities
- Foster collaboration

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 DE Africa. Increased economic development and job creation, through access to data for commercial products and services development.
- **Over \$2bn USD of benefits to the African continent** are possible through accelerated industry growth, improvements in agricultural productivity and the detection and prevention of unregulated mining.

\$2.3bn

Even under conservative assumptions, the impact of Earth Observation could be higher than **\$2 billion** (USD) per year

Three key areas



\$500 million
Earth Observation industry
accelerated growth



\$900 million
Agricultural
productivity boost



\$900 million
unregulated gold mining
detection and prevention



Marine Observation
\$212 million



Disaster Risk Reduction
\$74 million



Public Health
\$113 million



Renewable Energies
\$27 million



Oil & Gas
\$15 million



Security and Civil Protection
\$96 million

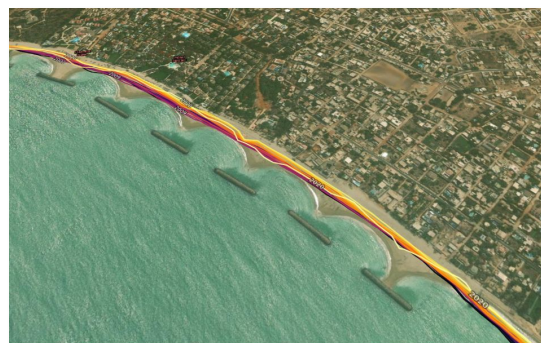
"The analysis estimates that an overall socio-economic impact of approximately USD 540 million could be achieved per year while keeping the conservative assumption of a 10% application."

*Source; World Economic Forum Report '[Unlocking the Potential of Earth Observation to Address Africa's Critical Challenges](#)'

October - December 2022 Highlights

Technical successes

- New Digital Earth Africa Coastlines monitoring service launched
- New forest monitoring notebook



Overview of rate of coastal change in Saly Portudal featuring the new Coastline service

Strong partner support

- Digital Earth Africa signs MoU with Esri, formalising our existing partnership.
- Teams from ASARECA in Botswana and Uganda as part of ACIAR project



Matthew Pennells (Esri) and Dr Thembi Xaba signing the MoU between DE Africa and Esri

Growing user capacity and engagement

- Over 120 Live Sessions held since commencing in 2020.
- Over 3,000 Sandbox Registrations, and over 13,000 map users



Capacity Development workshop at CSE

Increasing engagement & awareness

- Digital Earth Africa awarded an SDG Award for Community Impact for the Zanzibar Mangroves work.
- The YouthMappers challenge has closed to submissions, with winners to be announced in the new year



GEO Week 2022 Global Action for Local Impact winners

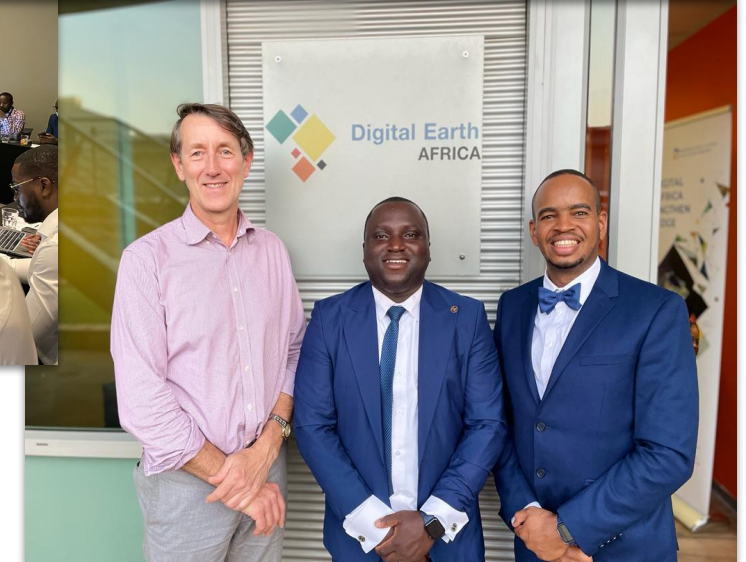
Governance

Digital Earth Africa began the quarter with the first face-to-face Technical Advisory Committee since the start of the pandemic. Digital Earth Africa team members and partners flew from around the world to Pretoria, South Africa, for 3 days of discussions and workshops. Attendees enjoyed productive conference, with the opportunity to renew bonds in person after years of online meetings.

