RESOURCE

Timely Monitoring of Environmental SDG Indicators in Somalia with Earth Observation and Geospatial Tools

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Introduction

In Somalia, rising temperatures and erratic rainfall patterns caused by climate change continues to be a major challenge to the government and its people as they face cycles of worsening drought, food insecurity, deforestation, and more. To effectively combat these issues, timely and disaggregated environmental and agricultural data is necessary. However, data gaps, inadequate data infrastructure, lack of capacity, and other obstacles have prevented the Government of Somalia from timely assessments of the situation, understanding progress, and charting a path toward achieving the relevant Sustainable Development Goals (SDGs).

Investment in Earth observation (EO) data capacity, monitoring of environmental SDG indicators, and more, is crucial to ensure that policy- and decision-making processes are not only informed by evidence, but also lead to sustainable, long-term solutions.

About the project

In collaboration with the Islamic Development Bank Institute and Digital Earth Africa (DE Africa), the Global Partnership set out to identify and address key opportunities for strengthening the Government of Somalia's capacity to produce and analyze timely EO data on environmental and climate issues. Activities undertaken included:

- Engagement with executive leadership of key institutions to ensure alignment with national needs and priorities and secure ownership and commitment
- Conducting capacity assessments across the stakeholder group to ensure alignment with needs and workshop content are well targeted
- Convening stakeholders to agree on priority problem statements and create understanding of the potential of EO to address environmental, agricultural, and climate change issues
- Building in-country technical capacity to use EO data through DE Africa platforms to address identified priorities

In the long term, these efforts aim to contribute to the development of a database of real-time information on environmental and climate change indicators and national agricultural productivity for use across government institutions.

In addition to building technical skills, the program also focused on communicating outcomes to policymakers and using the data to produce actionable insights. The program not only increased awareness of and capacity to use DE Africa platforms and EO tools, but also fostered collaboration between government agencies, DE Africa, and other technical partners and created a roadmap for other countries to replicate this experience tailored to their needs.

Building relationships and knowledge to advance the potential of Earth observations across institutions

Who

The project began through collaboration with the leadership of Somalia National Bureau of Statistics (SNBS) and the Ministry of Agriculture and Irrigation to ensure alignment with national objectives, assign senior officials as focal points, and obtain their commitment and co-ownership. After, focal points engaged their peers from national institutions with overlapping priorities with the project, such as the Ministry of Livestock, Forestry and Range; Ministry of Environment and Climate Change; and Somalia Disaster Management Authority. Representatives from these institutions discussed current data needs and challenges, the national work plan, and the potential of EO to address SDG data gaps. As a result, a national coordination and governance mechanism was agreed upon.

What

Engagement sessions with the above stakeholders surfaced overlapping data challenges, including a need for timely environmental, agriculture, and climate-related data; low awareness of geospatial and EO technology; lack of access to open-source EO data; and lack of data standards, policy, and institutional governance framework.

Following these discussions, the Global Partnership conducted a comprehensive capacity assessment of five institutions—Somalia National Bureau of Statistics; Ministry of Public Works, Housing and Reconstruction; Ministry of Livestock, Forestry and Range; Ministry of Agriculture and Irrigation; and Somalia Disaster Management Authority—to understand capacity concerns related to climate and environmental statistics. The results revealed that these institutions' priority issues are largely aligned with SDGs 1, 2, 11, 13, and 15, all with the aim of improving socio-economic welfare of the Somali citizens by addressing food, climate, environment, and land-related issues. Further, common obstacles surfaced:

- Little availability and access to locally produced environmental data and information
- Lack of environmental data production using non-traditional data and technology
- Insufficient evidence-informed policy development processes
- Lack of institutional EO and geospatial data strategies
- Few staff with technical EO data skills

Following these challenges, four key solutions were identified:

- Technical skills training
- Technology, tools, and infrastructure development for data management
- Development of data sharing agreements with relevant stakeholders
- Increases in national budget to support data production and analysis

Delivering Earth observations training to monitor deforestation, floods, and more

With Digital Earth Africa as a technical partner, a robust training curriculum was developed from the capacity assessment results, which included mapping of specific priorities of the five institutions on topics ranging from data governance to EO data modeling.

