

Digital Earth Africa: Independent Evaluation



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Disclaimer

The opinions expressed are those of the evaluation team, and do not necessarily reflect those of either [GA](#) or the [DE Africa](#) program. Responsibility for the opinions expressed in this report rests solely with the authors.



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Abbreviations

ACIR:	Australian Centre for International Agricultural Research
AFRIGIST:	African Regional Institute for Geospatial Information Science and Technology
ARD:	Analysis Ready data
AU:	African Union
AWS:	Amazon Web Services
CoP:	Community of Practice
CSE:	Centre de Suivi Ecologique
DE Africa:	Digital Earth Africa
DFAT:	Department of Foreign Affairs and Trade
EAC:	East Africa Community
ECAAS:	Enabling Crop Analytics at Scale
ECOWAS:	Economic Community of West African States
EO:	Earth Observations
ERB:	Executive Review Board
FAO:	Food and Agricultural Organisation (United Nations)
GA:	Geosciences Australia
GESI:	Gender equity and social inclusion
GEO:	Group on Earth Observations
GoA:	Government of Australia
HoM:	Head of Mission
IP:	Implementing Partner
MEL:	Monitoring, Evaluation, and Learning
MOU:	Memorandum of Understanding
OSS:	Observatoire du Sahara et du Sahel
PMO:	Program Management Office
RCMRD:	Regional Centre for Mapping of Resources for Development
SANSA:	South African National Space Agency
SDGs:	Sustainable Development Goals
TAC:	Technical Advisory Committee
UNECA:	United Nations Economic Commission for Africa
WEF:	World Economic Forum
WFP:	World Food Program



Executive Summary

Introduction

This is the report of the independent evaluation of the Digital Earth Africa (DE Africa) Program Phase II (March 2019–June 2023). The evaluation was commissioned by Geoscience Australia (GA) and assigned to Strategic Development Group. The review covers the period from the start of the program in March 2019 until data collection ended in February 2023.

The main objectives of the review are threefold:

- i. **To assess [DE Africa](#)'s performance** against the outcomes in the theory of change (ToC) and Monitoring, Evaluation, and Learning (MEL) Framework;
- ii. **To support decision-making for the future**, to maximise the effectiveness and efficiency of program implementation; and;
- iii. **To provide accountability** for results achieved by [DE Africa](#) during Phase II. **The effective delivery of the Diversity and Inclusion Strategy** is a priority focus of the evaluation.

Methodology

A mixed-methods approach was adopted, using key informant interviews an electronic survey of key users of the [DE Africa](#) platform, supported by a review of extensive project documentation (listed in [Annex 2](#)). Interviews we conducted in person in Nairobi, Accra, and Pretoria, and online with those stakeholders who were based in Australia, the United States of America, and elsewhere on the African continent.

Limitations faced during the evaluation were primarily related to the availability of key informants, nevertheless by the end of the planned fieldwork period the evaluation team did manage to interview more than 76 key informants, supplemented by a further 53 respondents who completed the survey. By using multiple approaches to data gathering, the evaluation team ensured that they were able to triangulate the data sufficiently to support the findings reported below.

Key findings

[DE Africa](#)'s **objectives align with continent-wide development goals** and the program is engaging on relevant regional sectoral issues (such as food security, climate change, disaster risk reduction and so on). [DE Africa](#) also aligns with the strategic priorities of the Australian government, both with respect to its strategy in Africa, and with domestic policy priorities. There was consistent persuasive endorsement by all respondents for the objectives of the program.

[DE Africa](#) has made **strong progress towards achieving its 3 End-of-Program Outcomes**. [DE Africa](#)'s structures (both in terms of operations and governance) are in place, and the Program Management Office (PMO) is fully operational. The transition from an Australian based team to a wholly African team is largely complete despite initial challenges



exacerbated by COVID-19, and the [PMO](#) is now fully recruited. In line with its objective of creating a distributed operational model [DE Africa](#) is leveraging its network of pan-African implementing partners effectively to expand the reach and utility of its services. [DE Africa](#) continues to promote and strengthen its African ownership.

[DE Africa](#) has established a **solid foundation to increase the likelihood of sustainability** and has secured significant additional partner investment through in-kind contribution and additional investments which will enhance sustainability. A program governance framework was agreed in 2019 and is now operational. However, challenges remain with the governance structure of the program, both in terms of its suitability for the Phase III operating context and clarity around the roles and responsibilities of the Governing Board vs the Executive Review Board in effectively overseeing program performance and compliance. Noting that program performance and compliance is currently being managed through the [GA-SANSA](#) hosting agreement.

Users and partners speak highly of the unique selling points of [DE Africa](#), namely that the program's objectives align with continent-wide strategies to address development needs in Africa, that **[DE Africa](#) is the preeminent Earth observations (EO) data platform on the African continent**, that it is the only platform providing real-time data and products for the whole continent; and its innovative cloud technologies and analytic workflows allow its users free access to cutting edge technology.

A growing number of **case studies demonstrate the environmental and development impact** being achieved by the program. An increasing number of African governments, academics, and others are becoming more aware of the value of the platform and are using it in multiple different ways to create meaningful impact. Evidence indicates that data is being used to inform decision making, but this is still primarily at individual rather than institutional level, although there are a growing number of institutions engaging with the platform.

[DE Africa](#) **adopts and promotes international data standards**, and actively participates in global forums to better integrate and share [EO](#) data. The program is engaging effectively with multiple multilaterals and regional partners to implement initiatives and is increasing its profile as the only Earth observation platform offering free, open-source data and thematic products and operational services for the entire African continent.

D&I strategy is comprehensive and ambitious and based on well researched evidence. There is a strong commitment to deliver the D&I Strategy, which has contributed to positive changes in regard to awareness, understanding on D&I, and some initial application of inclusive strategies that have enhanced participation particularly of women and younger people from a wide reach across the African continent. [DE Africa](#)'s implementing partners are committed and have demonstrated interest to continue to progress inclusive practice although there is varying degrees of capacity and experience to deliver. Now that the transition to an African led program has taken place, there is need to articulate the responsibilities and accountability for managing D&I within the program and to ensure that a sufficient level of resources and capacity is made available for safe and effective delivery.

There are demonstrated examples of Earth observation data providing new information that is used to make **evidence-based policy decisions**, but it is too early to document real impact. Nevertheless, there is a growing portfolio across multiple sectors of the contribution being made by [DE Africa](#), and the implicit, likely economic benefits of [EO](#) data is substantial. [DE Africa](#)'s platform and tools have been shown to enable transparent accountability and support reporting on relevant and important aspects of climate change. An increasing



number of users recognise the value of geospatial data to monitor, adapt and mitigate the impact of climate change.

DE Africa is helping to reinforce Australia’s reputation in Africa. The program provides an opportunity for Australia to demonstrate its commitment and comparative advantage with regards to using [EO](#) data to address fundamental development challenges. For Posts across Africa the program was seen to be particularly beneficial in that it helped build relationships with government departments they might not typically work with, and / or helped strengthen existing relationships. However, the engagement with Posts on the continent is ad-hoc, which lessens the impact the value the program brings for Australia. Engagement between the program and [DFAT](#) needs to be more deliberate.

Conclusion

Our overall conclusion is that [DE Africa](#) has made excellent progress against the 3 expected End-of-Program Outcomes that [DE Africa](#) has largely delivered against all its expected intermediate outcomes, and has exceeded delivery expectations in many areas.

[DE Africa](#) has laid a solid foundation to increase the likelihood of the program’s benefits continuing through the establishment of a reliable and consistently high-quality platform, the strong partnerships created, the establishment of the African based [PMO](#), and the steps it has taken to ensure it is truly African owned. The use of a ‘distributed operational model’ ensures that ownership is spread across the continent, leverages the capability of partners working at both national and regional level which enhances both the effectiveness and efficiency of delivery, and ensures collaboration and synergy with related efforts thereby increasing its reach and impact.

Recommendations

The evaluation’s recommendations reflect its main conclusions and focus on 4 areas which the program needs to consider in the next phase which, if addressed, will help strengthen the important work the program is doing in Africa.

Key Finding	Recommendation	Responsibility
Governance structure is sufficiently holding the program to account, and allows for effective transfer of technical advice from its members, but the structure is not optimised for the Phase III operating context, nor does it have fiduciary responsibility	Governance structure needs to be appropriately reviewed in line with the Phase III operating environment, and to clarify its roles and responsibilities (in particular its fiduciary responsibilities)	Governing Board / Geoscience Australia
DE Africa ’s vision is closely aligned with the strategic priorities of the continent, and is engaging with continent wide partners to help address Africa’s development challenges, but there is not the	Going forward the program will need to demonstrate relevance at country / local level, leveraging its implementing partners to strengthen this process / target specific development challenges /	PMO (in conjunction with IPs)



Key Finding	Recommendation	Responsibility
same clarity at national level (despite the fact that there is a growing body of evidence demonstrating local application)	broaden application at the national / sectoral level	
Need to articulate the responsibilities and accountability for managing D&I within the program and to ensure that a sufficient level of resources and capacity is made available for safe and effective delivery. The current Strategy is comprehensive but overly ambitious	A more modest and targeted plan for D&I that is appropriately resourced, and articulates clear lines of management responsibility between the PMO and IPs	PMO
The program brings noticeable benefits to Australia, but engagement with Posts is ad-hoc, which lessens the impact the value the program brings to Australia	Engagement between the program and DFAT needs to be more deliberate, and an agreed engagement process needs to be developed to ensure better coordinated support from Post. This could be done via a quarterly briefing session between Posts in Africa or some other means to ensure a structured approach to sharing information	DFAT / PMO

Table 1: Overview of the evaluation key findings and Digital Earth Africa's recommendations and their bodies for responsibility.

Evaluation Features

Task

This independent evaluation is focused on Digital Earth Africa (DE Africa) Phase II (2019–2023). The evaluation includes consideration of [DE Africa](#)'s performance and results between March 2019 until February 2023, answers the Key Evaluation Questions spelt out in the Terms of Reference (ToR) and further elaborated in the Evaluation Plan (January 2023), and in addition, provides recommendations to maximise [DE Africa](#)'s impact in the future.

Objectives

The Terms of Reference (ToR) outlined 3 specific objectives the independent evaluation needed to meet:

1. To assess [DE Africa](#)'s performance against the outcomes in the theory of change (ToC) and Monitoring, Evaluation, and Learning (MEL) Framework, and to capture and



- document the impacts of [DE Africa](#)'s work in contributing to its goal of improving the lives of people in Africa through access to tailored information for decision making;
2. To support decision-making for the future, to maximise the effectiveness and efficiency of program implementation; and,
 3. To provide accountability for results achieved by [DE Africa](#) during Phase II.

For what purpose

The evaluation had both **summative and formative** purposes. The *summative* element of the evaluation needed to 'assess [DE Africa](#)'s performance', 'provide accountability' for the results achieved by the program to date, within its second phase of delivery, and to establish the extent to which the program has been effective in the delivery of its Diversity and Inclusion Strategy.

The *formative* element of the evaluation needed to make recommendations on how best to strengthen the program going forward, in particular to maximise [DE Africa](#)'s impact into the future.

Our Approach

As set out in the Evaluation Plan, the team conducted a mixed-methods approach (a mix of in-person and online engagement with stakeholders), using key informant interviews (76 key informants), an online survey (53 respondents), supported by a review of extensive project documentation. The list of key documents consulted can be found in [Annex 2](#).

Limitations

Limitations faced during the evaluation were primarily related to availability of key informants, nevertheless the evaluation team did end up interviewing far more stakeholders than was initially envisaged and representing the scope of users, implementing partners, collaborators, and funders. Most of the respondents of the survey were from universities and academics, which probably has skewed a stronger view of the benefits than we heard from other users in government and civil society in interviews. However, by using multiple approaches to data gathering (documents, survey, and interviews), the evaluation team ensured that they were able to triangulate the data sufficiently to support the findings reported below.



Background

[DE Africa](#) Phase II began operations in March 2019, and will end in June 2023. The key focus of Phase II has been on the establishment of the [DE Africa](#) platform; support of uptake and application; and establishing [DE Africa](#) Earth Observation (EO) infrastructure and capability within Africa. [DE Africa](#) program is a follow-on from the brief first phase (June–December 2018), during which the program sought to develop a better understanding of the [EO](#) landscape in Africa and demonstrate the feasibility of an African based [EO](#) platform. Flowing out of the scoping exercise was the Investment Design for Phase II, with an emphasis on building the infrastructure and transitioning the program to Africa.

[DE Africa](#) was initially implemented by an Establishment Team located within Geoscience Australia, but the program was transitioned during Phase II to being an Africa-based and managed program based in the South Africa National Space Agency (SANSA). The program is operated by a Program Management Office (PMO), that sits within [SANSA](#)¹, and is governed by a Governing Board and Technical Advisory Committee.

Total revenue for [DE Africa](#) Phase II is \$24,198,573 AUD, largely provided by a grant of AUD\$10 million from the Department for Foreign Affairs and Trade (DFAT), and USD\$10,167,438 million from the Leona M. and Harry B. Helmsley Charitable Trust. The program also receives considerable in-kind support from a range of different partners (including Amazon Web Services and [SANSA](#)).

The long-term goal of [DE Africa](#) is to improve the lives of people in Africa through access to tailored information for decision making. For the program this encompasses (full program

¹ The [GA-SANSA](#) hosting agreement provides the legal framework which tracks program performance, compliance and so on, and ensures alignment with the funding partner agreements held with [GA](#).



logic can be seen in

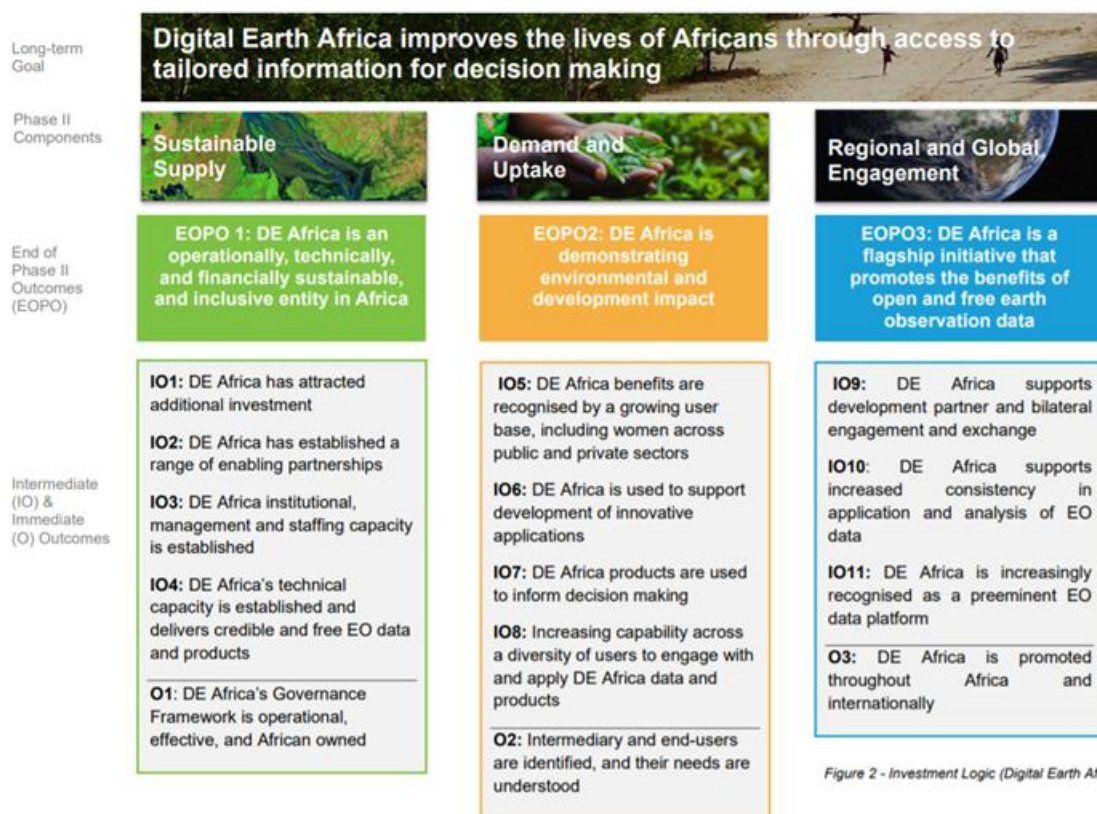


Figure 2 - Investment Logic (Digital Earth Africa Phase II)

Figure 1):

- **strengthening livelihoods** by seeking to ensure 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;
- contributing **to effective development** by supporting an 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 Sustainable Development Goals;
- promoting **digital transformation** through industry uptake and innovations, locating [DE Africa](#) as an entity that will help fuel ongoing evolution of the digital economy in Africa;
- enhancing **economic development and job creation** through access to data for commercial products and services development; and,
- will support new business development and employment opportunities.