Digital Earth Africa has continued to engage with the Governing Board, asking them to endorse the strategic direction for 2023, which will influence the work planning for next year. Discussions around work planning began, with the final 2023 work plan to be endorsed by the Governing Board at the beginning of 2023.



TAC members convening face to face for the first time since 2019



Program transition to Africa

To mark the transition of the Digital Earth Africa Program to African leadership based on the continent, government and private sector officials, Digital Earth Africa Governing Board representatives, our Technical Advisory Committee members, Implementing Partners and staff celebrated the official opening of the Program Management Office in Pretoria, South Africa. More details can be found here: [Digital Earth Africa launches Program Management Office on the African continent](#).

This quarter, the Digital Earth Africa team also welcomed Mpho Sadiki as our new Earth Observation Data Scientist. Mpho will work on creating, managing and delivering continental services and products using Earth observation and geospatial data.

The Africa team is now fully staffed and transition of program operations to Africa is nearly complete. The team has now completing the Standard Operating Procedures and from this point onwards, the documents will provide a single point of truth for the different work groups, and will be reviewed on a regular basis for updates.



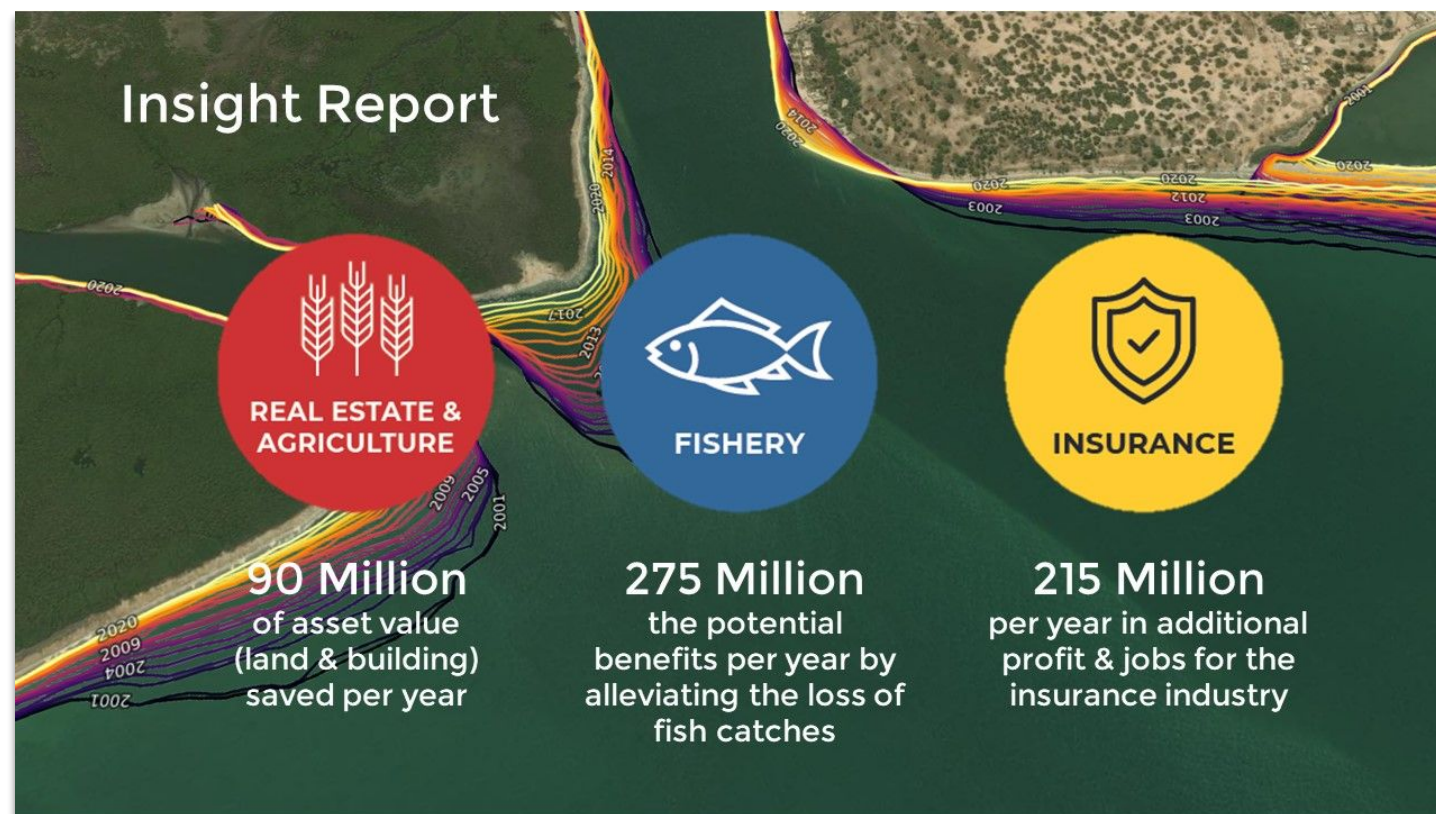
GB member, Dr Mmboneni Muofhe, SANSA Board Chairperson, Mr Mooketsa Ramasodi DG for Agriculture, Land Reform and Rural Development, Australian High Commissioner to South Africa, H.E. Gita Kamath and Mr Patrick Ndlovu SANSA Board Chairperson, cutting the ribbon to open officially the PMO Office.

