GROUP ON EARTH OBSERVATIONS

Earth Observation Solutions for the Sustainable Development Goals

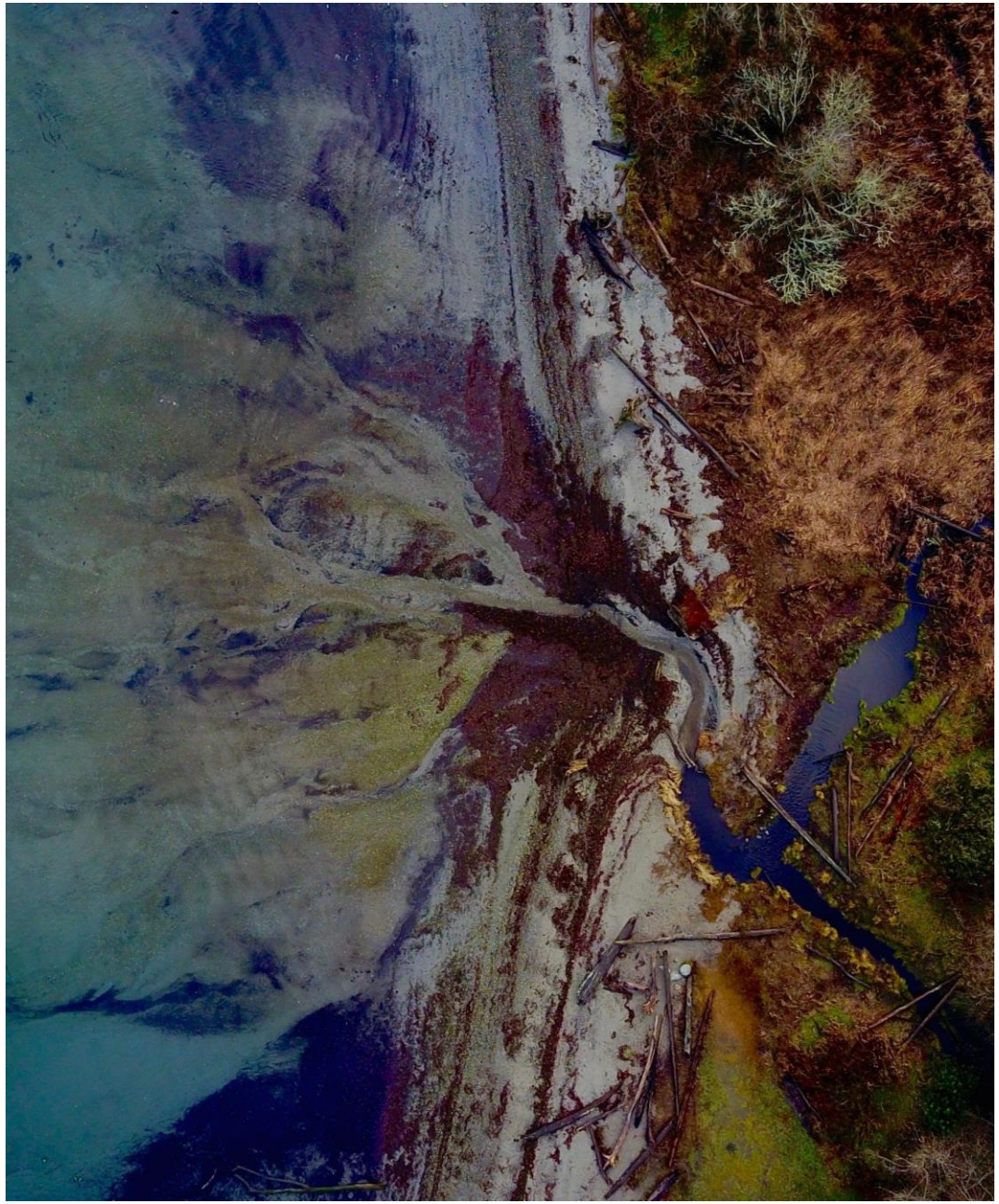
Earth Observations for Sustainable Development Goals (EO4SDG)
Annual Meeting 2019 — Open Session
9th Session of UN-GGIM

http://eo4sdg.org
@EO4SDG

5 August 2019 / New York, U.S.A.

GROUP ON EARTH OBSERVATIONS

Evidence Informed Policy: EO4SDG



EO4SDG Annual Meeting, 5 August 2019

Steven Ramage, GEO Secretariat
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Summary and recommendations

What?
Support greater links with UN-GGIM, notably via fundamental data themes and UNSN;
Support greater connections of SDG activities across the GEO Work Programme; and
Support the international community to find missing data and provide more timely data.

How?
Share scientific papers, methods, algorithms and data to develop long-term capacity;
Work more closely with regional GEOs and align with regional UN-GGIM activities; and
Increase awareness, understanding and use of EO to inform the SDGs at a policy level: consider developing an SDG MOOC (massive open online course) to build on the successful webinars, as well as contributions to GEO Report on Progress 2015-2019.

GEO Vision and Mission

GEO Vision

To realize a future where decisions and actions, for the benefit of humankind, are informed by coordinated, comprehensive and sustained Earth observation information and services.

GEO Mission

GEO's mission is to connect the demand for sound and timely environmental information with the supply of data and information about the Earth. Advocacy for broad, open data policies helps ensure that the data collected through national, regional and global observing systems is both made available and applied to decision making for global priorities.