Over a period of four weeks in February 2023, DE Africa carried out four virtual training modules, taking participants from an introduction to Python to mapping specific environmental SDG indicators with EO data. Nominated by 14 government, private, civil society, and academic institutions, 34 people (directors, technical managers, data analysts, data engineers, and statisticians) completed the training.

At the end of the course, participants were equipped with skills to use DE Africa platforms, provide assessments on crop productivity, report on water extent, monitor urban growth, and assess land degradation and deforestation. Following technical training and activities, participants identified and presented practical use cases to which learnings can be applied in the future.
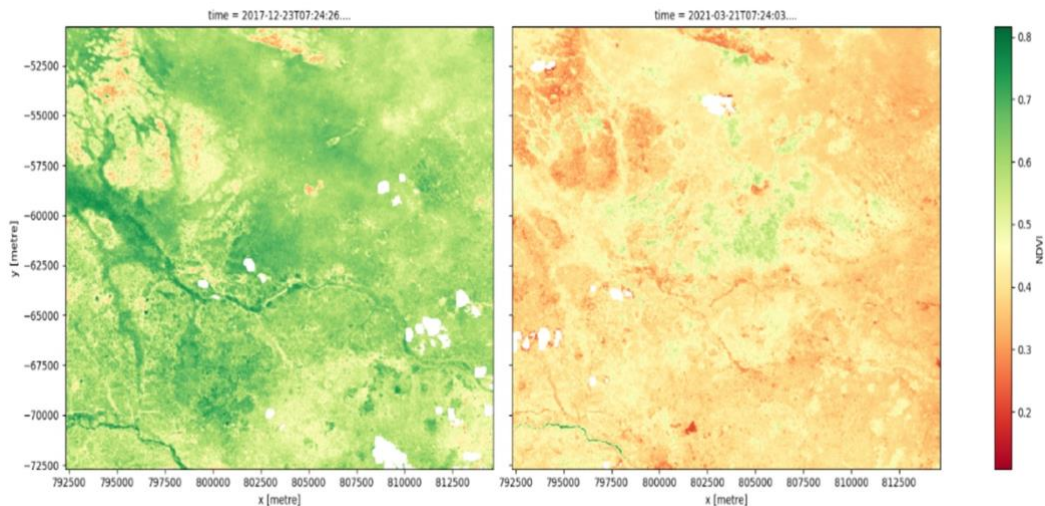
Use case: Monitoring vegetation cover

The Federal Ministry of Environment and Climate Change team conducted an analysis to monitor vegetation cover in the northwest of Buule Xaji from 2017 to 2021 using DE Africa's Sandbox tool.
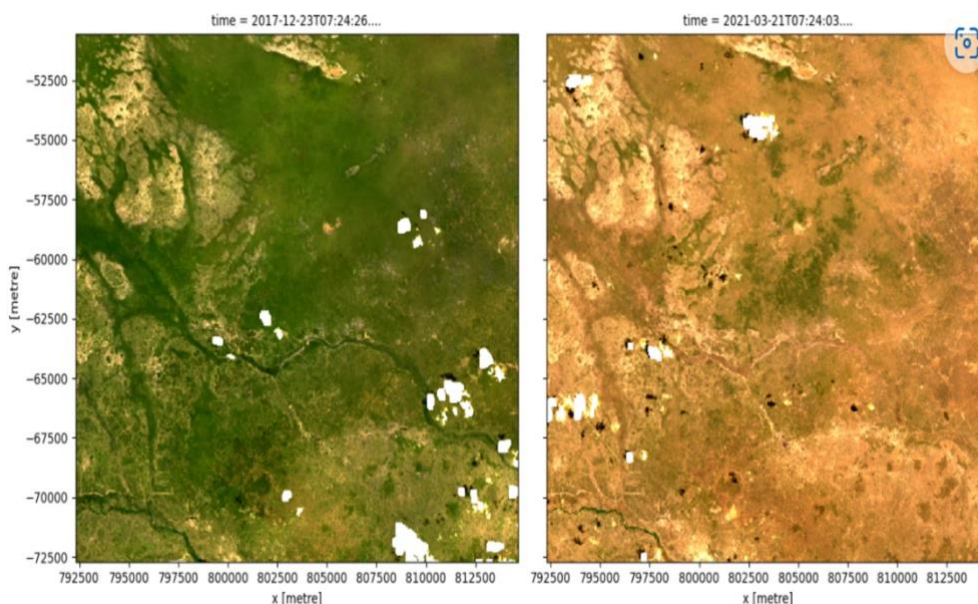
Changes that occurred in the area (2017–2021).