Sustainment

The newly released DE Africa Coastlines product empowers decision makers to prioritise and evaluate the impacts of local and regional coastal management based on historical coastline change.

According to the [Cost to Coast](#) economic value study by DISAL, commissioned by Digital Earth Africa, by mitigating coastal erosion risks in 3 key sectors, the platform could be used to inject ~\$460 million per year into Africa's economy and change the lives of ~270 million people in three key sectors: Real Estate and Agriculture, Fishery, and Insurance.

DevGlobal continues to support the DE Africa team with identifying funding opportunities, with 11 new funding proposals in progress, along with 2 others that have already been submitted. Currently the team are focused on positive future funding opportunities for Phase III.



Diversity and inclusion

DE Africa has commenced co-chairing the Diversity and Inclusion Working Group monthly meetings, and are looking forward to increased engagement in 2023. The Working Group meetings now include partner organisation African Women in GIS (AWGIS).

The YouthMappers Technical Challenge closed this quarter, and the submissions are currently being reviewed, with finalists to be announced in January.

The Digital Earth Africa team also hosted a YouthMappers awareness session on the 15th October. The session, held in English and French aimed to introduce YouthMappers Chapters to the platform, provide an overview of the free self paced online course and the products and services offered. The session also explored a number of use cases, highlighting how the platform can be used to address real world issues. A recording of the session can be found here: <https://youtu.be/-T4YmZNAgsw>.



YouthMappers Technical Challenge

Applications are now open!