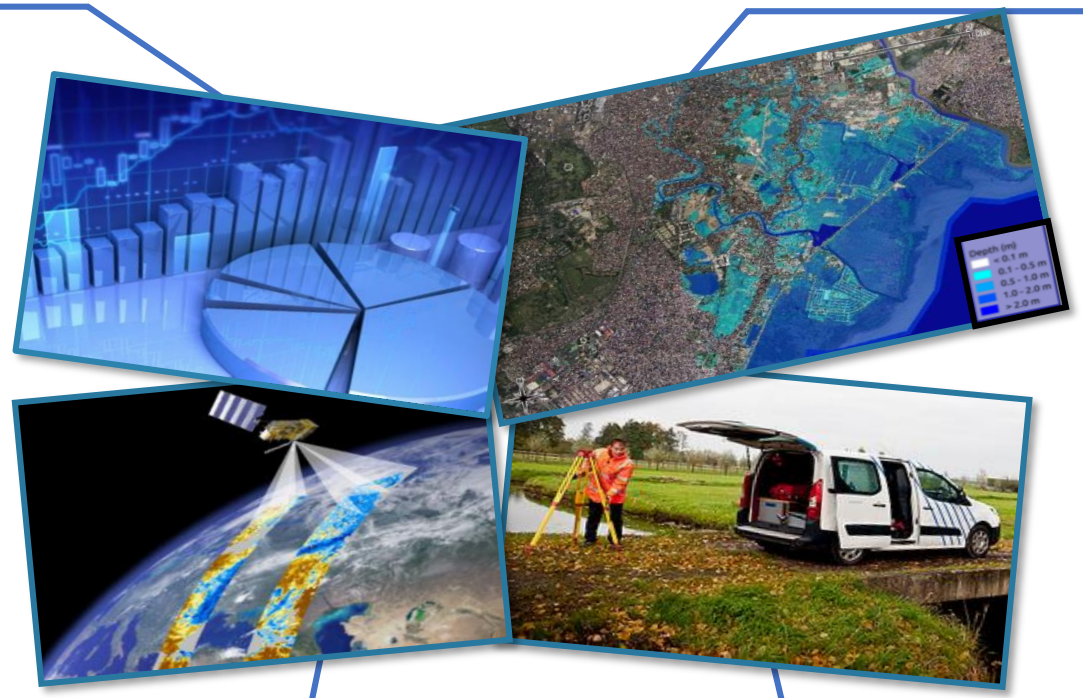
GEO Value

GEO is a **partnership convening** 105 national governments, 130+ partners comprised of international bodies with a mandate in and/or use of Earth observations. There are also international NGOs and the commercial sector contributing. Together, the **GEO community is creating** a Global Earth Observation System of Systems (GEOSS) to better integrate observing systems and share data by connecting existing infrastructures using common standards.