Normalized Difference Vegetation Index classification of the area (2017 –2021).

As shown in the figures above, the area in the Lower Juba region has experienced drastic environmental changes. Results of the analysis showed that 0.99% of the pixels likely underwent significant change in any direction (significant high levels of experienced deforestation). The team identified that possible drivers of these changes include deforestation for firewood or charcoal production, overgrazing, and prolonged drought as recorded in the drier seasons. The implications of these changes include environmental disasters, such as biodiversity loss, drought, and floods. These findings demonstrate a strong need for further policy support to address the changes identified. Moving forward, the team expressed that further EO training and access to practical sessions for satellite image dataset analysis and interpretation will remain invaluable to continue strengthening capacity to inform policies.

Use case: Coastal Monitoring

The SNBS is using DE Africa to monitor the country's vast 3,333 km coastlines, particularly important as many of the country's largest cities are situated along the coast. By using the DE Africa platform, the SNBS can better understand the drivers of coastline change, such as sea-level rise, extreme weather events, changing precipitation patterns, higher temperatures, and human development. This information is critical in developing strategies for managing the coastline and mitigating the risks of coastal erosion, which has impacts on fishing, tourism, coastal ecosystem, and economy and real estate of the coastal areas.

DE Africa's Sandbox has allowed SNBS to process and share data about shorelines for the entire country from 2000 to 2021. Their analysis has revealed that the coastline has retreated at an average of 2.8 meters per year since 2000, a concerning trend that underscores the importance of monitoring the coastline with satellite imagery.