26 September 2022 - 31 October 2022

Registration: tinyurl.com/YMxDEA

 **Digital Earth**
AFRICA  youthmappers

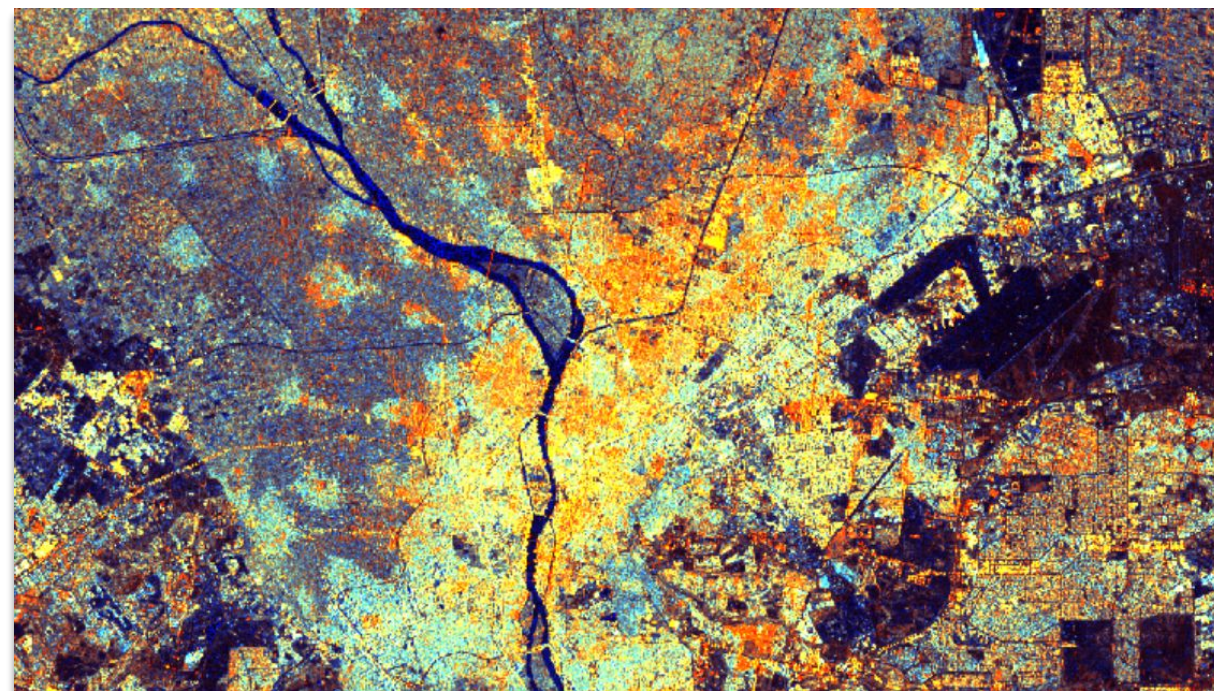
Platform and Data

DE Africa now has a total of 3.5 PB of data.

With the SANSA Platform Hosting team in full swing, the platform has been undergoing a series of maintenance steps to ensure components are up to date. This includes version upgrades to the database, reviewing user account access levels, OWS and Explorer upgrades, and improving the Geoserver configuration. The team have demonstrated they are up to the challenge of hosting our platform, and ensuring all of our notebooks continue to work as expected after software upgrades.

DE Africa has partnered with Sinergise to investigate further platform developments:

- Tested direct sentinel-1 data drops, and set up Sentinel-1 monitoring.
- New datasets added or upgraded: ALOS annual mosaic 2015-2021, and a review of current datasets and their STAC catalog completed.
- Commercial data access through Sentinel hub has been established. ESA sponsorship has been approved to access commercial data for research.



Cairo, Egypt, Sentinel-1 Showing false colour composition

Services and analysis tools

Digital Earth Africa's latest service release is a monitoring tool that enables users to analyse coastal erosion and growth trends on an annual basis at local, regional and continental scales. Driven by Digital Earth Australia experience, the processing workflow and methods used to build the DE Africa Coastline monitoring service (Coastlines) can be also experienced and tailored in the Sandbox thanks to 'Digital Earth Africa Coastlines method' and 'Coastal Erosion' notebooks.

Coastal erosion is closely linked to a changing climate, as it is highly responsive to rising sea levels, changing precipitation patterns, and higher temperatures. When combined with the impacts of human development it has the potential to cause significant changes to the coastlines of Africa. Ensuring that the Land, as outlined in Sustainable Development Goal 15, is protected, and restored and that sustainable use is promoted in order to halt degradation and biodiversity loss.

More information can be found here: [Monitoring coastal erosion in Africa using Earth Observation Data](#)

DE Africa now has more than 100 notebooks available with support 7 Sustainable Development Goals and 16 indicators. New notebooks and user guides this quarter include:

- Coastlines dataset
- NDVI Anomaly dataset
- [Understanding Dask for scaling-up analysis](#)



Capacity development

Digital Earth Africa's Capacity Development team have continued their hard work this quarter, marking a number of milestones:

- conducted the 100th live session, since they commenced in 2020
- exceeded 300 sandbox registrations
- reached over 13000 unique map users

DE Africa Implementing Partner AFRIGIST is also currently developing new online courses.

DE Africa continue to be recognised as an Internationally award winning capacity development program. This quarter DE Africa was honoured to receive:

- The Surveying and Spatial Sciences Institute, 2022 SIBA|GITA APSEA NSW award for community Impact
- GEO week Sustainable Development Goal Award for Climate Action: *"How data and community can save Zanzibar's mangroves"*. More information about the award can be found here: [Digital Earth Africa Zanzibar mangroves project receives recognition at GEO Week 2022](#)

In collaboration with FAO, the DE Africa and FrontierSI team has generated preliminary land cover maps and engaged with national users from Mozambique and Rwanda this quarter. A webinar on "National Land Cover Mapping using the DE Africa Platform" was run in November, and various training workshops supporting uptake and usage by Mozambique users were run throughout December.