2030 Agenda: Integration of Information Systems

Statistics

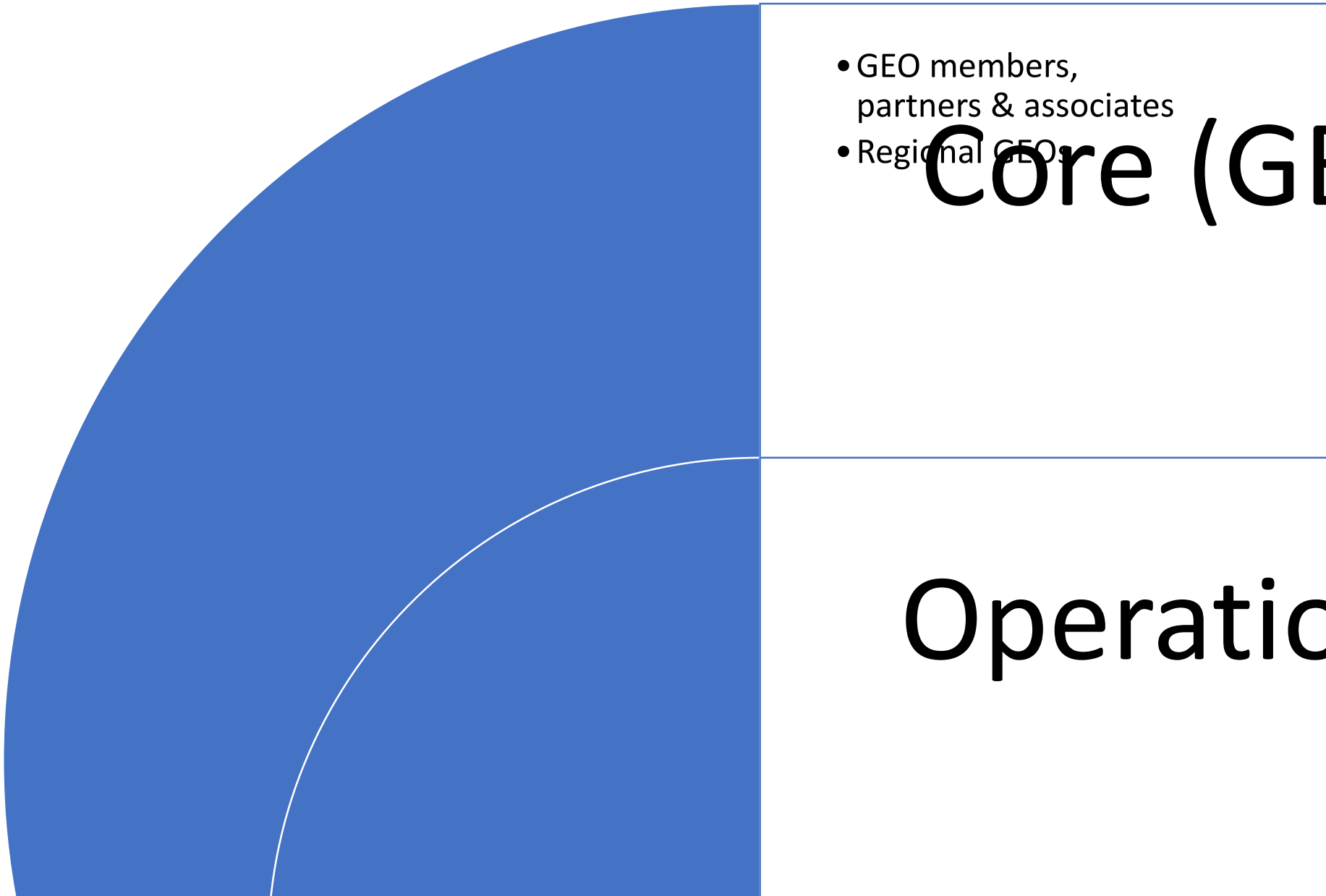
Geospatial



Earth observations

Other data

GEO activities at a glance



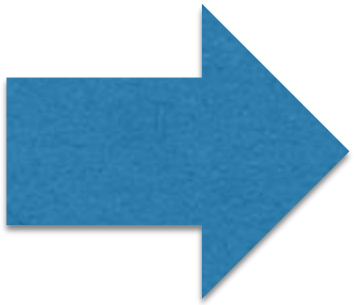
Group on Earth Observations (GEO)

The GEO Work Programme is the primary instrument to plan and implement GEO activities. The work programme for 2020-2022 is now under review.

http://earthobservations.org/gwp2020_dev.php

Implementation Plans submitted for scores of international activities, including EO4SDG and a number of these activities include the private sector, ranging from Brockman Consulting to Esri to Zurich Insurance.

Results-oriented GEOSS



The first decade
Focus on provision of open data [ongoing challenge].

The future
Focus on results based on open science, notably reproducibility.

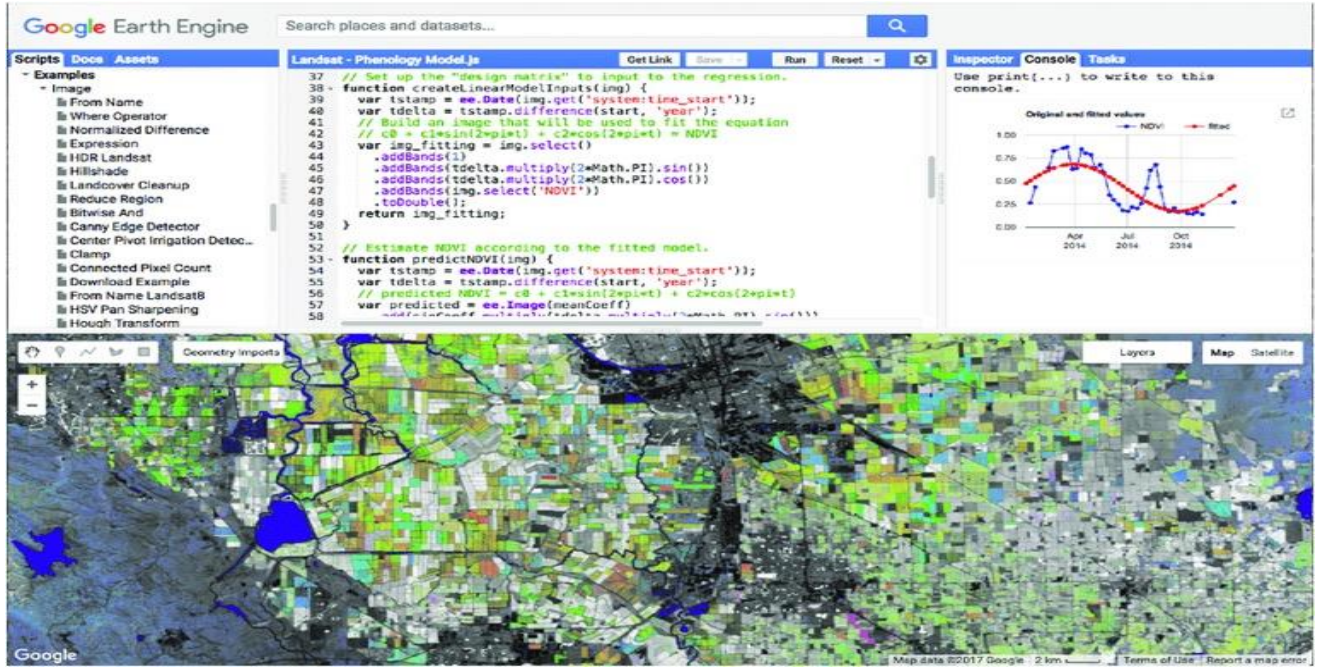
Results-oriented GEOSS

The driver for change

Easy access to the products and services developed in GEO.