[DE Africa](#) is the world's largest open data cube and provides insights into a range of issues, which include flooding, droughts, soils, coastal erosion, agriculture, forests and land use and land change, water availability and quality, and changes to human settlements. At the core of [DE Africa](#)'s work is the provision of openly accessible and freely available [EO](#) data to produce decision ready products. [DE Africa](#), with its continental-scale data infrastructure, provides analysis-ready data (ARD) to policy makers, scientists, the private sector, and civil society so that they will use the data to address social, environmental, and economic changes on the continent (more than 3,000 sandbox users, and more than 13,000 unique [DE Africa](#) map users). The [DE Africa](#) work program is implemented using a distributed operational model, which spreads out the ownership, use and application of the data, leveraging 6 Implementing Partners across Africa. The program provides interoperable



infrastructure that supports a data ecosystem (through the provision of core satellite and derived data products openly and for free) which enables partners to add value to the data and build their own applications to expand the reach and utility of the data.

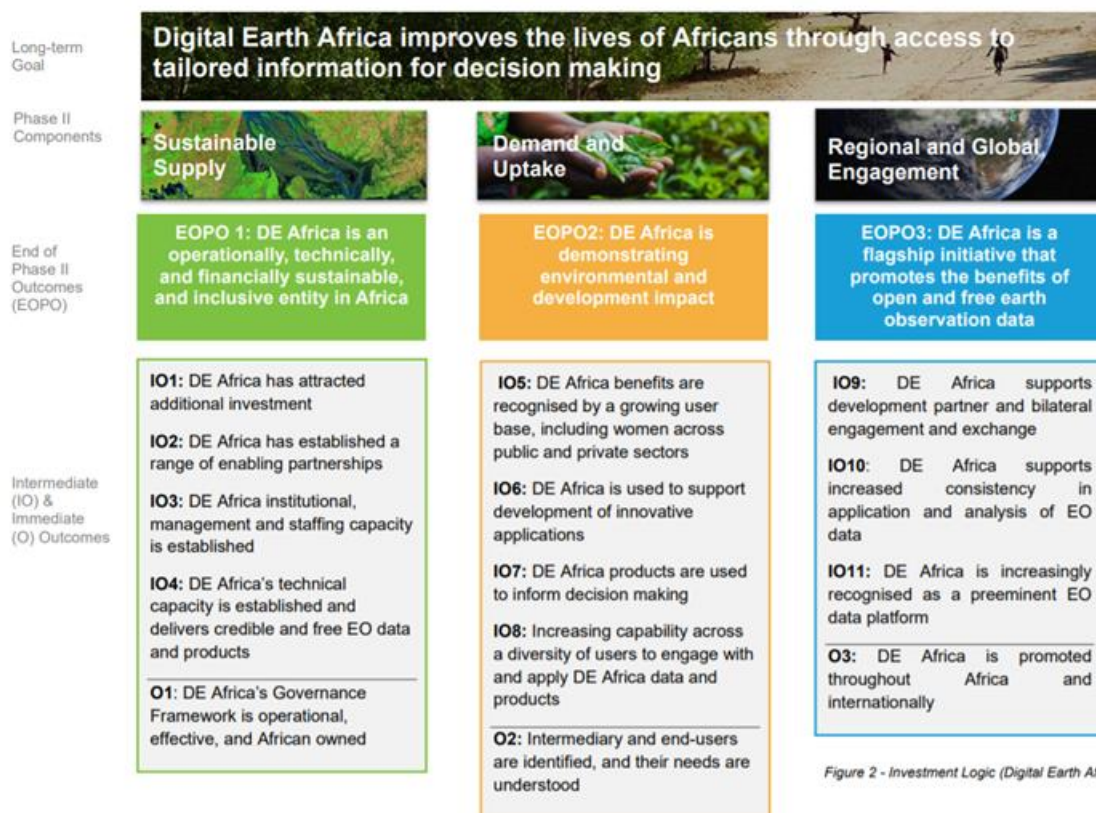


Figure 2 - Investment Logic (Digital Earth Africa Phase II)

Figure 1: DE Africa Phase II Investment Logic



Key Findings

The evaluation findings and the evidence to substantiate them are presented below. As per [DFAT](#) Evaluation Standards we present the evidence in response to the OECD — DAC evaluation criteria. However, due the interrelatedness of the different criteria with the objectives of [DE Africa](#) (e.g., a key objective of the program is to ensure both effectiveness of its operations, and the program's sustainability) and to avoid repetition we have split our discussion of findings as follows:

- We begin by assessing the extent to which [DE Africa](#) is responding to the development needs of Africa (i.e., its relevance);
- We then focus on each of the End of Program Outcomes (as per the ToRs), which address issues of effectiveness, efficiency, and sustainability;
- As per the ToRs we then examine the extent to which [DE Africa](#) has realised its objectives with regards to the cross-cutting issue of Diversity and Inclusion;
- We then assess the progress the program is making towards its long-term goal (impact); and,
- We then explore the extent of the program's value-add / benefit to Australia's public diplomacy interests in Africa.

In presenting our findings we draw on our assessment of how [DE Africa](#) has performed against relevant indicators from [DE Africa](#)'s own Monitoring, Evaluation and Learning (MEL) framework (the composite table recording progress against each indicator can be found in [Annex 1](#)).



DE Africa is Responding to the Development Needs of Africa

In examining the program's relevance, we assess the extent to which the objectives of [DE Africa](#) align with key components of 2 major continent-wide development strategies of direct relevance to Africa, namely the *Strategic Development Goals* (SDGs) and the Africa Union's *Agenda 2063*.

Key findings:

- Clear-cut alignment to both the [SDGs](#) and [AU](#) Agenda 2063, and with the strategic intent of regional bodies including the Economic Community of West African States (ECOWAS)
- Aligns with the strategic priorities of the Australian government, both with respect to its strategy in Africa, and with domestic policy priorities
- Consistent persuasive endorsement by all informants of the objectives of [DE Africa](#)

Conclusion:

- [DE Africa](#)'s vision is closely aligned with the strategic priorities of the continent, and is engaging with continent wide partners to help address Africa's development challenges
- Going forward the program will need to begin to demonstrate relevance at country / local level

[DE Africa](#)'s objectives align with continent-wide development objectives and the program is engaging on relevant regional sectoral issues (such as food security, climate change, disaster risk reduction and so on). In terms of the Sustainable Development Goals (SDGs) the key objectives of [DE Africa](#) (as spelt out in detail in the Investment Design, and illustrated in the program's Theory of Change) can be seen to align with the following [SDGs](#)²:

Sustainable Development Goals	DE Africa in alignment with...
#2 — End hunger, achieve food security and improved nutrition and promote sustainable agriculture	The commitment to enhance agricultural productivity and incomes of small-scale food producers (Target 2.3) and ensure sustainable food production systems / resilient agricultural practices (Target 2.4)
#5 — Achieve gender equality and empower all women and girls	The commitment to enhance the use of enabling technology to promote the economic empowerment of women (Target 5.b.) and contributing to the promotion of gender equality and empowerment of all women and girls (Target 5.c.)

² Case studies collected by DE Africa provide a good illustration of how the program has contributed to each of the targets mentioned in the table.



Sustainable Development Goals	DE Africa in alignment with...
#6 — Ensure availability and sustainable management of water and sanitation for all	All the 6 specific indicators (including access to safe and equitable water and sanitation resources, reducing pollution, addressing scarcity and water resource management issues, and restoring water-related ecosystems).
#9 — Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation	Target 9.5 (enhancing scientific research / upgrading technological capabilities / encouraging innovation in developing countries), Target 9.b (supporting domestic technology development in developing countries — and 9.c (increasing access to information and communications technology in least developed countries)
#11 — Make cities and human settlements inclusive, safe, resilient and sustainable	The commitment to enhance sustainable urbanization and sustainable human settlement (Target 11.3), strengthening national and regional development planning (Target 11.a), and strengthening resilience to climate change / disaster risk management (Target 11.b)
#12 — Ensure sustainable consumption and production patterns	Target 12.2 (sustainable management and efficient use of natural resources)
#13 — Take urgent action to combat climate change and its impacts	Target 13.1 (strengthening resilience and adaptive capacity to address climate related disasters), Target 13.3 (awareness raising / early warning on climate change mitigation and adaptation), and Target 13.b (promoting mechanisms for raising capacity for effective climate change related issues, focusing on women, youth, and local communities)
#14 — Conserve and sustainably use the oceans, seas, and marine resources for sustainable development	Target 14.2 (sustainably manage and protect marine and coastal ecosystems), Target 14.5 (conservation of coastal and marine areas) and Target 14.a (Increase scientific knowledge to enhance marine / coastal biodiversity within developing countries)
#15 — Protect, restore, and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss	Targets 15.1–15.5 (including supporting efforts to conserve / restore terrestrial and inland freshwater ecosystems, halt deforestation, combat desertification, conserve mountain ecosystems, reduce degradation of natural habitats)



Sustainable Development Goals	DE Africa in alignment with...
#17 — Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development	The commitment to enhance North-South, South-South and triangular regional and international cooperation on and access to science, technology, and innovation (Target 17.6), the dissemination and diffusion of environmentally sound technologies (Target 17.7), support national plans to implement measures to address SDGs (Target 17.9 & 17.16), and the provision of high-quality reliable data relevant in national contexts for developing countries (Target 17.18)

Table 2: Digital Earth Africa's objectives in alignment with their Sustainable Development Goals.

[DE Africa](#)'s strategic intent is aligned to specific goals of the African Union's Vision 2063, in particular the aspiration by the [AU](#) to increase the productivity and production of the agricultural sector (under Goal #1, aspiration 5); enhance oceanic / coastal observation (under Goal #1, aspiration 6); develop environmentally sustainable and climate resilient economies and communities (under Goal #1, aspiration 7); promote gender equality (under Goal #6, aspiration 17); and engage and empower youth (under Goal #6, aspiration 18). Economic analytical work³ has been conducted by [DE Africa](#) (and discussed in more detail below) to demonstrate the potential impact of [DE Africa](#) on 4 key sectors mentioned in the African Union's development goals (in addition to other work that highlights the potential contribution of the program to marine / coastal protection, disaster risk reduction, public health, and so on):

- **mining** — geological mining / infrastructure management (e.g., open pit mines) illegal mining / mine closing and rehabilitation;
- improvements in **land registration and urban planning** — information on land use and land cover;
- **agriculture** — water saving through smart irrigation using data from satellites to monitor crops and detect variabilities within or between fields; and,
- **forestry** — deforestation / carbon stock / regulation and protection of the timber market.

At the regional level, alignment can be seen with the aspirations of major regional bodies such as the 5 pillars of the Economic Community of West African States (ECOWAS) *Vision 2050* (especially the commitment under Pillar 4 to 'strengthen environmental sustainability and fight against climate change' and cross cutting commitments to gender, youth, and digitalisation and the role it can play in addressing development challenges within the region). These are also mirrored in the East Africa Community (EAC) Vision 2050 commitments under Pillar 3 (increased investment and enhanced agricultural productivity for food security and a transformation of the rural economy) and Pillar 4 (sustainable utilisation of natural resources, environment management and conservation with enhanced value addition).

³ Discussed in more detail below, but examples include for instance, '[Broader Perspectives on Digital Earth Africa](#)' (PDF 32.0MB) and '[DE Africa Cost to Coast](#)' (PDF 7.8MB).



As noted under EQ 7 below, all the stated objectives of [DE Africa](#) also closely align with the Australian Government's strategic interests on the African continent, and key domestic policy priorities in Australia (including climate change resilience and adaptation, disaster preparedness).

[DE Africa](#)'s vision for the continent was consistently endorsed by all informants. Survey respondents were in strong agreement with the expected end-of-program outcomes (Figure 2). Amongst survey respondents, 82 percent agreed or strongly agreed with the statement that [DE Africa](#) is operationally, technically, and financially sustainable, and inclusive entity in Africa (EOPO 1); 89 percent agreed or strongly agreed with the statement that [DE Africa](#) is demonstrating environmental and development impact (EOPO 2); and 89 percent agreed or strongly agreed with the statement that [DE Africa](#) is a world leading initiative that promotes the benefits of open and free Earth Observation data (EOPO 3). Implementing Partners also endorsed the view that [DE Africa](#)'s goals are relevant to and support the regional interventions that the [IPs](#) are currently engaged in. The [IP](#)'s own consultation processes involving stakeholders and end users further helps ensure the relevance of interventions supported by [DE Africa](#).