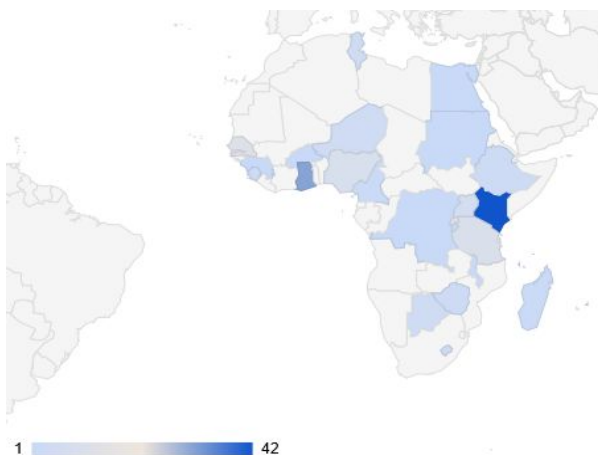
Dr Lisa-Maria Rebelo and Dr Fang Yuan with the 2022 SIBA|GITA APSEA Award

Growing user community - by the numbers

Weekly live sessions

120

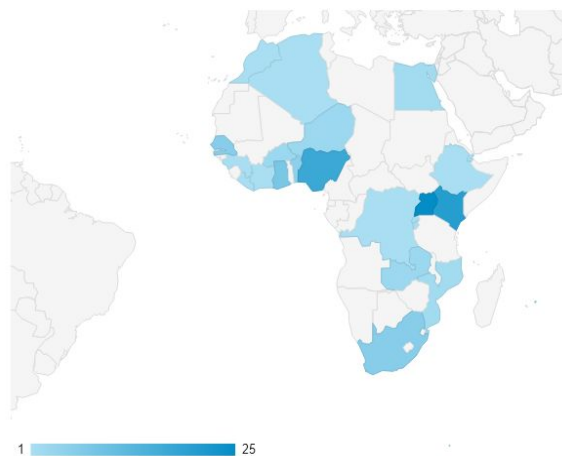
Held in EN and FR
-249 unique attendants
from 31 countries