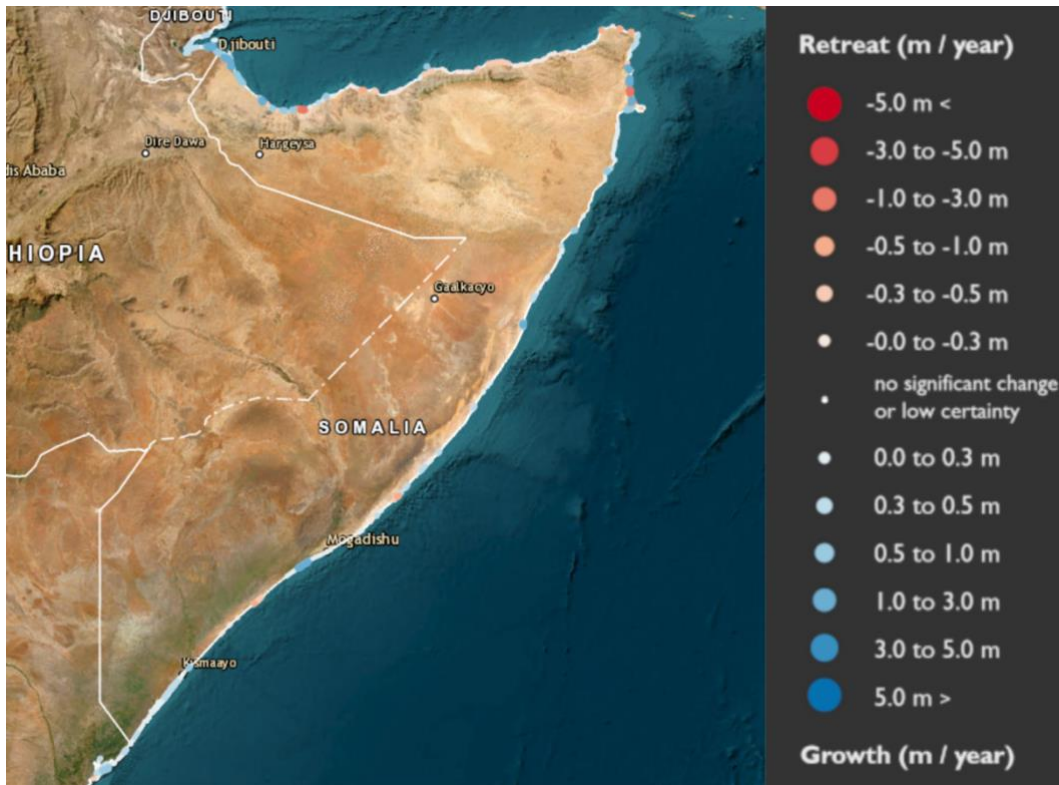
Average annual changes of the Somalia's coastline.
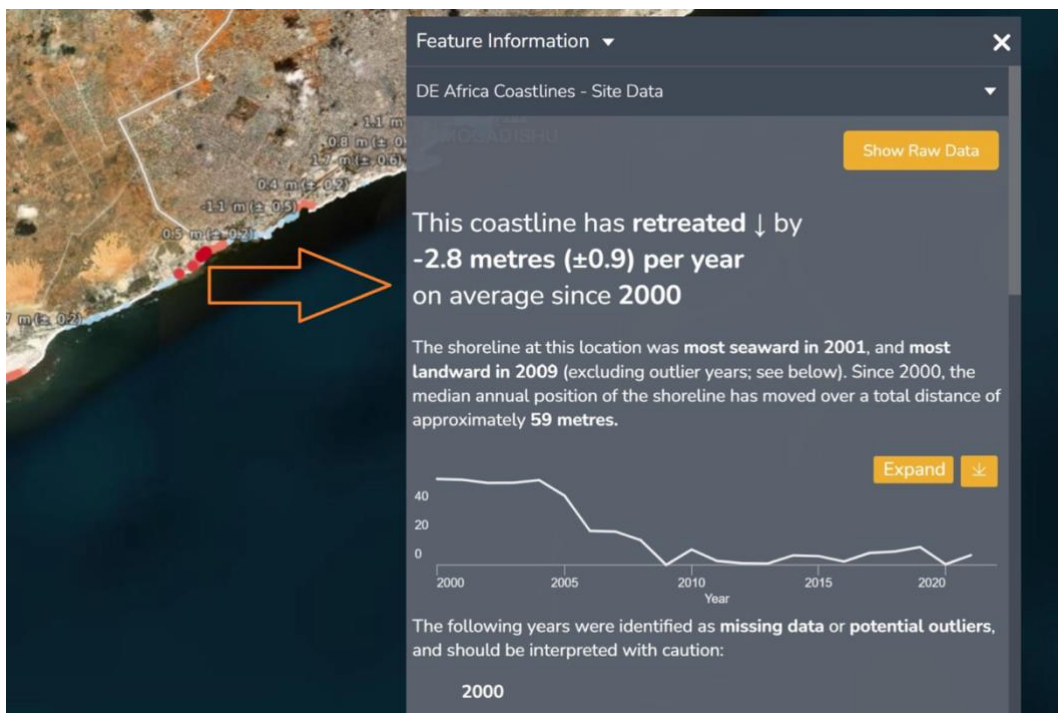
Analysis of DE Africa data on Mogadishu's coastline, showing changes (2000–2021).

Conclusion

As a result of the project, agreement has been established around a national structure to provide coordination and governance on the use of non-traditional data sources, and there is an increased awareness of EO data for sustainable development and for the SDGs across institutions. In addition, national ownership and collaboration among the participating government agencies, DE Africa, and Islamic Development Bank has been strengthened, leading to an increased adoption and use of EO data for environmental monitoring. With DE Africa's capacities, resources, and services, priority environmental and climate change challenges have been identified and action is being taken to produce information to assist programs and initiate policy dialogues.

The national stakeholder group, supported by both SNBS and the Ministry of Environment and Climate Change, is engaging with 15 government and non-state institutions. By deepening their skills capacity and developing use cases, institutional leadership and policymakers will be able to make informed decisions regarding the use of EO and geospatial data and technology.

To further strengthen this process, the Global Partnership will continue to connect the stakeholder group with relevant partners who can aid with technical skills building and development of use cases. Workshops have also been designed to provide an opportunity for stakeholders to engage with policymakers, senior government officials, and development partners and support where needed to further strengthen investment decisions for use of EO data and technology for sustainable development in Somalia.

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