Access to methods, code, models, source data, scientific papers, etc.

Enable others to reuse the results in their country, based on local circumstances.



Create a broad global network of EO practitioners who control of the tools they use, they are not just consumers of information.

Results-oriented GEOSS

Strengthening Institutions

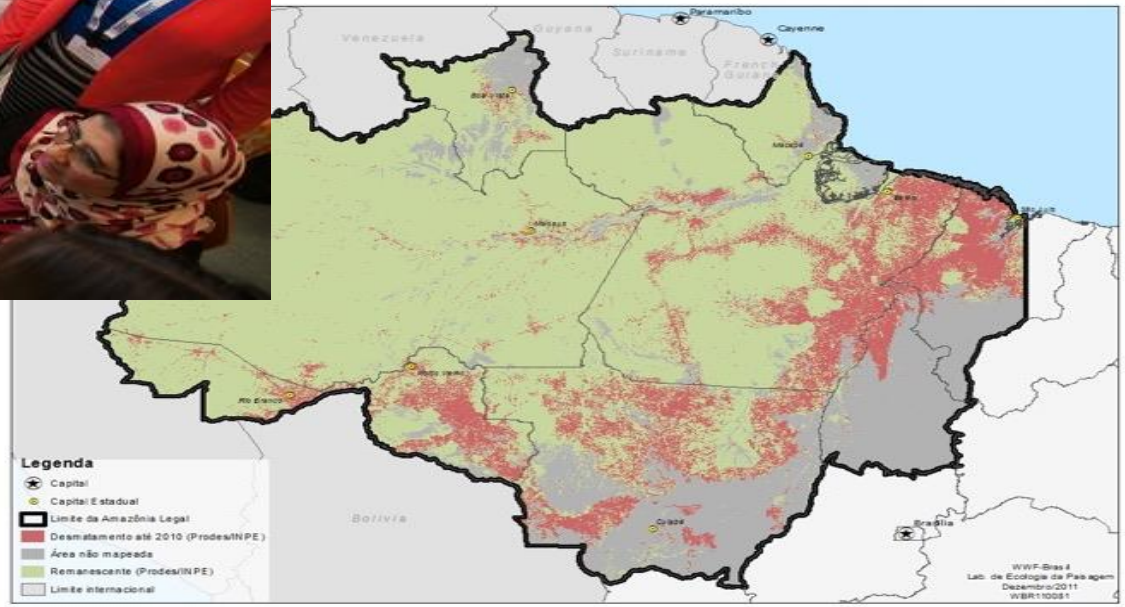
EO data

Co-design
co-production

and

Trust is the key!

Robust **and**
reliable results



GEO Engagement Priorities

Focus areas are the UN 2030 Agenda for Sustainable Development, the Paris Agreement on Climate and the Sendai Framework for Disaster Risk Reduction.

UN-Habitat recently invited the GEO Secretariat to support ongoing efforts around Sustainable Development Goal 11 and the **New Urban Agenda** through the GEO Work Programme.

SUSTAINABLE DEVELOPMENT GOALS

UN World Conference on Disaster Risk Reduction
2015 Sendai Japan

PARIS2015
UN CLIMATE CHANGE CONFERENCE
COP21·CMP11

EO4SDG key results achieved in 2017-2019

EO in SDG Methodologies

- SDG indicators 6.6.1, 6.3.2, 11.3.1, 11.7.1, 15.3.1
- Feasibility studies, pilot projects, in-depth endeavors
- **Focus on scalability & replicability of methods**

Capacity Development

- In-person training: UN-GGIM 8, RCMRD Intern. Conf. 2018, AMERIGEO 2019
- **Webinars (SDG awareness; thematic webinars)**
- **Contribution to UN-Habitat, UNEP and UNCCD**

Stakeholder Engagement

- UN IAEG-SDG WGGI, UN-GGIM, UN Custodian Agencies
- **Line ministries, NSOs, Mapping Agencies, GEO Community**

Data & Information Products

- Survey to GEO Member Countries on EO data use with SDG
- Satellite data requirements, data acquisition, access, discovery and usability (with CEOS, GEOGLAM)

GEO Report, 'Earth Observations and Sustainable Development Goals'

EO4SDG website: http://eo4sdg.org

SDG 6.6.1 Technical Brief, http://eo4sdg.org

CEOS EO Handbook on SDGs, http://eohandbook.com

SDG 11.3.1 Retrieved from: Training Module by UN-Habitat

EO4SDG Session: 2018 UN World Data Forum

EO4SDG Side Event – GEO Week 2018

Associates Category

GEO Associates means commercial and non-governmental, not-for-profit and civil society organizations can join national governments and international organizations as official GEO collaborators with no fees involved.

GEO Associates enable the application and use of GEO's global solutions at regional and local scales. GEO Associates must be registered in the territory of a GEO member country, it's the lead national government agency (GEO Principal) that reviews and approves Associates.

AfriGEO – value provided

- Framework for strengthening partnerships within Africa : AfriGEO foster intra-continental partnership and connects Africa to international partners and programmes;
- Coordination framework and platform for Africa's participation in GEO: understanding who is doing what where? Identifying capabilities, synergies and linkages and reducing duplication;
- "Co-design enabler": gathering user requirements, translating policy needs to observations requirements by scientific community to satellite specifications; and establishing communities of practice;
- Pan African initiative to raise awareness on EO : raising awareness on the value of EO, availability of resources and tools to the EO community and engaging with policy makers;
- Infrastructure: AfriGEO is working on a coordinated EO data acquisition strategy for Africa Gateway into Africa for international partners; and
- Centralized capacity building to guide implementation and adoption of Earth observation to address key societal benefit areas (SBAs).