Online training

979
+63%

Online Course Registrations



Users

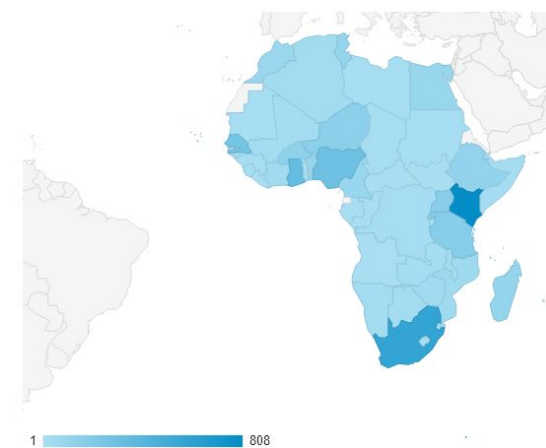
3,087
+3 %

Registration in Sandbox

Users

13,580
+23 %

Unique DE Africa map users

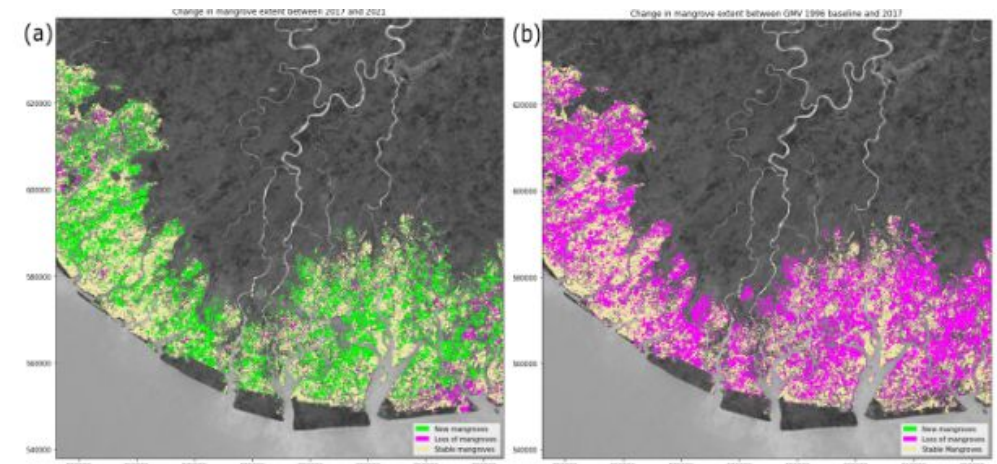


Mapping Mangrove extents in the Niger Delta region in Nigeria using DE Africa

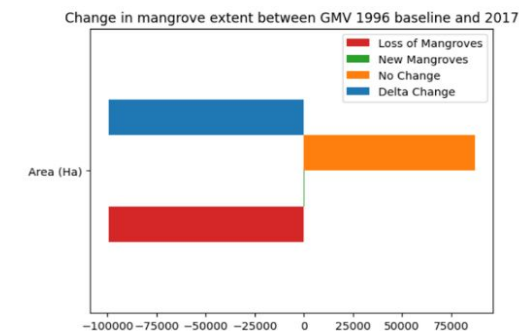
Mangroves provide a range of ecosystem services to humans and play a vital role in coastal zone protection and management. Mangroves in the Niger Delta region of Nigeria are affected by climate change and human activities leading to their degradation.

Jokotola Omidiji from the University of Lagos, member of the African Women in GIS network, partnering with our own Dr Kenneth Mubea and Dieynaba Seck from CSE (Senegal), used the analysis ready data (ARD) from Digital Earth Africa to map mangrove extent in the Niger delta over a period of four years from 2017 to 2021 and compared the findings with long-term observations from 1996 to 2021.

The approach of using ARD EO data to monitor ecosystem resources and status provides a framework for better coordinated and targeted conservation policies and planning efforts to reduce the impacts of climate change and sea level rise on the already vulnerable ecosystems, and support climate action such as the Sustainable Development Goals and African Union Agenda 2063. Jokotola's study was presented at the American Geophysical Union Fall Meeting, a major US technical conference, in December.



Comparison of changes in mangroves between the 2 study periods: 2017-2021 and 1996-2021.



Change in mangrove extent between 1996 and 2021



Jokotola Omidiji
from the
University of
Lagos

Projects with Aligned Programs

Digital Earth Africa signed a Memorandum of Understanding (MoU) with Esri, the global market leader in geographic information system (GIS) software. The MoU, signed in Pretoria, South Africa, is to formalise an already existing relationship between DE Africa and Esri. The collaboration is meant to establish a collaborative partnership that addresses some of Africa's most significant challenges in areas such as water resources and flood risks, agriculture and food security, land degradation, coastal erosion and urbanisation and the impacts of climate change. More information can be found here: [Forging partnerships through collective collaboration: Digital Earth Africa signs MoU with Esri](#)

The DE Africa team also celebrated the closing of the Enabling Crop Analytics at Scale (ECAAS) with an event and workshop in Washington, DC in December. This concluded the first phase of the initiative and convened a large portion of the community of practice, in order to continue co-designing for future phases of work.



DE Africa team with Matthew Pennells and Stuart Martin from Esri

Projects with Aligned Programs

The Information for Agriculture, Food and Water Security (IAFWS) Project, funded by Australian Centre for International Agricultural Research (ACIAR) and delivered in partnership with the Association for Strengthening Agricultural Research in eastern and Central Africa (ASARECA) and Centre for Coordination of Agricultural Research and Development for Southern Africa (CCARDESA) has been a key focus this quarter. Joseph attended the initial IAFWS consultation workshop, alongside ASARECA and CCARDESA in Gaborone, Botswana to raise awareness on existing Earth Observation information and tools. The next workshops were held in Uganda, Rwanda and Kenya in December, with future workshops to be held in Ethiopia and South Africa in the new year. These workshop have resulted in useful feedback to ASARECA and DE Africa for consideration in next steps, with follow up training sessions warmly welcomed.



IAFWS project engagement session hosted in collaboration with ASARECA, Kigali, Rwanda

Community engagement

GEO Week

The Digital Earth Africa team presented at GEO Week on the value and uptake of our tools and services, demonstrating DE Africa's impact, support of the GEO Program and opportunities that exist with our implementing partners and other initiatives across Africa.

This session shared the Coastal Monitoring Service by DE Africa, explored DE Africa's impact, links to the GEO Work Programme, and opportunities that currently exist with implementing partners and other leading initiatives across Africa, for example Global Monitoring for Environment, Security (GMES) and Africa. More information on this presentation can be found here: [Digital Earth Africa presents on Operational Services in Africa at GEO Week 2022](#).