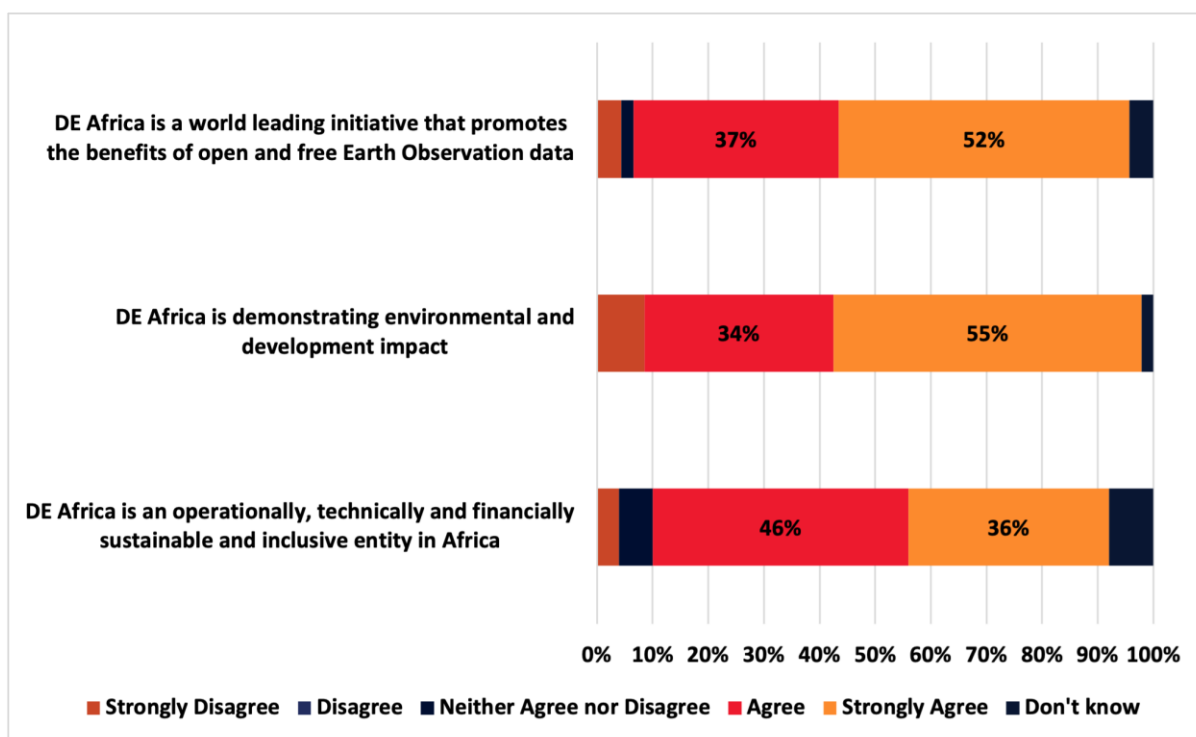


Figure 2: Extent to which there is agreement that DE Africa is meeting its expected outcomes (Source: review survey data)



EOPO 1

DE Africa is an operationally, technically, and financially sustainable, and inclusive entity in Africa

Key Findings:

- A key focus of the Establishment Phase has been to ensure that [DE Africa](#) has a solid foundation to increase the likelihood of sustainability;
- [DE Africa](#) has secured significant additional partner investment through in-kind contribution and additional investments which will enhance sustainability;
- [DE Africa](#) has developed a sustainability plan, which is regularly updated, and efforts are being taken to identify a mix of funders;
- In line with its objective of creating a distributed operational model [DE Africa](#) is leveraging its [IPs](#) effectively to expand the reach and utility of its services;
- [DE Africa](#)'s structures (both in terms of operations and governance) are in place, and the [PMO](#) is fully operational;
- Transition process was challenging, and tight time frame was exacerbated by COVID-19
- The transition from an Australian based team to a wholly African team is largely complete, and the [PMO](#) is now fully recruited;
- Platform is now hosted and operated within Africa;
- [DE Africa](#) is providing value for money, and in this regard has established robust systems and processes to ensure the integrity of its financial management, procurement, and other operational management issues, demonstrates a strong focus on results, and can be seen to be both highly accountable and transparent;
- New governance structure is in place, but challenges remain with the governance structure of the program, both in terms of its affiliation to the program's host and the extent to which the Governing Board has appropriate levels of fiduciary responsibility to effectively oversee program performance and compliance;
- [DE Africa](#) continues to promote and strengthen its African ownership.

Conclusion:

- To enhance sustainability DE Africa will need to continue to seek opportunities to refine and promote its value proposition, especially its 'catalytic value' to its partners, and the manner in which partners are leveraging the data ecosystem to deepen the program's reach and benefit to the continent;
- In terms of governance, the structure is efficient in terms of holding the program to account with respect to DE Africa's vision, mission and values, and the technical advice being given to the program, but there is also a recognition that the programs governance structure needs to be reconceptualised primarily as it has as it has no fiduciary authority to effectively oversee program performance and compliance.



With regards to EoPO1 we found that [DE Africa](#) has achieved nearly all its expected Intermediate IOs as we discuss below.

DE Africa has attracted additional investment (IO 1)

Attracted additional investment (both from without Africa and within, including from African investors and / or governments) during Phase II has strengthened the program's sustainability, as has the funding secured for the next phase of the program. At the time of writing a new agreement was signed between [GA](#) and Helmsley for Phase III of USD\$6.6 million. Whilst core funding was secured at the start of Phase II, the program made a concerted effort to ensure that investments in the program would increase during the Establishment Phase, and that additional funding would be secured for at least a further 3 years beyond the Establishment Phase. The program has been remarkably successful on both counts.

In terms of increasing its funding during the Establishment Phase, the program raised additional resources, in particular in terms of in-kind support (both in terms of contribution and other types of support). All in-kind contributions represent savings against key areas of program delivery — see details below.

- [SANS](#) — committed to an in-kind contribution to cover office hosting costs for [DE Africa](#) Phase II 2022–2023 — this includes Human Resources, financial management / administration, legal advice and compliance, procurement, communication, and marketing support;
- **Australian Centre for International Agricultural Research (ACIAR)** — provided \$500,000 to [GA](#) for the [Information for Agriculture, Food and Water Security \(IAFWS\)](#) project, to understand the needs, opportunities, and gaps for using [EO](#)-based services to increase agricultural productivity and sustainability, including through improved water use. The project aims to support uptake amongst national and sub-national policy and program makers; and deliver information to farmers and farm extension officers to empower them to take proportionate and timely management actions and intervention, especially with regards to water use. The project is overseen by [GA](#) and implemented by Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA) and the [DE Africa](#)'s African Leadership team;
- **Amazon Web Services (AWS)** — who store and process data. AWS is the leading cloud-based computing, and working with AWS improves [DE Africa](#)'s core infrastructure that enables their scope to reach the entire African continent. AWS provides storage for more than 3.5 Petabytes of satellite data. AWS have agreed to host 4 Petabytes of satellite data cost free through the [Amazon Sustainability Data Initiative \(ASDI\)](#). In 2021, AWS provided significant additional in-kind contributions by resourcing production and promotion of the recent AWS Climate Next documentary, featuring [DE Africa](#), and other blogs / communications material. Further opportunities will be explored during 2023;
- [Esri](#) — by ensuring compatibility with Esri's ArcGIS Geoportal the program ensures user-oriented utility and strengthened interoperability of [DE Africa](#)'s data and maximizes potential application of [DE Africa](#) products and services across the African continent, allowing a wider range of users to work with [DE Africa](#) data, using free-on-line tools;
- Through the [Enabling Crop Analytics at Scale \(ECAAS\)](#) initiative, Tetra Tech worked with [DE Africa](#) partners FrontierSI and [RCMRD](#) for the development of an open source framework for crop type mapping and demonstration of an end-to-end workflow in



Zambia using [DE Africa](#) platform. This work successfully delivered end 2022 in partnership — see how they created an [open-source framework for Crop-Type mapping in Africa](#);

- Further contribution was received from **UN Food and Agriculture Organisation** (UN [FAO](#)) to FrontierSI for Apr 2022–Feb 2023, to migrate [FAO](#) developed land cover mapping algorithm to [DE Africa](#).

[DE Africa](#) developed a Sustainment Strategy (2021, which was subsequently updated in 2022) with the aim of the program operating ‘as an independent organisation with a range of self-generated investors’ in the next 5 plus years. Importantly the strategy (and subsequent efforts by the program) recognise the need for multiple different funding sources and types of support. A potential mix of funders identified in the initial sustainment plan included more traditional funding sources (such as ODA and Philanthropic Organisations), partner country governments from within Africa, partner organisations (such as the types of support already provided by a number of different program partners) and commercial partners (such as development banks and other types of investors).

To date the program had success with some funding sources (e.g., ODA, Philanthropy, and partner organisation) and recognises that in the next phase more will need to be done to explore funding options with partner country governments and the private sector (and also the viability of whether or not the program is best served by remaining with its current host or whether it should become a fully-fledged independent / not-for profit entity). There is also a recognition that an ongoing challenge with regards to sustainability is the dichotomy between the program’s vision to provide a digital public good and the extent to which the program can realistically deliver costed services. Part of addressing this challenge may be for [DE Africa](#) to think more about its ‘catalytic value’ as part of refining its value proposition, to ensure a more nuanced understanding of what the program enables its partners to do, and how partners are leveraging the data ecosystem to deepen its reach and benefit to the continent.

DE Africa has established a range of enabling partnerships (IO 2)

[DE Africa](#) works consistently with 6 Implementing Partners (IPs) who have a shared vision and commitment to [DE Africa](#). The 6 partners are:

- the African Regional Institute for Geospatial Information Science and Technology (AFRIGIST, Nigeria);
- Centre Régional AGRHYMET (Niger);
- Centre de Suivi Ecologique (CSE, Sénégal);
- Regional Centre for Mapping of Resources for Development (RCMRD, Kenya);
- South African National Space Agency (SANSA, South Africa); and,
- Observatoire du Sahara et du Sahel (OSS, Tunisia).

[IPs](#) are key to the success of the program given it implements activities through a ‘distributed operational model’, whereby the capacity of partners is leveraged and commitment and ownership to the initiative of established partners operating in different regions across the continent is achieved. By drawing on the experience and expertise of those already working in the different regions provides important cost savings for the program. In addition, the



likelihood of success is enhanced as partners understand how best to operate within the local context that the program is targeting.

[IPs](#) also play a wide range of other support functions to the program including providing domain expertise (such as demonstrating use and championing the value of the program), providing technical expertise, helping [DE Africa](#) build relationships at regional and national level, and by reaching a far broader range of stakeholders (including at both community level, and within governments) than is practicable for the program unit to achieve. Further, [IPs](#) provide opportunities for [DE Africa](#) to enhance its utility by broadening the range of applications that enhances the program scale. The platform is facilitating collaboration and between different partners and regions on issues of common interest. This is “reducing silos” and risk of competition between actors, and promotes shared understanding and coherence on policy and programming on issues of shared interest including coastal erosion, wetlands, and other environmental and food security related issues.

[DE Africa](#) also has a range of other types of partners including having signed Memorandum of Understandings with the United Nations Economic Commission for Africa (UNECA), the International Water Management Institute, the Rwanda Space Agency, and the University of Energy and Natural Resources (Ghana). In addition, and as noted above [DE Africa](#) has also established partnerships with a number of technical partners including [AWS](#), Esri, and others.

It is important to note that COVID-19 also constrained the establishment of relationships across the continent, and the program did well to initiate and retain partnerships over a difficult period. Since COVID-19 restrictions were lifted the [DE Africa](#) Leadership team has put in considerable effort to build in-person relationships across the continent to enhance understanding of the program, but also to signal that [DE Africa](#) is a continent-wide approach and to dispel criticisms that this is a South African initiative. Drawing on members of the [TAC](#) has also enhanced the development of relationships, and its members are regularly drawn upon to advocate the value of the program in forums. Ongoing work with the AU, and [UNECA](#) as members of the Governing Board, ensures that [DE Africa](#) retains its continent-wide mandate and remains closely aligned to key development strategies on the continent.

The next phase will provide an opportunity to test the extent to which the partnerships will effectively enable delivery of the mission set for [DE Africa](#). Most implementing partners except 2 national bodies, [CSE](#) and [SANSa](#), are well placed regional bodies which gives the links to the national levels, which will be important going forward, especially as these partners know their stakeholders and understand their role in leading on engagement and needs analysis. However, with some partners [DE Africa](#) is one of many partnerships and programs that they work with and is not the largest, and feedback from interviews suggest that some partnership performance is variable. This raises questions about the level of capacity and resources demanded from [DE Africa](#) to deliver what the majority and priority of the [IPs](#) work is not. Certain [IPs](#) found that the demands on reporting were relatively onerous for the size of the assistance provided. Further thought will need to be given on how to manage both the relationship with [IPs](#) and their performance including ongoing partnership engagement and protocols for replacing [IPs](#) if required.



DE Africa's institutional, management and staffing capacity is established (IO 3)

The full staffing complement has now been appointed, and as of January 2023 only 2 items under Workstream 3 of the [DE Africa](#) Transition Plan were behind schedule, all 4 other workstreams are complete. However, the transition process was challenging, exacerbated by COVID 19 and the need to ensure that the [PMO](#) had at least a year to stabilise whilst there was sufficient funding.

COVID-19 initially provided a challenge for establishing the necessary institutional and management arrangements in Africa, due to delays in availability of the African majority selection committee. In addition, the process to identify a suitable host within the continent took longer than expected, after the original host (as identified during Phase I) was deemed by a key African advisory group (comprised of founding Technical Advisory Committee members) not to be the right fit and the program had to readvertise and restart the procurement process. As a result [SANSA](#) was not secured as the Program Management Office host until mid-2021.

The pandemic also led to a pivot by the program to new ways of working, and not being able to engage in person as a team and with [IPs](#) and users. Nevertheless, the team, partners and users managed the challenges well and in fact the shift to remote on-line training possibly contributed to increasing reach with individual users more quickly than anticipated and promoted increased efforts to manage inclusion — bilingual online activities for example. It did however limit expansion in relation to in person engagement with organisations and institutions which is now resolved as international travel resumed.

Between signing of the [PMO](#) hosting agreement in mid-2021, and the transition to African Leadership in mid-2022, 3 milestone adjustments needed to be made to accommodate the difficulties initially encountered. These adjustments in part reflected the effort that was required to adopt and work within the host's policies and procedures, including the complexities in navigating South Africa's PFMA provisions. [SANSA](#) has gone to considerable lengths to review and revise its own policies to accommodate the unique features of [DE Africa](#) (e.g., employment policies had to be adapted to allow the program to recruit and place staff outside of South Africa and pay salaries that were not being paid in ZAR).

Following the transition to African Leadership in mid-2022, the newly recruited [PMO](#) staff experienced challenges in developing an understanding of the existing [DE Africa](#) frameworks and systems and how this integrated into [SANSA](#) frameworks and systems. There is evidence that there is now a much clearer understanding of how to ensure the program's systems and processes align with those of the host institution. It was certainly a sharp learning curve for all involved, and recognition must be made of how different organisations adapted their own approaches to create more effective and integrated processes. It is worth noting that Geoscience Australia has continued to provide significant on-going support for the full FY22 / 23 to support the transition and continues to work with [SANSA](#) and the [PMO](#) to ensure strategic, operational, financial and risk management frameworks are embedded into all aspects of the program for transparency, accountability and long-term sustainability.

Moreover, respondents acknowledge that the transition has brought the different parties much closer together, they feel they better understand each other, and there is growing acknowledgement that different organisations will have a different work culture. Respondents were also of the view that any challenge posed is now dealt with far more efficiently as everyone better understands what is needed, and how the challenge can be addressed



within existing systems and processes (e.g., how to deal with a deviation from an existing prescript within government regulations). Hosting of the program by [SANSA](#) is seen by the host to be of enormous value as it has allowed [SANSA](#) to pursue important components of its mandate, such as helping to promote the use of [EO](#) data by governments and advocating for the uptake of applications using geospatial data.

The establishment of the [PMO](#) will also further enhance the sustainability of the program. [PMO](#) team cohesion and mission ownership with the right delegated responsibilities is critical for the delivery of the enormous ambitions of [DE Africa](#) into the future. The current host of the program, [SANSA](#), provides in-kind support and allows the [PMO](#) to focus on operations, whilst the host provides important business as usual features including HR, logistics, procurement, and a physical home for the [PMO](#). [SANSA](#) is also important as it is currently the host of the Technical Platform for the program, and thus provides technical support to ongoing operations of the platform. [PMO](#) participation in international events and visiting countries and having locally led engagement at a senior level in Africa should also assist the sustainability of the program as senior officials get to learn about and begin to acknowledge the importance of the program.

We also assessed the extent to which [DE Africa](#)'s institutional arrangements are not only established but whether they demonstrate Value for Money (VfM). This assessment was made using [DFAT's VfM principles](#). Our overarching assessment (**Table 3**) is that under nearly all the criteria considered [DE Africa](#) is offering Value for Money. The program has established robust systems and processes to ensure the integrity of its financial management, procurement, and other operational management issues. The program also demonstrates a strong focus on results and can be seen to be both highly accountable and transparent. As already previously noted, optimisation of the governance structure is still being addressed by the program.