GMES AND AFRICA

SERVIR GLOBAL
CONNECTING SPACE TO VILLAGE

Digital Earth AFRICA

1

The AmeriGEOSS Platform is a regional community resource to *promote collaboration* and *coordination* among the GEO members of the American continent.

2

- Data
- Tools
- Products
- Services
- Resources

3

Communities

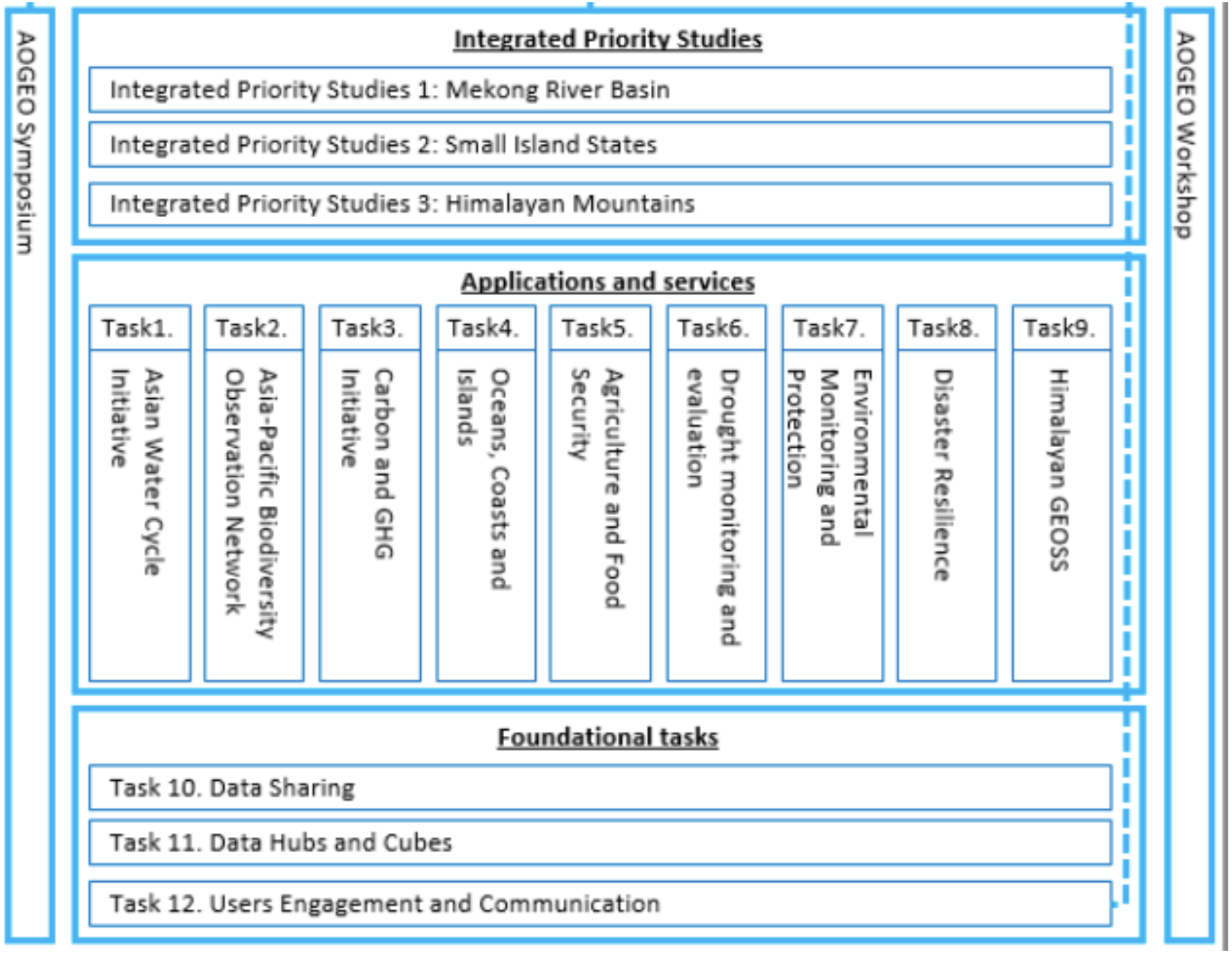
Agriculture

Biodiversity & Ecosystems

Disasters

Water

AOGEO – regional tasks



EuroGEO – value provided

- Delivering an integrated European contribution to GEOSS and increasing GEOSS benefits for Europe;
- Acting as an incubator in cooperation with Copernicus/European countries/organisations to produce & test EO services and applications
- Delivering specific EO applications benefiting from integrating global datasets made available through GEOSS;
- Promoting, scaling up and developing EO applications in association with users;
- Building on Copernicus Data & Information Access Services (DIAS) + Horizon 2020 resources; and
- Compliance with GEO engagement strategy: **supporting the implementation of UN 2030 Agenda for Sustainable Development**.

GEO-AMAZON WEB SERVICES – EARTH OBSERVATION CLOUD CREDITS PROGRAMME

GEO and AWS have awarded $1.5 million in grants, cloud services and technical support for projects in developing countries to use Earth observations to support sustainable environmental development based on GEO priorities.