While at GEO Week Digital Earth (DE) Africa won a Sustainable Development Goal (SDG) Award for Climate Action for the project "How data and community can save Zanzibar's mangroves". This project was led by Khairiya Masoud, Raya Ahmada and Massoud Hamad from the State University of Zanzibar (SUZA). DE Africa Capacity Development Lead, Dr. Kenneth Mubea, worked closely with the research team at SUZA to see this project to completion. More information about the award and the project can be found here: [Digital Earth Africa Zanzibar mangroves project receives recognition at GEO Week 2022](#).



Community engagement

This quarter marked the return of participating in face to face events in Africa. This kept our team very busy with travelling across the continent and world!

Digital Earth Africa attended:

- Zimbabwe Institute of Geomatics (ZIG) conference, where Dr. Kenneth Mubea was honoured as a keynote speaker
- GEO Blue Planet Symposium in Accra, Ghana, where Dr Lisa Rebelo co-led a session on coastal hazards and presented DE Africa Coastlines service
- 13th African Association of Remote Sensing of the Environment (AARSE) conference, held in Kigali, Rwanda
- PECORA 22, Denver, Colorado
- GIS day 2022, Kigali, Rwanda
- GIS day 2022, University of Nairobi, Kenya.

The DE Africa team based at Geoscience Australia were invited to present as part of the Distinguished Geoscience Australia Lecture series, and we welcomed our Lead Scientist Dr Lisa-Rebelo to present her Derek Tribe Address as the 2022 recipient of the Derek Tribe Award. Dr Rebelo presented on “Earth Observations for Water Resource Management” detailing her previous work with the International Water Management Institute.

Co-presenting along with Dr Rebelo was Dr Cedric Jorand, Senior Advisor - Capacity Development of Digital Earth Africa, presenting an overview of the Digital Earth Africa platform and its services and tools.



Above: Dr Kenneth Mubea at the ZIG Conference.

Left: Dr Lisa-Maria Rebelo receiving the Derek Tribe Award after presenting a Distinguished Geoscience Australia Lecture.

Community engagement

The Africa Earth Observation Challenge final pitching event took place in Nairobi, Kenya from the 6th - 9th December. DE Africa as a partner to the AEOC attended the event as a Finals Judge to the event. Our Programme Manager, Farrah Naidoo represented the DEA as a judge. The event was a great success with winners from Kenya, Nigeria and South Africa. A workshop was held with all Partners on the 7th Dec to review the learnings and outcomes of the challenge. This workshop was attended by Dr Ken Mubea and Ms Farrah Naidoo

Objectives of the Africa EO Challenge

- **Climate Action**
 - To help build Africa's capacity in climate change, the challenge seeks to also identify start-ups that are
 - helping to tackle the issue of food security, flooding, and droughts, and to encourage the use of earth
 - observation data and climate change to bring in climate funding.
- **Diversity and Inclusion**
 - To encourage uptake from the youth and female segments of the society the Challenge place special, continued, emphasis on encouraging both female and youth demographics to participate in the Challenge.

Above: Dr Kenneth Mubea at the ZIG Conference.

Left: Dr Lisa-Maria Rebelo receiving the Derek Tribe Award after presenting a Distinguished Geoscience Australia Lecture.

Africa-Australia engagement

Digital Earth Africa joined the Australian Ambassador for Zimbabwe in Harare on 18th October 2022 for a roundtable discussion on climate and food security with Non-Governmental Organisations and representatives from the Ministry of Environment and Ministry of Lands, Agriculture, Fisheries, Water and Rural Development. The discussions explored synergies to address climate change including the role DE Africa could support using the continental cropland service, which supports crop type mapping and highlights productivity over time including identifying seasons such as planting and harvest.

H.E. Brontë Moules and Dr Xaba were also guests on 3Ktv Zimbabwe at the People n Earth show, discussing the role of the Australian government towards climate change initiatives, sharing insights on elevating earth observation and reliable data access provided by DE Africa as a digital public good. More information can be found here: [Digital Earth Africa engagement on climate action in Zimbabwe](#). The PMO team also hosted the Acting High Commissioner to South Africa, David Geyer, at their office in Pretoria.