VfM Principle	Criteria	Assessment
Economy	Cost consciousness	<ul style="list-style-type: none"> Program is taking reasonable opportunities to leverage the use of resources in the most cost-effective way possible Using SANSA systems, guided by PFMA / National Treasury prescripts Clearly defined procurement processes Uses a distributed operational model which leverages the capacity of existing partners to implement initiatives
Economy	Encouraging competition	<ul style="list-style-type: none"> Program is taking reasonable opportunities to leverage the use of resources in the most cost-effective way possible Using SANSA systems, guided by PFMA / National Treasury prescripts Clearly defined procurement processes Uses a distributed operational model which leverages the capacity of existing partners to implement initiatives



VfM Principle	Criteria	Assessment
Efficiency	Evidence based decision making	<ul style="list-style-type: none"> • Examples of good practice (e.g., recent TAC review process), but not consistently yet as MEL system has not been fully transitioned to being under PMO control (work in progress, PMO now responsible for all reporting) • Major decisions taken by the program are taken once structures have been consulted and evidence assessed
Efficiency	Proportionality	<ul style="list-style-type: none"> • DE Africa's use of SANSAs systems now fully operational & better understood • Where deviations are required to existing prescripts within regulations the program is able to do this in a time efficient manner
Effectiveness	Performance and risk management	<ul style="list-style-type: none"> • Robust risk and compliance management system in place • HR applies SANSAs Performance Assessment Process • Program has mechanisms in place to routinely discuss and review risks
Effectiveness	Results Focus	<ul style="list-style-type: none"> • Program routinely reports against results / strong results orientation • Program continuously reviews performance, but not clear of the extent that MEL data informs decision making • The PMO is not yet fully overseeing all delivery
Effectiveness	Experimentation and Innovation	<ul style="list-style-type: none"> • Experimentation and innovation underpin all DE Africa's work
Accountability and Transparency	Accountability and Transparency	<ul style="list-style-type: none"> • Governance structure is in place, but additional work required to optimise the functioning of this structure • The parallel governance structures of the Executive Review Board and Governance Board are holding PMO to account, and the program is seen to be highly transparent in terms of budgeting and reporting

Table 3: Value for Money Assessment of DE Africa, Phase II (source: own assessment)



Africa's technical capacity is established and delivers credible and free EO data and products (IO 4).

In assessing IO 4 we first comment on the technical capacity of the platform, before commenting on the capacity and capability within the program. The platform is functioning well, and respondents noted that significantly at no time during the transition was the service disrupted. The program has exceeded deliverables planned in its *Technical Roadmap*. Key achievements include:

- 5 Analysis-Ready Data streams;
- 7 [DE Africa](#) continental services;
- 10 external datasets available through more than 100 open-source notebooks.

The platform is making noticeable progress towards reducing barriers to uptake and usage by providing free and open data, in analysis ready form, and associated decision ready products. Products delivered by the program are regarded as cutting edge, informed by the program's strong ongoing links to the global [EO](#) community (including through USGS, NASA, [GEO](#), [GA](#), and so on). Help desk, live sessions, and capacity building initiatives continue to be highly appreciated by respondents, and the tools introduced by the program are well regarded.

There are now multiple entry points for users with different technical / maturity levels — including the [DE Africa](#) maps, ESRI geoportal, and other products. Each has strengths and areas for improvement, and continuing to uplift these to enhance user experience will be an important component for Phase III. Phase II has focused on continent wide infrastructure establishment, and moving into the next phase the program will need to continue to bridge the gap completely for non-technical end-users, noting there are many ways in which this could be achieved including enhancing in-country engagement (which includes a better connection to the end user, through more user-friendly products). This may be done directly by [DE Africa](#) (e.g., through ESRI geoportal) or through third parties.

[DE Africa](#) has been successful to date to outsource and secure sufficient technical capacity and capability to maintain effective operations of the platform. The program will need to continue to rely on this approach, noting, for instance, that securing appropriately skilled cloud engineering technical capacity will continue to be a challenge globally, due to the high demand for these skill sets. However, there is also a sense that there also needs to be adequate familiarity and understanding of the technical components by [DE Africa](#) Leadership is required to effectively engage in technical matters, and to be able to effectively monitor technical performance of [IPs](#) and other partners. This cannot be outsourced.

Immediate Outcome 1 — DE Africa's Governance Framework is operational, effective, and African owned

Due to the current operating environment, [DE Africa](#) is currently governed through 2 parallel structures:

- the [DE Africa](#) Governance Framework, including the Governing Board and Technical Advisory Committee;
- the fiduciary governance established through:
 - the funding partner agreements between [DFAT](#), Helmsley and ACIAR and [GA](#), and



- the [GA-SANSA](#) hosting agreement, governed by an Executive Review Board (ERB) and Executive Steering Committee (ESC).

Whilst the governance structure outlined in the [DE Africa](#) Governance Framework is optimal (i.e., having both a governance board and an advisory council), the Governing Board does not have fiduciary responsibility. Fiduciary oversight and compliance are managed through the parallel contractual governance structures set in the [GA-SANSA](#) hosting agreement, overseen by an Executive Review Board (comprising [GA](#) and [SANSA](#) senior responsible officers). The [ERB](#), however, operates outside the official DE Africa Governance Framework. This means the efficiency of [DE Africa](#) program governance has yet to be fully realised.

The program acknowledges that it is work in progress, and that it has yet to fully review the working of the structure as the program was deliberately focussed on the establishment of the necessary procedures and processes to ensure an efficient transition from [GA](#) to the [PMO](#).

In terms of the 2 key components of the [DE Africa](#) Governance Framework, the Technical Advisory Committee ([TAC](#)) has been functioning since late 2019, while the Governing Board was formed in mid-2021. The [TAC](#) meets more often and has therefore been providing technical advice for twice as long, has met 14 times (compared to 5 meetings by the Board) and can generally be considered to be more mature in its operations than the Board. The [TAC](#) and the Board have been engaged with providing different types of advice as relevant to the TORs of each group. The [TAC](#) is more operational and focusses on short term strategy, while the Board is focused on program oversight and long-term strategy.

In terms of diversity of its members, and operations:

- 74 per cent of Governing Board members are from Africa;
- 43 per cent are female;
- 4 / 5 planned meetings have happened — #5 no quorum, #6 was postponed until January 2023 when it did happen;
- [TAC](#) has representatives from 13 African countries;
- 32 per cent of [TAC](#) is female;
- 12 / 13 [TAC](#) meetings held with quorum — average attendance = 71 per cent of members (including meeting where quorum not achieved).

In order to assess the functioning of the governance structure we applied a 'good governance' framework⁴, which assesses the structure in terms of 7 broad criteria of good governance, namely:

Clarity of vision and mission — Only when a clear vision and mission are in place can a rationale for governance be formulated.

Rationale — Clarity of the process by which priorities for ReCAP are set and the process by which the funding of priorities is subsequently allocated. Good governance is characterised by a clear outline of these processes and a shared understanding of these processes by all stakeholders.

Representativeness — Representation of different groups in the governance boards of the programme.

⁴ Adapted from RAND (2016), *Review of 6 DFID-funded Growth Research Programmes*: Main Report, pp. 14–17



Quality assurance — Presence of quality assurance (QA).

Responsibility and accountability — Clarity of roles and responsibilities.

Transparency and learning — Communication of, and reporting on, the processes of funding and conducting research, and on the outcomes of funding decisions. Furthermore, transparency includes the presence of mechanisms to track progress and learn from problems identified.

Appropriateness and effectiveness — Appropriateness and effectiveness of the governance processes in place. Processes of good governance should not overburden staff and researchers or lead to undue delays (RAND, p. 15).

As we note in our assessment below there are 2 primary challenges faced by the board. The first challenge is clear articulation of the roles and responsibilities of the Governing Board compared with the Executive Review Board. The Governing Board is critical for setting strategic direction and ensuring alignment with African priorities, however it is not a legal entity and has no fiduciary responsibilities. For instance while the Board has a say over the effective and efficient performance of the [PMO](#), they are not legally accountable and therefore have limited engagement with the process. Performance management of the [PMO](#) is instead the legal responsibility of [SANSA](#), with oversight from the Executive Review Board.

The second challenge is the way the board is constituted, particularly because the board has struggled to get senior government officials who are members to attend and / or actively participate in its deliberations. However, in terms of other key governance functions, the board is efficient in terms of holding the program to account with respect to [DE Africa's](#) vision, mission and values, but there is also a recognition that program governance needs improvement primarily as it has no fiduciary authority to effectively oversee program performance and compliance.

Good Governance Criteria	Summary Assessment
Clarity of vision and mission	<ul style="list-style-type: none"> • DE Africa's objective and purpose is well defined; • Clear logic as to why different elements of governance structure are necessary.
Rationale	<ul style="list-style-type: none"> • The program's governance structure is well designed, and there is a clear rationale and division of labour for the different components; • Processes are well defined, but stakeholders unclear about governance processes.
Representativeness	<ul style="list-style-type: none"> • A key strength of the governance structure is that it is representative and demonstrates a wide diversity; • Whilst appropriately representative, respondents agree that some members are senior government officials and do not have the time needed to dedicate appropriate levels of attention to the program; • Respondents also noted the risk of having elected politicians on the Governing Board, bearing in mind that



Good Governance Criteria	Summary Assessment
	regime changes or cabinet reshuffles could have an impact on certain members participation.
Quality Assurance	<ul style="list-style-type: none"> • TAC has strong emphasis on quality assurance, as does the Executive Steering Committee and the ERB.
Responsibility and accountability	<ul style="list-style-type: none"> • Stakeholders are largely clear about roles and responsibilities, albeit there is some dissatisfaction as to the extent to which all Board members are carrying out the responsibilities expected of them.
Transparency and learning	<ul style="list-style-type: none"> • Transparency is a strength of the governance structure; • Respondents welcome the clear communication of, and reporting on, funding decisions, and the opportunity afforded to them to participate and shape decision making; • Confusion regarding the roles and responsibilities of the Governing Board (who do not have fiduciary responsibility) and ERB (who do); • Learning has been a key feature of the different components; respondents appreciated the quality and depth of reports received).
Appropriateness and effectiveness	<ul style="list-style-type: none"> • Respondents questioned the extent to which the governance structure as a whole is operating effectively; • Suggestions (discussed below) have nevertheless been made with regards to improving efficacy, especially with respect to composition and operations of the Governance Board.

Table 4: Assessment of the DE Africa Governance Structure (Source: own analysis)

The [DE Africa](#) Governance Framework provides a clear outline of the program’s governance structure, identifies the key components, and provides a concise description of each body. This supports the view that there is a clear governance structure, and an applicable rationale and division of labour for the different components within the structure.

However, good governance not only requires a clear outline of how the different bodies will operate and interact, but it is also characterised by the extent to which the different components interact and operate. Feedback from respondents suggests that the efficacy of the governance structure is not optimal, and there is a need for [DE Africa](#) to do a comprehensive review to reconceptualise the governance structure, and to also strengthen interactions between the Board and the [TAC](#). Such a review should include the following aspects:

- Clarity about the scope and composition of the Governing Board compared with the Executive Review Board (especially with regards to both strategic decision — making / influence, and fiduciary responsibilities);
- Guidelines about the roles and responsibilities of the board;



- Review Board Skills and Competencies Matrix;
- review and implement the [DE Africa](#) Governance Monitoring framework.

A further important feature of [DE Africa](#)'s governance structure is the extent to which the program is perceived by its partners as being managed as, and represents, a whole of Africa initiative, that stakeholders are confident in the quality of its operations, and stakeholders can perceive real benefit in what [DE Africa](#) is contributing to. Whilst shifting perceptions and building trust is often a lengthy process as we noted above, the program is being effective in promoting its African ownership. With a local [PMO](#) now established and operating the program, a governance structure that is primarily based in Africa, and drawing on the expertise of African-based [IPs](#), the program is clearly Africa based. Whilst technical support from [GA](#) is likely to continue in the foreseeable future (notwithstanding [GA](#)'s on-going fiduciary responsibility for Phase III), a number of African based technical experts are providing the necessary technical support to the program. An expanding number of governments, academics, and others are becoming more aware of the value of the platform and are using it in multiple different ways to create meaningful impact.



EOPO 2

DE Africa is demonstrating environmental and development impact

Key Findings:

- Growing number of case studies demonstrate the environmental and development impact being achieved by the program;
- An increasing number of African governments, academics, and others are becoming more aware of the value of the platform and are using it in multiple different ways to create meaningful impact;
- [DE Africa](#)'s platform is delivering high quality products, is well regarded, and there is growing recognition that it is the preeminent [EO](#) data platform on the continent;
- [DE Africa](#) has been the enabler in reducing barriers to entry by providing free access to [EO](#) data, although for some users connectivity and coding / technical knowledge and time remain a barrier to access;
- [DE Africa](#) is being used to support the development of innovative applications having developed more than 100 open-source notebooks to date;
- Evidence indicates that data is being used to inform decision making, but this is still primarily at individual rather than institutional level, although there are a growing number of institutions engaging with the platform;
- [DE Africa](#) has put considerable effort into capacity building initiatives and can be seen to be increasing capability to engage with and apply [DE Africa](#) data and products.

Conclusion:

- Largely individuals not institutions are applying the products on the whole and the next phase will need to show more wider uptake and application in related sectoral areas;
- In order to expand the scope of users, the next phase will need to continue to work on bridging the gap for non-technical users to enhance access and application of a wider and more diverse user group.

Appropriately at this stage there is evidence of early adoption and a growing number of examples of potential impact. All the IOs under EOPO have been effectively met, in particular the growing number, and diversity of users.

DE Africa's benefits are recognised by a growing user base, including women across public and private sectors (IO 5)

Data collected by the program notes that there are now 24 Power users (users using more advanced features of the platform) who represent 15 different African countries, of whom 8 are French speaking. More broadly the platform provides a diverse set of continental wide



data services in different sectors, including Water Observations from Space, Cropland extent Map, Fractional Cover⁵, and analysis of Coastlines⁶.

The user numbers are increasing although the feeling is this is more within those with coding and technical capacity rather than by groups where data will apply, and that use is still mainly driven by a commitment shown at individual level or specific units, rather than embedded within the agency or entity which presents the program with opportunity in the next phase. Nevertheless, there are examples of institutions engaging with the platform, including:

- Ghana Statistical Service;
- National Bureau of Statistics (NBS), Tanzania;
- Ghana's Environmental Protection Agency;
- Ghana's Water Resources Commission;
- National institute of statistics Rwanda;
- Ministry of Food and Agriculture, Ghana;
- The State University of Zanzibar;
- Data provided by [DE Africa](#) is helping to track the Kenyan Government's Integrated Coastal Zone Management Action Plan for Kenya 2018–2023.

There is also strong and positive interest among graduates and new professionals (women and men) in GIS and [EO](#) data, and some exposure and experience of allied professional groups (in environment for example). Interviews suggest that to date there seems to be a limited number of users in a more senior role, who may be well placed to influence progress and increase uptake at organisational / institutional level that to date has not yet really taken hold.

Engagement with the private sector beyond the current technical / service agreements, has not yet been strong, although there have been examples of this beginning to shift (examples include the support provided to address illegal mining, and engagement by agribusinesses with the platform). This is not unexpected given the program's vision, as [DE Africa](#) is largely focussed on public users. It is envisaged that the relationship with the private sector will need to be explored further during the next phase, ideally as an action for early in Phase III. This could include developing a forward business model to support sustainment, with the option to include industry engagement, or a more contained option would be development of an industry engagement strategy. The potential value of greater engagement and working more closely with the private sector, will be something that needs to be better understood during the next phase while recognising this could have implications for [DE Africa](#)'s commitment to provide credible and free data as a public good. Nevertheless, the example of [DE Africa](#)'s involvement in the [Africa EO Challenge](#), provides the program with an interesting opportunity to engage with small and medium enterprises (SMEs) in a number of different ways. The program has been the enabler in reducing cost barriers to entry for SMEs into this space by providing free access to data. SMEs have begun to utilise this data in innovative ways to

⁵ Provides estimates of the proportions of green vegetation, non-green vegetation for a range of environmental and agricultural applications, including soil erosion monitoring, land surface process modelling, land management practices (e.g., crop rotation, stubble management, rangeland management), vegetation studies, fuel load estimation, ecosystem modelling, land cover mapping.