DevelopmentSeed and Sinergise have both supported this programme from a European and North American perspective.

21 projects announced in 17 developing countries.
http://www.earthobservations.org/article.php?id=362

Brazilian Earth Observation Data Cube using AWS for Land Use and Cover Change	National Institute for Space Research (INPE)	Brazil
Fire Monitoring Service	Tsinghua University/China	China
A Global Modeling Tool for Nature's Contributions to People in Sustainable Development	Ministry of Environment and Energy	Costa Rica
Filtered Alert Hub Toolset	Cairo University, Electronics and Electrical Communications Engineering Department	Egypt
Computing Groundwater Potential in Arid and Semi-arid parts of Ethiopia.	Ministry of Water, Irrigation and Energy	Ethiopia
Capacity Building on Monitoring of SDGs	Remote Sensing and Climate Center Ghana Space Science and Technology Institute	Ghana
Integrating Earth Observation Data with Censuses and Sample Surveys to Estimate Development Indicators for India	Indian Institute for Human Settlements	India
AWS4AgriSAR-Crop inventory mapping from SAR data on cloud computing platform	Centre of Studies in Resources Engineering (CSRE) Indian Institute of Technology Bombay	India
Global Mobile Tsunami Warning System using Amazon Web Sever—A Life-Saving Platform	Ikatan Ahli Tsunami Indonesia, Tsunami Research Foundation	Indonesia
agriBORA - Geodata for actionable farm intelligence	Kenya Agricultural and Livestock Research Organization (KALRO)	Kenya
EO For Sustainable Development	National Institute of Statistics and Geography (INEGI, Mexico)	Mexico/Colombia
South Asian drought monitoring and outlook system to support agricultural advisory processes	ICIMOD	Nepal
Operational monitoring system of ground deformations in Nigeria	Department of Geoinformatics and Surveying, University of Nigeria	Nigeria
Spatial Agricultural Intelligence	African Regional Institute for Geospatial Information Science and Technology (AFRIGIST)	Nigeria
Implementation of a service of information to monitor the degradation of Zones Marino Coastal	Ministry of Environment / Direction of Monitory and Evaluation of the Natural Resources of the Territory.	Peru
Automation of processes in the cloud, for the generation of mosaics of annual satellite images free of clouds, to contribute in the generation of information on changes in forest cover.	National Program for the Conservation of Forests for the Mitigation of Climate Change of the Ministry of the Environment of Peru	Peru
Air Quality Forecasting for Africa	Kigali Collaborative Research Center (KCRC)	Rwanda
AfriCulturReS Decision Support System (ADSS) Community Version	South African National Space Agency	South Africa
Methodology for SDGs indicators assessment	Space Research Institute NAS Ukraine and SSA Ukraine	Ukraine
Deep Learning for Satellite Monitoring of Illegal Amber Mining in Ukraine	Kharkiv National University	Ukraine
Monitoring Rice Paddy and Flood in the Lower Mekong Basin	HCMC Space Technology Application Center	Vietnam

GEO–AWS
21 projects from
17 developing countries

GEO and Amazon Web Services Announce Cloud Grants to Improve Understanding of Our Planet

News / 10 June 2019

Today, the Group on Earth Observations (GEO) announced the 21 projects from 17 developing countries that will be awarded $1.5 million USD worth of cloud services, grants and technical support through the Earth Observation Cloud Credits Programme.

Under the Amazon Sustainability Data Initiative (ASDI), this programme will enable Earth observations and applications to support sustainable environmental development including the United Nations Sustainable Development Goals, the Sendai Framework for Disaster Risk Reduction, and the Paris Agreement on Climate Change.