Digital Earth Africa was honoured to be invited to COP27 to present at the Australian Pavilion about our platform developed by Australian Innovation. Dr Lisa Hall travelled to Sharm El Sheikh to participate,



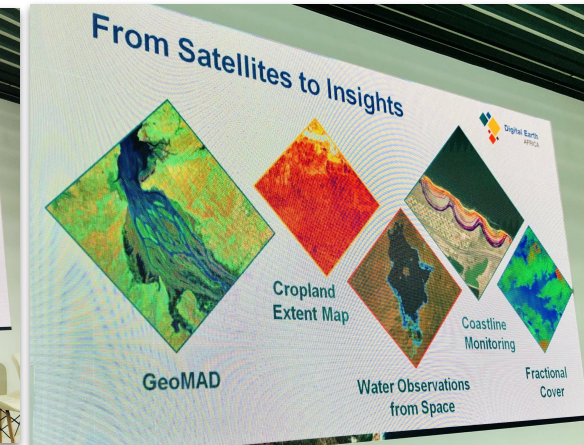
Dr Xaba, HE Bronte Moules, Dr Mubea at Australian NGO Cooperation Program in Zimbabwe



Acting High Commissioner David Geyer at the Digital Earth Africa office in Pretoria



Dr Lisa Hall presenting at the Australian pavilion at COP27

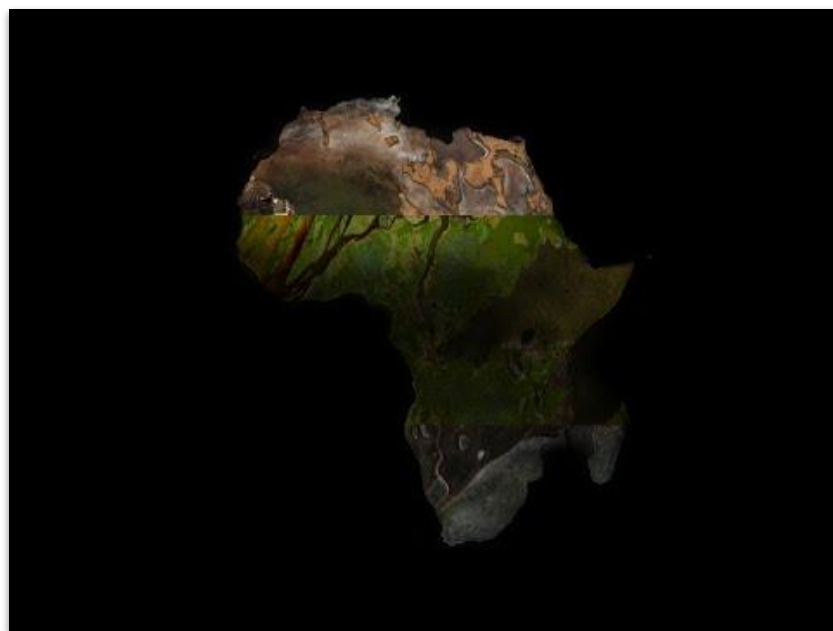


DE Africa videos

Patterns of the Past - the promise of Tomorrow - Grayson Cooke

This digital creative piece by Grayson Cooke was showcased at COP27 by the Australian Government. It captures the diverse landscapes of Australia and Africa to reflect the synergies between DE Australia and DE Africa to enable the use of Earth Observation to visualise change & inform Climate Action across both continents:

<https://youtu.be/xb2wTOLoPeU>



Digital Earth Africa – Oct - Dec 2022

Introducing the Digital Earth Africa Coastlines Service

DE Africa's Coastlines service enables users to monitor coastlines across Africa. The service is a product of global collaboration; built on innovation from Geoscience Australia, with the new service developed and validated in collaboration with CSE.

<https://youtu.be/k7S49TX7SHE>



Communication metrics

Twitter

- There are almost **5,500 Twitter followers** with 488 new followers gained this quarter
- **122K impressions** over the quarter
- **364 link clicks** and **510 retweets** over the quarter

LinkedIn

- There are now **over 4,500 LinkedIn followers** with 630 new followers gained this quarter
- Almost 2,000 reactions to posts over the quarter
- A total **77,7K impressions** and 108 shares over the quarter

Website

- **8,909 visitors** over the quarter
- **54,910** unique page views this quarter

Top 5 Visitor locations (% users)

USA (17%), Kenya (7%), South Africa (6%), Ghana (5%), Australia (4%),

Acknowledgements



THANK YOU