⁶ Continental dataset that includes annual shorelines and rates of coastal change along the entire African coastline.



share analysis through applications and are creating opportunities for wider adoption of the findings by a wide range of commercial enterprises including small holder farmers.

As noted earlier the platform is making noticeable progress towards reducing barriers to uptake and usage by providing free and open data, in analysis ready form, and associated decision ready products. Nevertheless, some barriers still remain for certain types of users, and which the next phase will need to determine what is feasible for the program to address. From the conversations that explored equity of access (which is expanded on in the section on D&I) it is clear that obstacles of cost, connectivity and coding / technical knowledge and time (engaging in the platform in own time rather than paid work time) are obstacles that users experience and adversely contribute to their level of engagement and ability to apply the full extent of what the platform offers. This finding presents the program with an opportunity in the next phase to continue to work on bridging the gap for non-technical end-users to enhance the value of the platform at both individual and institutional levels.

The needs of intermediary and end-users are well understood through the effective relationship with [IPs](#) (who are well placed to engage directly with individual end users). There are mechanisms in place through the live online sessions, help desk and informal relationships between [DE Africa](#) and users that helps the program to better understand needs and be responsive. Although the numbers of users are increasing, the opportunity will now present itself in the next phase to promote [DE Africa](#) to users outside the immediate [EO](#) data / GIS expertise. In order to expand the scope of users, adjustments are needed that address certain barriers that currently limit ease of access and application of a wider and more diverse user group.

agriBORA:

[agriBORA](#) is a platform that provides smallholders in East Africa with vital information such as weather forecasts, and enhances access to farm inputs, financial services, and markets.

agriBORA was the winner of the Digital Earth Industry Challenge and was invited to take part in a 3-month incubator, using the full archive of analysis ready satellite data and services available through the [DE Africa](#) platform.

agriBORA used the opportunity to advance their SMARTFARMER project which integrates satellite imagery with weather data, soil data and farm management information to provide farmers with practical advice and recommendations.

DE Africa is used to support development of innovative applications (IO 6)

To date the program has developed more than 100 open-source notebooks, that enable innovative applications to demonstrate real world examples of how [EO](#) data can be applied to issues such as:

- Forecasting vegetation condition;
- Monitoring changes in forest extent;
- Temperature trends analysis;
- Water turbidity estimate;
- Mountain Greenness Cover Index;



- Generating satellite imagery animation;
- Mapping water extent;
- Waterbodies identification and inspection.

In addition, [DE Africa](#)'s continental services provide robust examples of [EO](#) data being analysed and applied, examples include:

- *Water Observations from Space* (WOfS) provides historical and current information on water presence, absence and where inundation has been observed by satellite. With data back to 1984, WOfS can be used to understand flood risk and climate impact, and to inform policy decisions around water resource management
- [DE Africa Coastlines](#) service maps the typical location of the African coastline through time, helping to understand the past changes to the coastline and identify areas of concern for the future;
- The *Cropland Extent Map* shows an indication of the presence or absence of crops for a 10 metre pixel resolution for 2019, based on Sentinel-2 data;
- *GeoMAD* condenses satellite images from each year or 6-month period into a high-quality representative view of the ground cover during the time period. Available at 10-meter resolution from 2017 (annually and semi-annually) and 30-meter resolution from 1984 (annually).

DE Africa products used to inform decision making (IO 7)

Monitoring data collected by the program reports that there is an increased capacity to use [DE Africa](#) platform and services:

- 250 completed training
- 1255 participated in Training on [DE Africa](#)'s platform and services — 19 different African countries represented
- 20% of participants were women
- More than 100 weekly live sessions held, in English and French
- Help desk service established

Evidence from the survey indicates that data is being used to inform decision making, but this is still primarily at individual rather than institutional level. As noted above there are a small number of examples of application by Departments and organisations in using [EO](#) data for monitoring and drawing on evidence for publications. However, it is too early to see uptake of data to inform policy decisions across the continent. There is potential for this but points to the need to get institutional uptake, and the need for more applicable tools (to manage quality of resolution) and an offline function for ease of access particularly for field work and in locations where there is poor and / or costly connection.

To enhance reach of [DE Africa](#) in the next phase it will be important to continue to translate technical aspects into more understandable language. Further, there is need in the next phase for institutional collaborations on common sectoral issues especially at the national level to allow for better decision making.



Increasing capability to engage with and apply DE Africa data and products (IO 8).

[DE Africa](#) has put considerable effort into capacity building initiatives. Over 1000 users have participated in training on [DE Africa](#)'s platform and services, representing 19 different African countries. Participation in a wide range of online events has helped participants share experiences, on technical aspects (such as notebooks). This has helped create an effective Community of Practice (CoP) amongst users, especially those with coding knowledge and skills. Local level CoPs have emerged — for instance, a local [CoP](#) is being formed in Ghana across different government entities and coordinated through the National Statistical Services.

The needs of intermediary and end-users are well understood through the effective relationship with [IPs](#) (who are well placed to engage directly with individual end users). There are mechanisms in place through the live online sessions, help desk and informal relationships between [DE Africa](#) and users that helps the program to better understand needs and be responsive. Although the numbers of users are increasing, the opportunity will now present itself in the next phase to promote [DE Africa](#) to users outside the immediate [EO](#) data / GIS expertise. Options identified by respondents to enhance uptake are offline accessibility to manage poor and costly connectivity, and development of “user friendly application” for non-technical users. In the next phase there will be an opportunity to broaden these CoPs to increase scale and scope of uptake. The development of applications such as the one initiated by Bigdata Ghana offers the potential for real time accessibility and larger number of users.



EOPO 3

DE Africa is a flagship initiative that promotes the benefits of open and free Earth observation data

Key Findings:

- Users and partners speak highly of the unique selling points of the program
- [DE Africa](#)'s objectives align with continent-wide strategies to address development needs
- [DE Africa](#) is the only platform providing real-time data and products for the whole continent;
- [DE Africa](#) adopts and promotes international data standards, and actively participates in global forums to better integrate and share [EO](#) data
- [DE Africa](#) is engaging effectively with multiple multilaterals and regional partners to implement initiatives
- [DE Africa](#) is increasing its profile with its innovative use of cloud technologies and analytic workflows which allow its users free access to cutting edge technology
- offering free, open-source data and products for the entire African continent
- [DE Africa](#) is world leading and is a rapidly evolving technology and application that through use of cutting-edge cloud technologies and big data analytic workflows has helped African users to leapfrog the need to engage with older more out of data technologies

Conclusion:

- Users have a very positive view of the platform, and there is a nuanced understanding that program is promoting the benefits of open and free earth observation data.
- The next phase will enable more users to develop applications drawing on open and free [EO](#) data, and thereby create opportunities to increase awareness and to demonstrate more explicitly the tangible benefits of the program.

There is strong evidence that under this EOPO [DE Africa](#) is engaging effectively and helping to shape [EO](#) policy and direction in Africa.



DE Africa supports development partner engagement and exchange (IO 9)

[DE Africa](#) is the only Earth observation platform offering free, open-source data and products for the entire African continent and is now the world's largest Open Data Cube. There is a growing realisation on the continent that [DE Africa](#)'s cutting-edge cloud technologies and big data analytic workflows means [DE Africa](#) has allowed African users to leapfrog the need to engage with older more out of data technologies.

[DE Africa](#) is actively participating in Group on Earth Observations' efforts to better integrate observing systems and share data by connecting existing infrastructures using common standards, and is engaging effectively and helping shape [EO](#) policy and direction in Africa through its active participation in global initiatives (such as events that fall under the auspices of [GEO](#))⁷, and through continent — wide and inter-regional collaborations and fora to enhance the interoperability of its platform with other initiatives. [DE Africa](#) also commenced collaborations with the Brazilian Open Data Cube team to enable R programming language in the sandbox. This free programming language assists in making the platform more accessible to wider groups of users and was enhanced at the end of 2002 with an R image deployed in development.

[DE Africa](#) has used its regional convening power including by leading the working group which was established to create a communications network between [EO](#) implementing partners in Africa that has supported efforts to enhance the Global Partnership for [SDGs](#) (through targeted interventions drawing on [EO](#) data provided by its platform), and helped organise the 2021 Open Data Cube community conference. Within [GEO DE Africa](#) has also joined the Diversity and Inclusion (D&I) Working Group to support and influence D&I policy within the [EO](#) community.

[DE Africa](#) has actively participated in a wide range of major events, including:

- the United Nations World Data Forum 2021,
- United Nations Climate Change Conference (Conference of the Parties — COP 27),
- [GEO](#) Virtual Symposium 2022,
- AfriGEO Symposium to facilitate knowledge about and interest in its products and services for alignments with development initiatives,
- GEO Week (Ghana) — [GEO](#)'s main annual event
- [AWS](#) Reinvent
- Sat Summit
- ESA's Living Planet Symposium
- United States Geological Survey's Pecora Meeting
- National Adaptation Planning Expo, Botswana.

Users and partners speak highly of the unique selling points of the program, namely (as already noted in earlier sections of the report) that the program's objectives align with

⁷ The intergovernmental Group on Earth Observations ([GEO](#)) is leading a worldwide effort to build a Global Earth Observation System of Systems (GEOSS) to better integrate observing systems and share data by connecting existing infrastructures using common standards. Key role players within DE Africa, such as Geosciences Australia and [SANSa](#), have been integral to the success of [GEO](#) since the notion of coordinated earth observation was highlighted at the [Word Summit on Sustainable Development](#) held in South Africa in 2002.



continent-wide strategies to address development needs in Africa; that [DE Africa](#) is the only platform providing real-time data and products for the whole continent; and its innovative cloud technologies and analytic workflows allow its users free access to cutting edge technology.

The program works with more than 8 pan-Africa partners and multilaterals operating across the continent including AfriGEO, Esri, United Nations Economic Commission for Africa (UNECA), United Nations Food and Agriculture Organisation (UN [FAO](#)), United Nations Development Program (UNDP), and the World Food Program (WFP).

DE Africa supports increased consistency in application and analysis of EO data (IO 10)

By adopting and promoting international data standards, by actively participating in multiple international and continent-wide [EO](#) forums. In addition, [DE Africa](#) is actively participating in [GEO](#) efforts to better integrate observing systems and share data by connecting existing infrastructures using common standards.

The ongoing relationship with [AWS](#) provides a secure, stable, and high performing cloud-based platform for users across Africa, which supports continuously updated and consistent analysis ready pipelines for users to access and analyse data. As already noted, [DE Africa](#) now hosts over 100 notebooks which provide real world examples of how [EO](#) data can be applied and analysed consistently.

DE Africa is increasingly recognised as a preeminent EO data platform (IO 11).

[DE Africa](#) is enhancing awareness and increasing its profile as a leading [EO](#) entity within the region and internationally. This can not only be seen in the increasing number of conferences it attends, publications it produces but also in the number of sandbox registrations (more than 3,000 in 2022, increase of 80 percent from the previous year), and the number of unique map users (now more than 13,000 in 2022, increase of 40 percent from the previous year).

- [DE Africa](#) also has a growing social media presence:
 - More than 70,000 visitors to website;
 - More than 5,800 followers on Twitter;
 - More than 2,800 on LinkedIn.

In addition, [DE Africa](#) won 2 international awards for Capacity Building in 2022; and 2 international awards for Communications and Marketing in 2021.

Overall, there is a very positive view of the platform, and there is a nuanced understanding that with the program now established in Africa, and managed and owned by Africa. As the program in the next phase enables more users to develop applications drawing on open and free [EO](#) data, it will create opportunities to increase awareness and to demonstrate more explicitly the tangible benefits of the program.



Diversity and Inclusion

Key Findings:

- D&I strategy is comprehensive and ambitious and based on well researched evidence;
- Strong commitment to deliver the D&I Strategy, which has contributed to positive changes in regard to awareness, understanding on D&I, and some initial application of inclusive strategies that have enhanced participation particularly of women and younger people from a wide reach across the African continent;
- [IPs](#) are committed and have demonstrated interest to continue to progress inclusive practice although there is varying degrees of capacity and experience to deliver.

Conclusion:

- Now that the transition to an African led program has taken place, there is need to articulate the responsibilities and accountability for managing D&I within the program and to ensure that a sufficient level of resources and capacity is made available for safe and effective delivery;
- A more modest and targeted plan for D&I that is appropriately resourced and articulates clear lines of management responsibility between the [PMO](#) and [IPs](#), may yield more effective results in the short to medium term.

In answering EQ3 in this section of the report (and in line with the objectives of the evaluation) we pay particular attention to the extent to which [DE Africa](#) has been effective in the delivery of its Diversity and Inclusion (D&I) strategy.

Diversity and Inclusion Strategy

[DE Africa](#) has from the outset of Phase II articulated a strong commitment to diversity and inclusion. A Diversity and Inclusion Strategy was approved relatively early on in this phase (approved by the [TAC](#) in July 2020 and Board approval December 2021). The Strategy is well grounded in evidence that provides a strong rationale for [DE Africa](#)'s approach of both mainstreaming inclusion across all areas and undertaking targeted investment towards achieving greater diversity and equity of access, participation, and benefits from the program. The concept of diversity applied in the Strategy is broad. The focus is [on] *geographic and language diversity across the African continent, gender equality, youth, and disability inclusion*⁸.

The early commitment and strong leadership from Geoscience Australia has helped ensure that diversity and inclusion considerations have been at the forefront of many aspects of the program including representation of staff, board, and of advisory and technical working groups; prominence in planning and delivery of activities by implementing partners; and as part of the design through the product development task team. Engagement with the relevant networks and organisations that promote inclusion in [EO](#) / GIS has created opportunities for

⁸ Page 5 Diversity and Inclusion Strategy Document



drawing on the experience and capacity of like-minded groups and individuals and provided opportunities for practical collaboration.

Progress towards the agreed outcomes of its Diversity and Inclusion Strategy

The outcomes and the indicators of success set in the D&I strategy are ambitious and encompass all the 3 EOPOs. The ambition is high particularly given the relatively low starting point in terms of awareness and understanding of Diversity and Inclusion by Geoscience Australia, and the mixed and level of experience and capacity of [IPs](#). In addition, this ambitious Strategy was initially delivered in a context of high demands and heavy workload for the [DE Africa](#) team, particularly for those responsible for managing the transition to an African based and African led entity, and implementing adaptive management response to the COVID-19.

Given the operating context, solid progress has been made in critical foundational areas of raising awareness, visibility and understanding about diversity and inclusion issues and strategies whereby to address them. This has translated into some positive outcomes. Overall, however the ambition articulated in the Strategy has not been fully realised, particularly in delivering environmental and development impacts (EOPO2). The lack of progress and the contributing factors in EOPO2 that have been mentioned in previous sections of the report, relate to the lack of systematic and wider uptake and application of the [DE Africa](#) products for program and policy by those outside the [EO](#) sector, and user groups largely being individuals rather than institutional have influenced the limited progress on D&I made in this outcome area. In reality, the expected outcome articulated for this phase of the program is more aspirational than achievable, particularly given the starting point in the program, the operating context and the level of capacity and resources available.