What's New

Ready for take-off: Earth Observation Cloud Credits Programme Updates

5 ways to promote women in STEM: Lessons

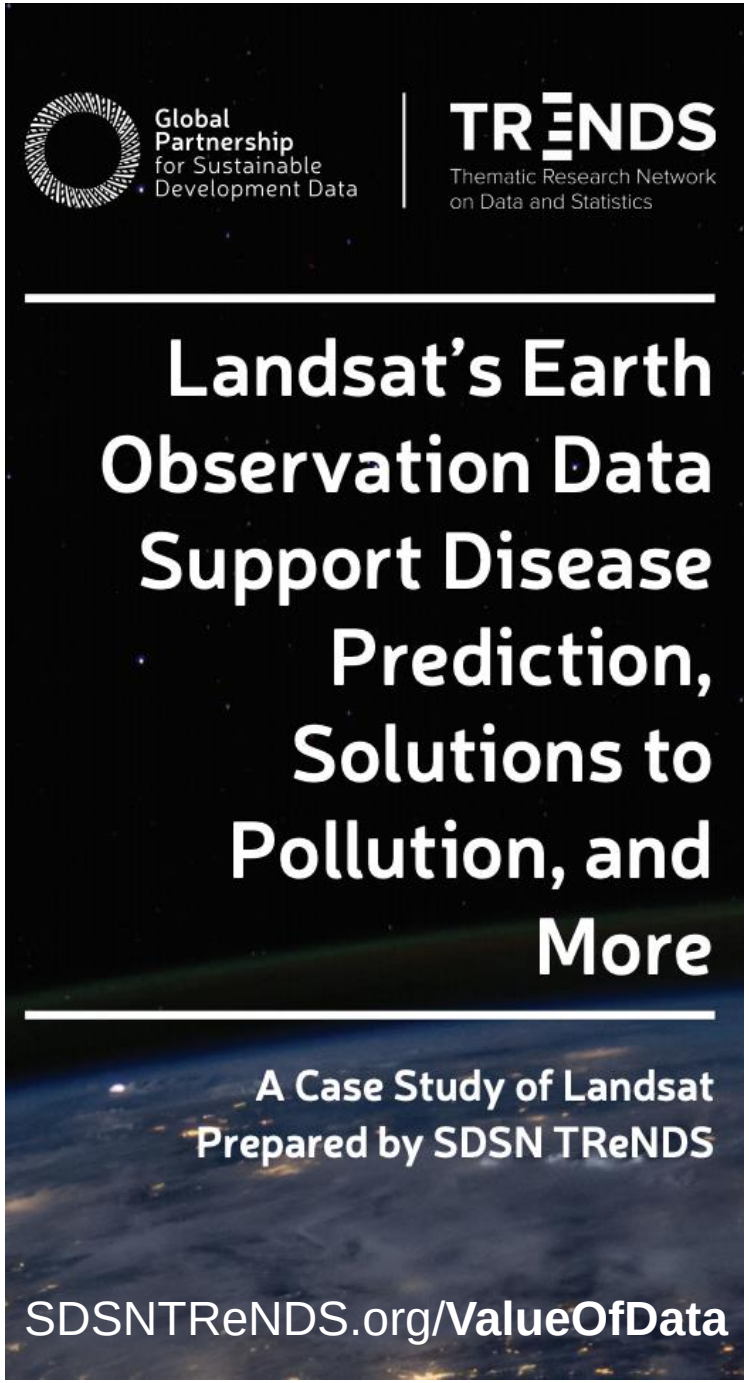
nature
International journal of science

WORLD VIEW · 17 JULY 2019

Sustainable development will falter without data

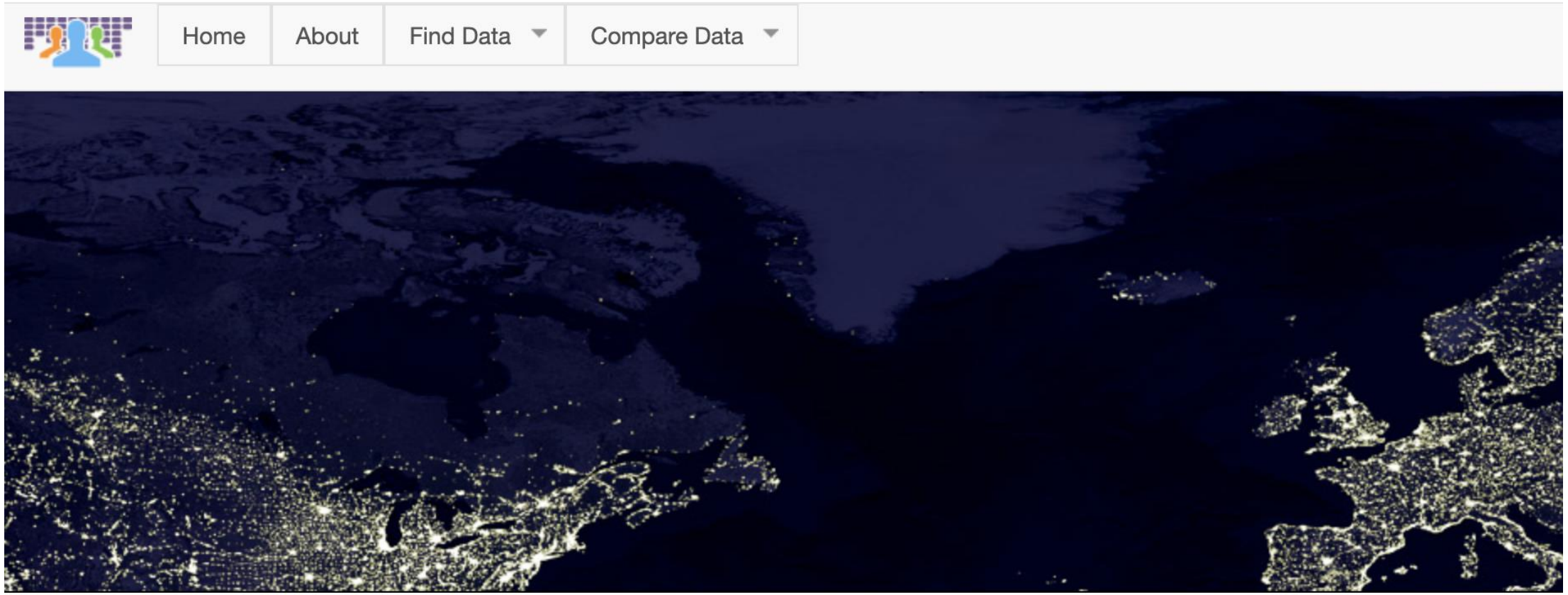
Unless governments establish competent monitoring systems, the world will not reach the UN Sustainable Development Goals, says Jessica Espey.

With daily Earth observation data, governments could monitor erosion, sand mining and illegal development and then act to stabilize fragile coastlines. Interconnected administrative systems could help to give vulnerable people access to health facilities, social services and entitlements. Data systems are the mortar with which a sustainable planet and society will be built.