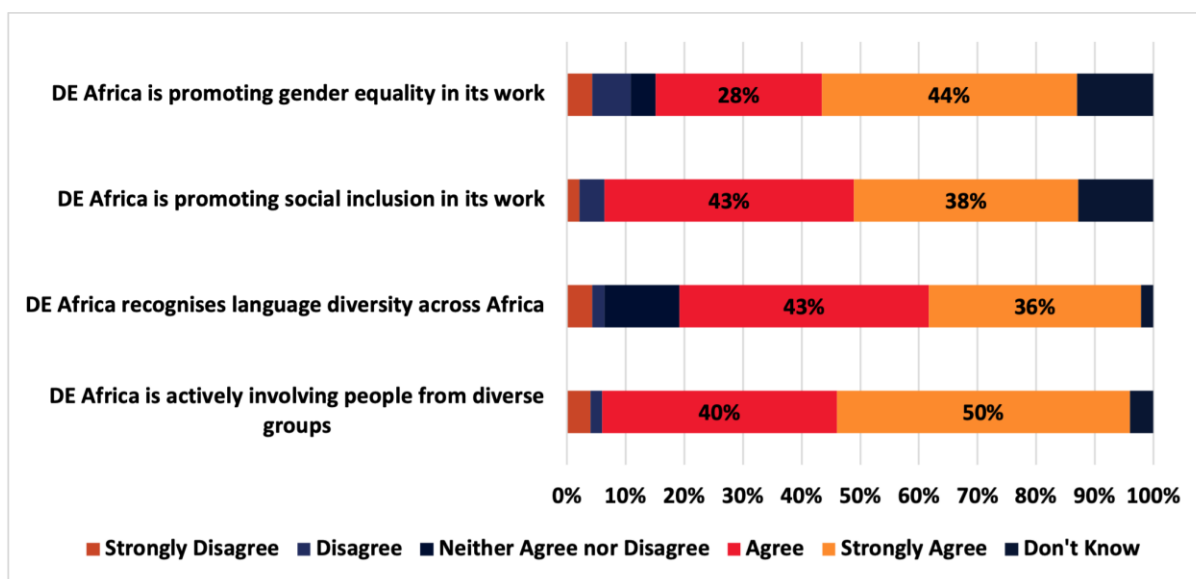


Figure 3: Rating of progress made in diversity and inclusion (Source: own survey)

Significant successful diversity and inclusion outcomes were identified by review informants. The survey respondents overall gave positive ratings about the achievements made in the areas of promoting gender equality, social inclusion, recognising language diversity and actively involving people from diverse groups (

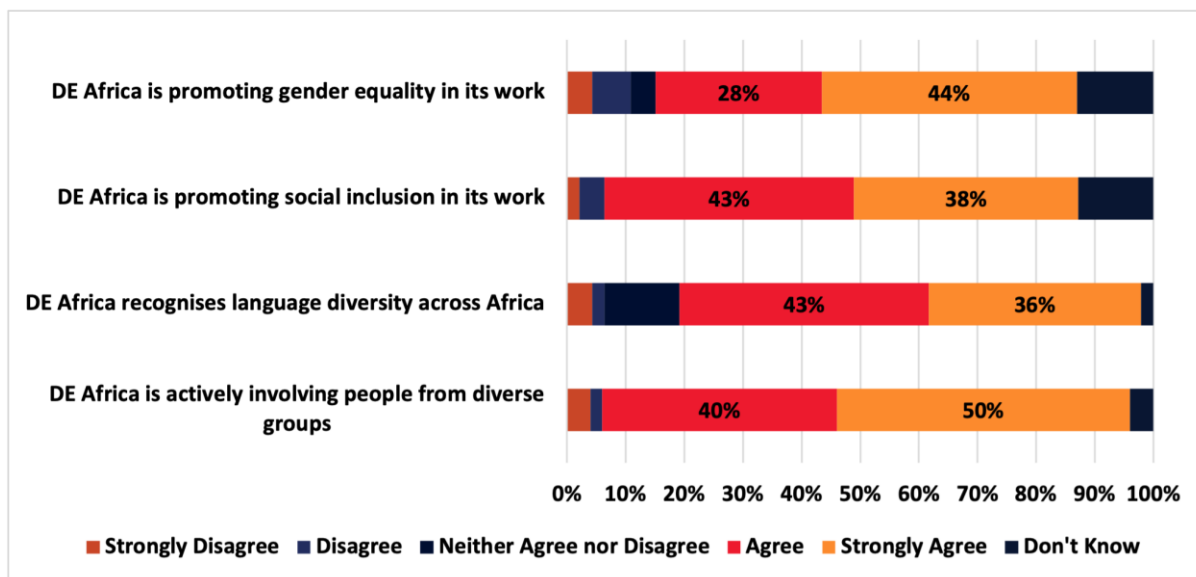


Figure 3). The information garnered from the informant interviews validated those provided by the survey respondents. Informants consistently highlighted progress in the following areas:

- **Heightened awareness and commitment** of all associated in the program (staff and implementing partners) on the importance and their responsibility to promote diversity and inclusion in their areas of work and the development of guidelines to support application in practice as part of [IPs](#)' planning processes;
- **Increased understanding and knowledge of the program staff and [IPs](#)** on ways to deliver inclusive practice particularly regarding promoting and supporting participation of women, younger people (students and professionals), and other professional groups;
- **Increased participation of women in training events and activities** delivered by [DE Africa](#) and by implementing partners, noting that gender parity is not expected given the overall low representation of women in [EO](#) / GIS which is currently the primary user group;
- **Increased visibility of young women champions** who are adapting and applying the [DE Africa](#) products in their work, and are acting as motivators and mentors for other young and emerging women working in [EO](#) / GIS;
- Increased consistency in collecting and reporting gender disaggregated data by [IPs](#), for example participation in training events and activities.

Delivery of the Diversity and Inclusion (D&I) Strategy

The critical aspects of delivery of the D&I Strategy that have contributed to the progress made are:

- **Strong leadership** by a Geoscience Australia staff person and committed support of the senior management team across all the program's work areas;
- **Active D&I working group** made up of [IP](#) staff and [DE Africa](#) staff that until the end of 2022 met regularly and has provided an important forum for exchange of ideas, sharing of experiences and for training on specific aspects of diversity and inclusion in [EO](#);



- **Additional technical capacity provided** by ongoing periodic inputs from a contractor based in Australia and one-off training from other international experts in gender and disability inclusion in [EO](#);
- **One-off projects with Women in GIS and Youth Mappers** that have helped [DE Africa](#) products to reach a wider group of interested professional women, young people and students and created potential for the design and application of [DE Africa](#) products in the field in their areas of practice and research, and offered a channel to contribute to more “grassroot” benefits through connecting “space to village”;
- **Accessible communication** by offering bilingual (French / English) events, interpreting and translation services, captioning, and an accessibility audit of web-based information has been completed;
- **Diversity of members of the [TAC](#) and the Board** has assisted in ensuring D&I remains prominent and is progressed across the breadth of the program.

Threats to the D&I Strategy

The limitations of capacity and resources, particularly that of access to locally based personnel with the requisite knowledge and skills within the Africa region, has contributed to some limitations of progress made and the outcomes achieved. Examples of gaps shared by informants included inadequate assessment as part of the design of projects and activities; examples of factors that may create barriers for women to enrol or be able to continue to participate in activities, including managing professional and domestic workloads, the timing and duration of events and activities, particularly if being done in own time (rather than paid time) or in a volunteer capacity, and the cost of internet and downloads needing to be covered by the individual users.

Another example where additional locally based advice may have benefited stronger progress and better outcomes is in regard to making enquiry of participants about the presence and type of disability. At present a valid tool for collecting disability data is not being applied. While one [IP](#) has made considerable effort to try and collect this information, the question being asked is focusing on the individual’s impairment rather than seeking information about barriers to participation and reasonable adjustment requirements. Respecting that collecting valid and relevant disability disaggregated data is challenging, there are internationally accepted tools that have been applied in the African continent available that may be applicable for use in this program.

These gaps in delivery can be addressed by putting in place the appropriate level of capacity and skills and now that the program is managed in Africa locating it within the region or at subregional level. The question of whether the capacity sits within the [PMO](#) as a staff member or an advisory role or is something that [IPs](#) are resourced to access locally will need to be considered as part of future program management and partnership arrangement considerations. However, it is important that the gaps in capacity are addressed as the examples indicate it has implications on fundamental elements that support effective delivery and outcomes. While there is no evidence that this occurred, continuing to deliver with suboptimal capacity contributes to heightened risk of ‘doing harm’. For example, further reducing motivation and confidence of women seeking to participate and benefit from events, creating risks in regard to dynamics in the work and domestic environment, and discouraging people from disability from identifying their needs, and not having accessibility adjustments they require being put in place, which is likely to reinforce existing perceptions of exclusion, lack of self-confidence and demotivate interest and commitment to participate in the future.



DE Africa's Long-term Goal

Key Findings:

- Demonstrable examples of earth observation data providing new data that is used to make evidence-based policy decisions;
- Too early though to document real impact;
- Growing portfolio across multiple sectors of the contribution being made by [DE Africa](#);
- The implicit, likely economic benefits of [EO](#) data is substantial;
- [DE Africa](#)'s platform and tools enable transparent, accountability and support reporting on relevant and important aspects of Climate Change;
- Users recognise the value of geospatial data to monitor, adapt and mitigate the impact of climate change;
- There is a growing number of demonstrable examples of data being used to mitigate environmental impacts of climate change in affected communities.

Conclusion:

- Growing number of demonstrable examples of the platform being used to improve the lives of Africans through access to tailored information for decision making;
- Opportunity now exists for [DE Africa](#) to broaden its application of tools and products to enhance its benefit to a wider group of users (such as governments reporting against international commitments, or CSOs and NGOs advocating for change).

Use of DE Africa data can be shown to improve the lives of those living on the African continent

Demonstrable examples of earth observation data providing new data that is used to make evidence-based policy decisions. Though it is still too early to document real impact of the program, there is a growing portfolio of success stories, More than 50 that demonstrate the use of [DE Africa EO](#) data for decision making towards the journey of achieving the long-term goal of the program. The program has produced 17 blogs to date which provide evidence of impact, tabulated as follows:

Some of these examples are outlined in Table 5.

Year	Sub-Sectors	Data use title
2021	Conservation	Using Earth observation to protect and conserve wetland in Kenya
2021	Conservation	EO for conservation: rehome giraffes on Lake Baringo
2021	Geographic information systems innovations	Volcano of Mount Nyirangongo: Cloud covered areas and Sentinel-1
2021	Forest Management	Mapping forest fires in Mount Kenya
2021	Forest Management	DE Africa support for Government Decision making



Year	Sub-Sectors	Data use title
2021	Climate change	Data driven community climate action: Zanzibar - the essential Mangrove
2021	Agriculture	Using Digital Earth Africa to address unsustainable agriculture
2021	Agriculture	Using satellite data to monitor agriculture in Ghana: the GAIMS platform from Big Data Ghana
2021	Geographic information systems innovations	Rising Lakes in the Rift Valley in Kenya
2021	Conservation	Monitoring Chlorophyll in Lake Elmenteita
2021	Conservation	Water Assessment and Monitoring in the Lake Ngame, Lower Okavango Delta
2021	Coastline monitoring	Monitoring water extent using earth observation data
2020	Coastline monitoring	Using satellite data to combat drought: Monitoring Lake Sulunga, Tanzania
2021	Landscape monitoring	Detecting landscape changes and unregulated mining
2020	Conservation	Time series for nature: Preserving mangroves in Zanzibar
2021	Agriculture, Livelihoods, Commodities	Intelligence Agriculture: How Digital Earth Africa is supporting sustainable coffee production in Kenya (with prospects for wetland mapping in Djibouti)
2021	Urban life / Urbanisation	Monitoring urbanisation to support sustainable cities, Gulu City

Table 5: Examples of DE Africa EO data used in making evidence-based policy decisions (Source: Own Survey; DE Africa Blogs March 2022)

Mapping forest fires in Mount Kenya

- [DE Africa](#) made it possible to compare forest hotspots from the Fire Information for Resource Management System, which plots hotspots observed from satellites for Near Real-Time active fires and historical fires;
- [DE Africa](#) helped to generate a quick assessment of the burnt area with the forest at around 90 km² (about 10 per cent of the area);
- This was useful in engagement with the Kenya Forest Service, mandated with the task of monitoring forest cover in the country.

Monitoring urbanisation in Gulu City, Uganda

- Earth observation datasets, such as those available through the [DE Africa](#) platform provide a cost-effective and accurate means of mapping the urban extent of cities;
- By delivering impactful analysis in a short time frame and with free and open data, [DE Africa](#) provides a powerful platform to inform policy makers in the design of sustainable cities.



Climate Next: How data and community can save Zanzibar's mangroves

- [DE Africa](#) is helping Zanzibar fight the effects of climate change and protect the island's precious mangrove habitat;
- The data and tools provided by [DE Africa](#), examine near-real-time images of Earth thus allowing government officials, NGOs, business leaders, and farmers to use the data to inform decisions and conservation efforts;
- The analysis ready data provided by [DE Africa EO](#) allows the team in Zanzibar to obtain important insights that they continue to apply directly to their conservation efforts, such as protecting and restoring mangroves.

Monitoring coastal erosion at Saly Portudal resort, Mbour-Senegal

- [DE Africa](#) continues to develop Coastline tools and services as part of the mission to provide users with reliable and decision-ready land observation data;
- The [CSE](#) team validated the coastline tool that was found to be scientifically satisfactory for monitoring coastal erosion and growth trends at the seaside resort of Saly Portudal and throughout the national territory and continental scales;
- The [DE Africa](#) coastline service will support decision-making in diverse infrastructure and livelihood-threatening situations and will contribute not only to the Sustainable Development Goals but also the 2063 agenda of the African Union.

Using Data in Ghana: Helping Parliament to reduce deforestation

- The Ghana Statistical Service collaborating with other government agencies, analysed changing Apamprama forest extent by completing a Natural Capital Assessment using [DE Africa](#) data and services.

The report was provided to the Ghanaian Parliament and local authority and resulted in a ban on logging and other activities to reduce deforestation in the area.

These examples are corroborated by the survey respondents (76 per cent) who indicated making more informed decisions because of access to [DE Africa](#) data and products as outlined in Figure 4 below.

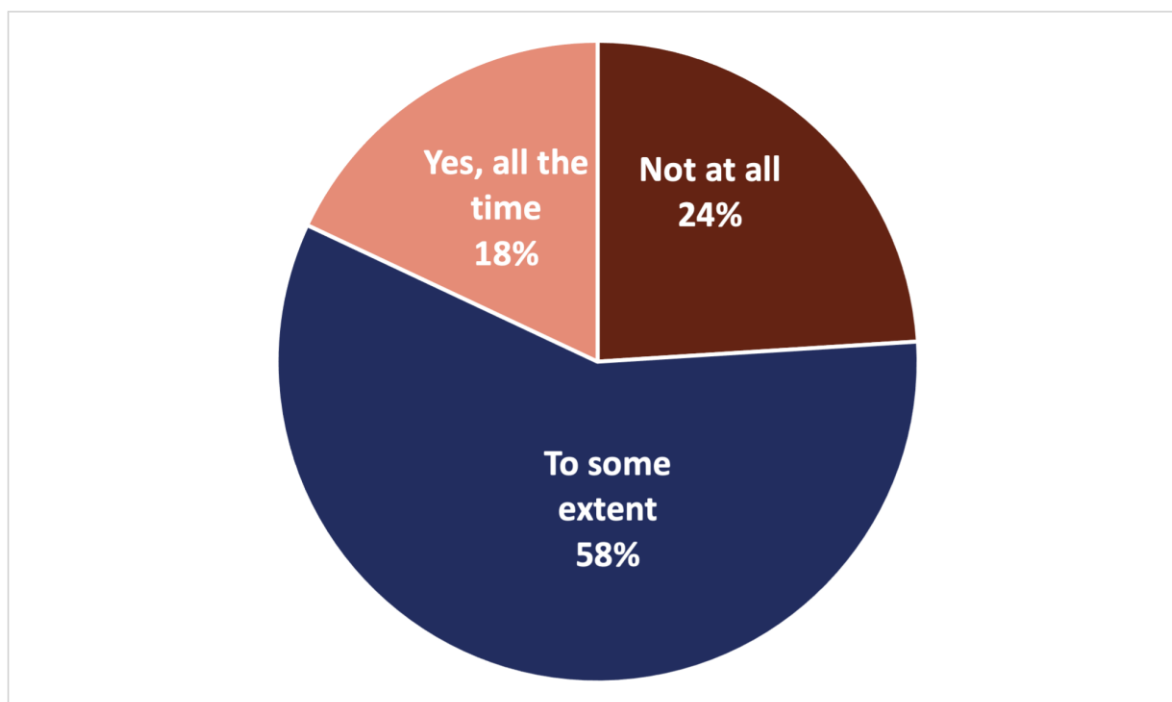


Figure 4: Making more informed decisions as a result of access to DE Africa data and products (Source: own survey)

Additionally, the survey respondents highlighted specific areas that they used [DE Africa EO](#) data to inform their decisions. These areas of focus included on flood impact assessments, climate change impact on fishing industry, wetlands management, and annual vegetation condition, land use and destruction of farms due to illegal mining. In the next phase of the program there is need to focus and document more on the longer-term impact now that the establishment phase is complete. It will also be critical that the evidence of [DE Africa EO](#) data and services informing policy / decision making is gathered and documented to demonstrate program impact in the next phase. It should be noted though that there is still need for more uptake, application and easier access and institutional commitments to [DE Africa EO](#) data, products, and services amidst the enormous challenge of engaging all the 54 countries in the continent.

Economic value of benefits to the African continent provided by DE Africa

Whilst there is no explicit measurement of the economic value of benefits accrued from [DE Africa](#), the implicit benefits from the open and free analysis ready [EO](#) data is quite significant for the continent especially in light of the informed decision making on issues that could otherwise be disastrous to the different economies. Commissioned economic analysis by [DE Africa](#) has found that the likely impact of the program is profound, estimating USD\$2.8 Billion in potential economic benefits⁹, in terms of accelerated economic growth, a boost to

⁹ "[Broader perspectives on Digital Earth Africa](#)". Unlocking the potential of Earth Observation to address Africa's critical challenges | World Economic Forum (weforum.org). Insight Reports | Digital Earth Africa. See also



agricultural productivity, the fiscal and environmental benefits from effective regulation of mining activity, and improved risk mitigation of coastal erosion (coastal real estate, fisheries — jobs, insurance)¹⁰. Further work by the program, at sectoral level estimates additional benefits including¹¹:

- USD\$212 million per year in Africa's Marine Observation industry;
- USD\$74 million per year in disaster risk management;
- USD\$113 million per year in public health;
- USD\$27 million per year in renewable energy;
- USD\$36 million per year in security and civilian protection.

In addition, the continued capacity building by [DE Africa](#) for [EO](#) community and user groups across the continent often for free, continues to build a valuable technical human resource base that can be leveraged on to develop high economic value projects across the continent.

Use of DE Africa data to support climate change, monitoring, adaption, and mitigation

DE Africa's platform and tools enable transparent, accountability and support reporting on relevant and important aspects of Climate Change. The value of [DE Africa](#) is that its images show changes over time and provide a powerful sense of the threat that Africa faces from climate change. As confirmed in interviews, users recognise the value of [EO](#) data in this context and are keen to apply and make evidence-based decisions using [EO](#) data.

There is a growing number of demonstrable examples of data being used to mitigate environmental impacts of climate change in affected communities (a number already referred to above such as the work done in partnership with YouthMappers to restore Mangroves in Zanzibar, and the work being done using [EO](#) data to monitor post-fire regrowth in Mount Kenya). Additional examples¹² include:

- **Protecting the highly endangered Rothschild giraffes** on an island in Lake Baringo in the Kenya Rift Valley, through monitoring depletion of pastures for grazing as a result of rising water levels in Lake Baringo due to floods;
- **Detecting changing landscapes due to unregulated mining practices** in the Apamarama Forest Reserve in central Ghana which represents an important Ghanaian ecosystem and source of great biodiversity, but also contains rich gold deposits;

additional reports (cited in bibliography) including the earlier [WEF](#) report conducted in January 2021, and the work done, for instance, on estimating the benefit of DE Africa's coastal monitoring services by Disal Consulting in December 2022.

¹⁰ Help policy makers identify coastal erosion hazards, DE Africa can help Africa save \$580 million per year with positive effects on around 270 million people in 3 key sectors. For instance, with regards to fishing [EO](#) helps monitor shoreline changes, improves forecast and monitoring of sea levels, helps assess maritime security hazards, and tracks destruction of fishing infrastructure.

¹¹ As above — taken from 'Broader perspectives on Digital Earth Africa'.

¹² See also [DE Africa's Insight Reports](#), featuring 'Empowering Country-level Climate Action in Africa', October 2021.



- Ghana's Environment Protection Agency and Ghana Statistics Services will draw on the [DE Africa](#) platform to better understand the health of the reserve's ecosystem and identify factors that were adversely affecting the environment;
- Using [DE Africa](#)'s data, services, and tools **to monitor and evaluate very large and complex water systems** such as those typified in the Okavango Delta. The results provide critical information for sustainable management of the Delta by relevant government authorities.

Opportunity now exists for the program in the next phase to broaden the application of tools and products in programming and policy by users through institutional commitment and action for example governments in their reporting for international commitments, and by CSOs / NGOs and media in their advocacy and communication. Ongoing efforts to make information more accessible through products and publications, will further widen awareness and uptake by more user groups who are seeking to address and manage climate change related impacts in different sectoral areas and through advocacy, program design and policy influencing and reform.

DE Africa's Benefit to the Government of Australia

Key Findings:

- The program reflects many of the current domestic priorities of Australia (such as climate change resilience and adaptation, disaster preparedness);
- The program also provides an opportunity for Australia to demonstrate its commitment and comparative advantage with regards to using [EO](#) data to address fundamental development challenges;
- The program also provides visibility for Australia across a wide — range of sectors, including those it does not typically work with, and it provides a very tangible demonstration of the intent of the Australian Government in Africa;
- For [HoMs](#) / Post, the program was seen to be particularly beneficial in that it helped build relationships with government departments they might not typically work with, and / or strengthened existing relationships;
- Posts are not systematically engaged in the program, which makes it difficult to reinforce Australia's reputation with regards to geospatial data on the continent.

Conclusion:

- The program brings noticeable benefits to Australia, but the engagement with Posts is ad-hoc, which lessens the impact the value the program brings for Australia.

The program brings noticeable benefits to the Australian Government at both a strategic level and a programmatic level. The focus of the program reflects many of the current domestic priorities of the Australian Government (such as climate change resilience and adaptation, disaster preparedness and so on). Whilst the program focuses on African priorities, these are also of mutual importance to the Australian Government. Once the new strategy for Africa is



completed it is likely that this will identify how further synergies can be created between the [DE Africa](#) program and Australian strategic priorities on the continent.

At a programmatic level, the program facilitates the exchange of knowledge and technical expertise between Australia and the African continent. The program has provided an opportunity to 'showcase' innovative solutions to challenges faced in Africa and provides a demonstration of Australia's commitment to help address developmental challenges, help realise the [SDGs](#), and promote diversity and inclusion. The program also facilitates the opportunity to strengthen peer-to-peer exchanges through joint activities between technical experts across Africa, and between those in Australia and Africa. The gradually increasing body of case studies collated by the program also provide an illustration of the value of the peer-to-peer approach, which helps to reinforce the value of relationships and partnerships within the [EO](#) space, and which also help strengthen the relationship between Australia and key stakeholders on the African continent.

From the perspective of Heads of Mission ([HoMs](#)) and other senior Australian government officials the program provides visibility of Australia across a wide range of sectors, including those that Australia might not have worked in in the past, and it provides a tangible demonstration of Australia's commitment to the developmental challenges of the continent, is present in Africa to support solutions to address these challenges, and that Australia is committed to supporting important issues of diversity and inclusion, climate change adaptation and many other areas of common interest. As one [HoM](#) noted the program has helped open channels of communication and visibility 'with those whom it might not typically work with, or it has helped revitalise relationships that we might have had in the past'.

Engagement between the program and [DFAT](#) does need to be more deliberate to enhance the substantial public diplomacy benefits for Australia to be gained from investing in [DE Africa](#). Key informants did however note that there was an ad-hoc nature to how they got involved in activities of the program. One [HoM](#) noted, for instance, that they were only informed of the program visiting the day before the activity was due to start. A clearer process is needed to inform Post of potential opportunities to engage with the program, with the understanding that there might be different levels of engagement by different Posts based on their own priorities. Not only would earlier engagement ensure better-coordinated support from Post, but it would also encourage Post to help with any necessary follow up discussions with relevant government departments to help sustain interest in the program. Noting however that Posts will not necessarily be advocating for the program but rather open the doors with relevant government officials and departments on the continent. It would be helpful if the program could facilitate a more systematic approach to engaging with Posts in the future through, for example, quarterly information sessions with Posts or some other structured process of sharing information.



Conclusions and recommendations

Overall Conclusion

Our overall conclusion is that [DE Africa](#) has made excellent progress against the 3 expected outcomes, that [DE Africa](#) has largely delivered against all its expected intermediate outcomes and has exceeded delivery expectations in many areas.

A strong focus of the Establishment Phase has been to ensure that [DE Africa](#) has a solid foundation to increase the likelihood of the program's benefits continuing. The main pillars of this foundation include the quality and reliability of the platform, the strong partnerships built by the program, the establishment of the African based [PMO](#), and the steps it has taken to ensure it is truly African owned, including a governance structure that promotes the program's African identity. Whilst the quality and utility of the platform has been secured through both its data infrastructure development, and ongoing innovation to enhance its utility, challenges remain with the governance structure of the program, both in terms of its suitability for the Phase III operating context and clarity around the roles and responsibilities of the difference governance groups in effectively overseeing program performance and compliance.

The use of a 'distributed operational model' ensures that ownership is spread across the continent, leverages the capability of partners working at both national and regional level which enhances both the effectiveness and efficiency of delivery, and ensures collaboration and synergy with related efforts thereby increasing its reach and impact. To enhance sustainability [DE Africa](#) will need to continue to seek opportunities to refine and promote its value proposition, especially its 'catalytic value' to its partners, and the manner in which partners are leveraging the data ecosystem to deepen the program's reach and benefit to the continent.

Appropriately at this stage there is evidence of early adoption and a growing number of demonstrable examples of the platform being used to improve the lives of Africans through access to tailored information for decision making. Users have a very positive view of the platform, and there is a nuanced understanding that the program is promoting the benefits of open and free Earth observation data. Whilst it is largely Individuals not institutions applying the products, on the whole the next phase will provide an opportunity to broaden the application of tools and products in programming and policy, including through ongoing efforts to make information more accessible through products and publications.

With regards to Diversity and Inclusion, there has been a strong commitment by the program to deliver the D&I Strategy that has contributed to positive changes in regard to awareness, understanding on D&I, and some initial application of inclusive strategies that have enhanced participation, particularly women and younger people from a wide reach across the African continent. The need to prioritise D&I is well embedded in the program. The [IPs](#) are committed and interested to continue to progress inclusive practice and have varying degrees of capacity and experience to deliver. Now that the transition to an African led program has taken place, there is need to articulate the responsibilities and accountability for managing D&I within the program and to ensure that a sufficient level of resources and capacity is made available for safe and effective delivery. The current Strategy is comprehensive and ambitious. A more modest and targeted plan for D&I that is appropriately



resourced and articulates clear lines of management responsibility between the [PMO](#) and [IPs](#), may yield more effective results in the short to medium term.

The program brings noticeable benefits to Australia. [DE Africa](#) reflects many of the current domestic priorities of Australia (such as climate change resilience and adaptation, disaster preparedness), and provides an opportunity for Australia to demonstrate its commitment and comparative advantage with regards to using [EO](#) data to address fundamental development challenges. However, the engagement with Posts on the continent is ad-hoc, which lessens the impact the value the program brings for Australia. Engagement between the program and [DFAT](#) needs to be more deliberate to enhance the substantial public diplomacy benefits for Australia to be gained from investing in [DE Africa](#).

Recommendations

The evaluation's recommendations reflect its main conclusions and focus on 4 areas which the program needs consider in the next phase which, if addressed, will help strengthen the important work the program is doing in Africa.

Key Finding	Recommendation	Responsibility
Governance structure is sufficiently holding the program to account, and allows for effective transfer of technical advice from its members, but the structure is not optimised for the Phase III operating context, nor does it have fiduciary responsibility	Governance structure needs to be appropriately reviewed in line with the Phase III operating environment, and to clarify its roles and responsibilities (in particular its fiduciary responsibilities)	Governing Board / Geoscience Australia
DE Africa 's vision is closely aligned with the strategic priorities of the continent, and is engaging with continent wide partners to help address Africa's development challenges, but there is not the same clarity at national level (despite the fact that there is a growing body of evidence demonstrating local application)	Going forward the program will need to demonstrate relevance at country / local level, leveraging its implementing partners to strengthen this process / target specific development challenges / broaden application at the national / sectoral level	PMO (in conjunction with IPs)
Need to articulate the responsibilities and accountability for managing D&I within the program and to ensure that a sufficient level of resources and capacity is made available for safe and effective delivery. The current Strategy is comprehensive but overly ambitious	A more modest and targeted plan for D&I that is appropriately resourced, and articulates clear lines of management responsibility between the PMO and IPs	PMO
The program brings noticeable benefits to Australia, but engagement with Posts is ad-hoc, which lessens the impact the value the program brings to Australia	Engagement between the program and DFAT needs to be more deliberate, and an agreed engagement process needs to be developed to ensure better coordinated support from Post. This could be done via a quarterly briefing session between Posts in Africa or some other means to ensure a structured approach to sharing information	DFAT / PMO



Annex 1: DE Africa Phase II MEL Framework — Progress against program’s indicators

Applicable outcome as per Investment Design	Indicator(s)	Independent Evaluation Findings
<p><i>Long-term goal:</i></p> <p>DE Africa improves the lives of Africans through access to tailored information for decision making</p>	<p>Modelled economic value of DE Africa</p>	<p>\$2.8 Billion potential economic benefits¹³:</p> <ul style="list-style-type: none"> Accelerated economic growth; Boost to agricultural productivity; Fiscal and environmental benefits from effective regulation of mining activity; Risk mitigation of coastal erosion (coastal real estate, fisheries — jobs, insurance)¹⁴. <p>Additional analysis estimates¹⁵:</p> <ul style="list-style-type: none"> USD \$212 million per year in Africa's Marine Observation industry; USD \$74 million per year in disaster risk management; USD \$113 million per year in public health; USD \$27 million per year in renewable energy; USD \$36 million per year in security and civilian protection.
<p><i>Long-term goal:</i></p> <p>DE Africa improves the lives of Africans through access to tailored information for decision making</p>	<p>Assessment of benefits and impact</p>	<p>Growing portfolio of user cases addressing Africa's development challenges / supporting SDGs:</p> <ul style="list-style-type: none"> 50 User cases of DE Africa generated from CRM; More than 100 open-source notebooks supporting progress towards 7 SDGs. <p>Growing number of institutions reporting benefit / use — e.g.:</p> <ul style="list-style-type: none"> Ghana Statistical Service; National Bureau of Statistics (NBS), Tanzania; Ghana's Environmental Protection Agency; National institute of statistics Rwanda; Ministry of Food and Agriculture, Ghana.

¹³ '[Broader perspectives on Digital Earth Africa](#)' (PDF 32.0MB). Unlocking the potential of Earth Observation to address Africa's critical challenges | [World Economic Forum](#). Insight Reports | Digital Earth Africa

¹⁴ Help policy makers identify coastal erosion hazards, [DE Africa](#) can help Africa save \$580 million per year with positive effects on around 270 million people in 3 key sectors. For instance, with regards to fishing [EO](#) helps monitor shoreline changes, improves forecast and monitoring of sea levels, helps assess maritime security hazards, and tracks destruction of fishing infrastructure.

¹⁵ As above — taken from 'Broader perspectives on Digital Earth Africa'.



Applicable outcome as per Investment Design	Indicator(s)	Independent Evaluation Findings
		Data provided by DE Africa is helping to track the Kenyan Government's Integrated Coastal Zone Management Action Plan for Kenya 2018–2023
<p><i>End of Program Outcome 1:</i> DE Africa is operationally, technically, and financially sustainable</p>	Evidence of established and functioning governance and management systems and operations.	<ul style="list-style-type: none"> • DE Africa has attracted additional investment; • DE Africa has established enabling partnerships; • DE Africa has established a full complement of staff; • DE Africa's has established the necessary infrastructure to secure the quality of the platform and has over-delivered against its Technical Roadmap; • Growing recognition that DE Africa is the preeminent EO data platform in Africa; • Structure established and operational, and is both accountable and transparent; • Program Governance not functioning optimally, due to lack of fiduciary authority; • Majority of governing board are African; • TAC has been effective in providing technical strategic advice to the program; • Revisions to governance structure ongoing (TAC has recently undergone a review).
<p><i>Intermediate Outcomes (IO):</i></p> <ul style="list-style-type: none"> • (IO 1) DE Africa has attracted additional investment; • (IO 2) DE Africa has established a range of enabling partnerships; • (IO 3) DE Africa's institutional management and staffing capacity is established; • (IO 4) DE Africa's technical capacity is established and delivers credible and free EO data and products. 	<p>Evidence of secured or pipeline financial support</p> <p>Amount of funding secured (incl. co-finance, in-kind etc).</p>	<ul style="list-style-type: none"> • Analysis shows evidence of increased value of support (financial and in-kind) increasing over time; • Secured financial support (incl. co-funding, in-kind support) for next 3 years; • 2021 — Future Funding Strategy Development (updated and revised in 2022).
<p><i>Intermediate Outcomes (IO):</i></p> <ul style="list-style-type: none"> • (IO 1) DE Africa has attracted additional investment; • (IO 2) DE Africa has established a range of enabling partnerships; • (IO 3) DE Africa's institutional management and staffing capacity is established; 	Number, diversity, and type of partnerships established	<ul style="list-style-type: none"> • Established over 17 technical strategic and delivery partnership with national, regional, and international organisations; • Broad coverage across Africa and technical, engagement and user communities (working with 42 different partners).



Applicable outcome as per Investment Design	Indicator(s)	Independent Evaluation Findings
<ul style="list-style-type: none"> (IO 4) DE Africa's technical capacity is established and delivers credible and free EO data and products. 		
<p><i>Intermediate Outcomes (IO):</i></p> <ul style="list-style-type: none"> (IO 1) DE Africa has attracted additional investment; (IO 2) DE Africa has established a range of enabling partnerships; (IO 3) DE Africa's institutional management and staffing capacity is established; (IO 4) DE Africa's technical capacity is established and delivers credible and free EO data and products. 	<p>Percentage of positions filled relative to the established organisational chart. A more meaningful indicator is the percentage of workstreams on track for DE Africa transition.</p>	<ul style="list-style-type: none"> As of January 2023, only 2 items on Workstream 3 were behind schedule, all the other 4 workstreams have been deemed as complete; As of Jan 2023, all Africa positions fully staffed; Platform hosted and operated in Africa.
<p><i>Intermediate Outcomes (IO):</i></p> <ul style="list-style-type: none"> (IO 1) DE Africa has attracted additional investment (IO 2) DE Africa has established a range of enabling partnerships (IO 3) DE Africa's institutional management and staffing capacity is established (IO 4) DE Africa's technical capacity is established and delivers credible and free EO data and products 	<p>Number of products delivered against endorsed Technical Roadmap</p>	<ul style="list-style-type: none"> More than 3.5 Pb of free and open data available through AWS; 5 Analysis-Ready Data / products using satellite images; 10 DE Africa data (other data layers) — Tool / services; 9 DE Africa continental services More than 100 open-source notebooks Online technical documentation, available in English and French
<p><i>Immediate Outcome:</i></p> <p>(O1) DE Africa's Governance Framework is operational, effective, and Africa owned</p>	<p>Evidence of a diversely represented Governing Board (GB), Technical Advisory Committee (TAC) and Stakeholder User Group operating effectively.</p>	<ul style="list-style-type: none"> Diversity of board / TAC members 74 per cent of governing board members are from Africa <ul style="list-style-type: none"> 43 per cent are female 4 / 5 planned meetings have happened — #5 no quorum, #6 was postponed until January 2023 when it did happen TAC has representatives from 13 African countries <ul style="list-style-type: none"> 32 per cent of TAC is female 12 / 13 TAC meetings held with quorum — average attendance = 71 per cent of members (including meeting where quorum not achieved)



Applicable outcome as per Investment Design	Indicator(s)	Independent Evaluation Findings
<p><i>End of Program Outcome 2:</i> DE Africa is demonstrating environmental and development Impact</p>	<p>Evidence of benefits as demonstrated through Case Studies</p>	<p>User case studies — e.g., for mitigating environmental impacts of climate change in affected communities:</p> <ul style="list-style-type: none"> • Mapping Mangrove extents in parts of the Niger Delta region in Nigeria — Mangroves provide a vital role in coastal zone protection and management • Using satellite imagery data to restore Mangroves, which play an essential role in protecting communities from climate change (natural barriers to storms and rising seas / sequester carbon), in Zanzibar. In Zanzibar, YouthMappers and other conservation groups build community awareness around the importance of mangrove forests as a way to demonstrate the impacts of climate change on the island — getting local communities to plant mangroves (roughly 1 000 seeds per week). • Mount Kenya — identify fire-affected areas and monitor post-fire regrowth within the National Park. • Assessment of degradation of Oueme Boukou forest reserve in the centre of Benin republic • Mangroves changes Kenya — the Kenya Forest Research Institute (KEFRI) has been supporting the monitoring of wetlands including the Sabaki Estuary • Moving highly endangered Rothschild giraffes from island in lake Baringo — need to move the giraffes has been due to the fact that the pasture has been depleted over time as a result of rising water levels in Lake Baringo due to floods
<p><i>Intermediate Outcomes (IO):</i></p> <ul style="list-style-type: none"> • (IO 5) DE Africa benefits are recognised by a growing user base, including women across public and private sectors • (IO 6) DE Africa is used to support development of innovative applications • (IO 7) DE Africa products used to inform decision making • (IO 8) Increasing capability to engage with and apply DE Africa data and products 	<p>Number and diversity of known Use Cases</p>	<ul style="list-style-type: none"> • 17 DE Africa blogs on the impact of DE Africa's use / demonstrating significant application and benefits • Blog Topics: Conservation / Forest Management / Climate Change / Agriculture / Coastline monitoring / Landscape monitoring / Livelihoods / Urbanisation
<p><i>Intermediate Outcomes (IO):</i></p> <ul style="list-style-type: none"> • (IO 5) DE Africa benefits are recognised by a 	<p>Number, diversity, and type of individuals /</p>	<ul style="list-style-type: none"> • 24 Power users — represent 15 different African countries, of whom 8 / 24 are French speaking



Applicable outcome as per Investment Design	Indicator(s)	Independent Evaluation Findings
<p>growing user base, including women across public and private sectors</p> <ul style="list-style-type: none"> (IO 6) DE Africa is used to support development of innovative applications (IO 7) DE Africa products used to inform decision making (IO 8) Increasing capability to engage with and apply DE Africa data and products 	<p>organisations accessing / using DE Africa</p>	<ul style="list-style-type: none"> Continental — wide data services available in diverse sectors Water observations from space Cropland extent Map Fractional Cover¹⁶ Coastlines¹⁷
<p><i>Intermediate Outcomes (IO):</i></p> <ul style="list-style-type: none"> (IO 5) DE Africa benefits are recognised by a growing user base, including women across public and private sectors (IO 6) DE Africa is used to support development of innovative applications (IO 7) DE Africa products used to inform decision making <p>(IO 8) Increasing capability to engage with and apply DE Africa data and products</p>	<p>Increasing capacity to use DE Africa platform and services</p>	<ul style="list-style-type: none"> Free online training available in English and French 250 completed training 1255 participated in Training on DE Africa's platform and services — 19 different African countries represented 20 per cent of participants were women More than 100 weekly live sessions held, in English and French Help desk service established
<p><i>Intermediate Outcomes (IO):</i></p> <ul style="list-style-type: none"> (IO 5) DE Africa benefits are recognised by a growing user base, including women across public and private sectors (IO 6) DE Africa is used to support development of innovative applications (IO 7) DE Africa products used to inform decision making 	<p>Evidence of EO demand and engagement opportunities</p>	<p>Evidence of EO data demand and engagement opportunities:</p> <ul style="list-style-type: none"> Empowering Climate change action WEF report Follow up on WEF report with GEO A report on how EO data can be used in addressing 4 points in the African Union strategic plan: mining, forestry, agriculture, and regional & urban planning¹⁸ Information for agriculture and food security¹⁹

¹⁶ Provides estimates of the proportions of green vegetation, non-green vegetation for a range of environmental and agricultural applications, including soil erosion monitoring, land surface process modelling, land management practices (e.g., crop rotation, stubble management, rangeland management), vegetation studies, fuel load estimation, ecosystem modelling, land cover mapping.

¹⁷ Continental dataset that includes annual shorelines and rates of coastal change along the entire African coastline.

¹⁸ [Master Report](#) — [ARD](#) for Africa — May 2022 (PDF 7.1MB)

¹⁹ In conjunction with ACIAR — [DE Africa Quarterly Report: Jul–Sept 2022](#) — (Google Slides 8.17MB)



Applicable outcome as per Investment Design	Indicator(s)	Independent Evaluation Findings
(IO 8) Increasing capability to engage with and apply DE Africa data and products		
<i>Immediate Outcome:</i> Intermediary and end-users are identified and their needs are understood	Nil	<ul style="list-style-type: none"> Information for Agriculture and Food security study — (funded by ACIAR) Earth Observation challenge
<i>End of Program Outcome 3:</i> DE Africa is a flagship initiative that promotes the benefits of open and free earth observation data	Evidence that DE Africa is engaging effectively and helping shape EO policy and direction in Africa.	<ul style="list-style-type: none"> DE Africa objectives align with continent-wide strategies to address development needs DE Africa is the only Earth observation platform offering free, open-source data and products for the entire African continent, and is now the world's largest Open Data Cube DE Africa's cutting-edge cloud technologies and big data analytic workflows means DE Africa has allowed African users to leapfrog the need to engage with older more out of data technologies
<i>Intermediate Outcomes (IO):</i> <ul style="list-style-type: none"> (IO 9) DE Africa supports development partner engagement and exchange (IO 10) DE Africa supports increased consistency in application and analysis of EO data (IO 11) DE Africa is increasingly recognised as a preeminent EO data platform 	Number of regional / continental / international platforms engaged / interoperable with DE Africa .	<ul style="list-style-type: none"> DE Africa adopts and promotes international data standards DE Africa has actively participated in multiple international and continent-wide EO fora DE Africa is actively participating in GEO efforts to better integrate observing systems and share data by connecting existing infrastructures using common standards
<i>Intermediate Outcomes (IO):</i> <ul style="list-style-type: none"> (IO 9) DE Africa supports development partner engagement and exchange (IO 10) DE Africa supports increased consistency in application and analysis of EO data (IO 11) DE Africa is increasingly recognised as a preeminent EO data platform 	Evidence that DE Africa is recognised and used by a range of key (regional and international) development partners to support programming and project delivery.	<ul style="list-style-type: none"> DE Africa is working with 42 different multilaterals, and regional partners MoUs with 6 implementing partners, who represent the interests of 43 African countries
<i>Intermediate Outcomes (IO):</i> <ul style="list-style-type: none"> (IO 9) DE Africa supports development partner engagement and exchange (IO 10) DE Africa supports increased consistency in 	Evidence of national and regional integration and interoperability of DE Africa .	<ul style="list-style-type: none"> DE Africa uses analysis-ready data standards and ensures data is compliant with these standards to enhance interoperability. DE Africa uses standard metadata to enhance interoperability



Applicable outcome as per Investment Design	Indicator(s)	Independent Evaluation Findings
<p>application and analysis of EO data</p> <ul style="list-style-type: none"> (IO 11) DE Africa is increasingly recognised as a preeminent EO data platform 		
<p><i>Immediate Outcome:</i></p> <p>DE Africa is promoted throughout Africa and internationally</p>	<p>Evidence that DE Africa is enhancing awareness and increasing profile as a leading EO entity within the region and internationally.</p>	<ul style="list-style-type: none"> More than 3,000 sandbox registrations (up from 80 per cent the previous year) More than 13,000 unique DE Africa Map users (up 40 per cent from the previous year) DE Africa has registered 24 Power users (identified from 37 applicants) Social media presence <ul style="list-style-type: none"> more than 70,000 visitors to website more than 5,800 followers on Twitter more than 2,800 on LinkedIn Awards — DE Africa won 2 international awards for Capacity Building in 2022; and 2 international awards for Communications and Marketing in 2021 (see annual reports)



Annex 2: Bibliography

Number	Document
1	Digital Earth Phase II Investment Design
2	DE Africa Investment Logic
3	DE Africa Partnership Strategy
4	DE Africa Capacity Development Strategy
5	DE Africa Diversity and Inclusion Strategy
6	DE Africa Governing Framework
7	DE Africa MEL Framework — 2021 Update
8	DE Africa Fundraising Report, November 2021
9	DE Africa 2023 Annual Plan
10	DE Africa 2022 Annual Plan
11	DE Africa Quarterly Report April–June 2022
12	DE Africa Quarterly Report January–March 2022
13	DE Africa Quarterly Report July–September 2022
14	DE Africa Annual Report 2022
15	DE Africa Annual Report 2021
16	DE Africa Annual Report 2020
17	DE Africa PMO Transition Report, January 2023
18	DE Africa Governing Board Papers (1–4, 6)
19	DE Africa Phase III Helmsley Grant Application
20	Review of Digital Earth Technical Advisory Committee
21	' Broader perspectives on Digital Earth Africa . Unlocking the potential of Earth Observation to address Africa's critical challenges', World Economic Forum (www.weforum.org).
22	' Cost to Coast: Estimating the benefit of Digital Earth Africa's coastal monitoring service on the continent's economy ' (PDF 7.8MB), Digital Africa, Disal Consulting, December 2022
23	' Analysis Ready Data: A smart way to use Earth Observation for Africa's rising nations ' (PDF 7.1MB), Panaglobo Consulting, May 2022
24	' Unlocking the potential of Earth Observation to address Africa's critical challenges ' (PDF 6.1MB), conducted by World Economic Forum, January 2021
25	' Empowering Country-level Climate Action in Africa ' (PDF 37.2MB), October 2021