Landsat has produced **annual cost savings in the United States ranging from US$350 million to $436 million** for federal and state governments, nongovernmental organizations, and the private sector.

Landsat has provided an **estimated worldwide economic benefit as high as $2.19 billion** as of 2011.



POPGRID Data Collaborative

- Improving accessibility and documentation of data sets and data services
- Comparing and contrasting methods and implications of different data sources
- Convening technical experts from the geospatial and demographic monitoring communities at events and conferences worldwide
- Developing an intercomparison report and tool that clarify how different data sets fit different needs for statisticians, policymakers, development practitioners, and other applied users

DATA4NOW

We will increase the sustainable use of robust methods and tools that improve the timeliness, coverage, and quality of SDG data through collaboration and partnership, technical and capacity support, and information sharing.


Hectares Of Forest Cover
time
1680h
+4.33%
+269
Number Of People In Extreme Poverty
time
320h
-2.73%
76%
Number Of Women w/ Bank Account
76%
Volume Of Freshwater Resources
64%

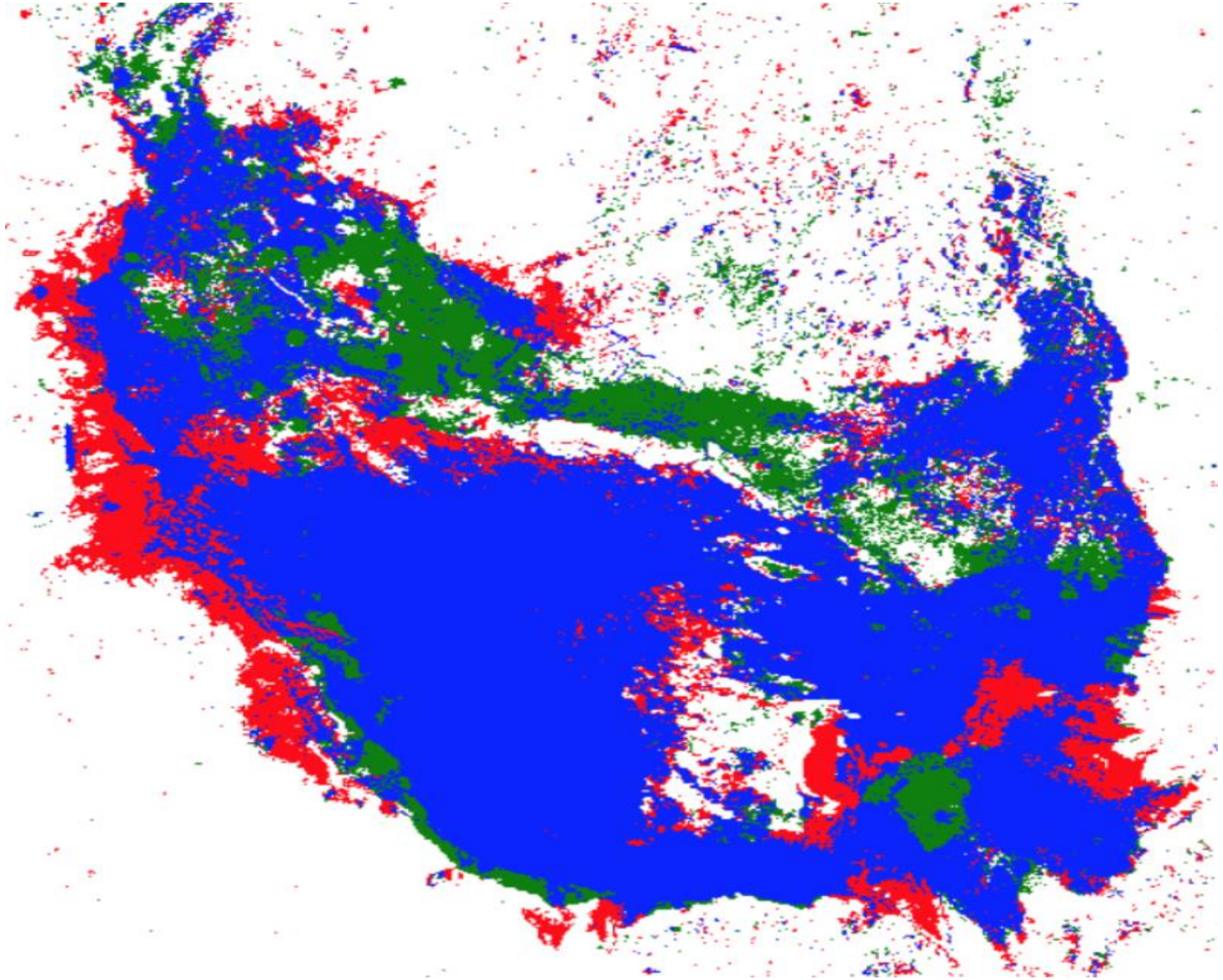
Digital Earth AFRICA

Building on the work done in the Africa Regional Data Cube by CEOS, GPSDD and others, Digital Earth Africa will provide a unique continental-scale platform that delivers analysis ready data for operational purposes.

It will track changes across Africa in unprecedented detail, and provide data on a vast number of issues, including soil and coastal erosion, forest and desert development, water quality and changes to human settlements.

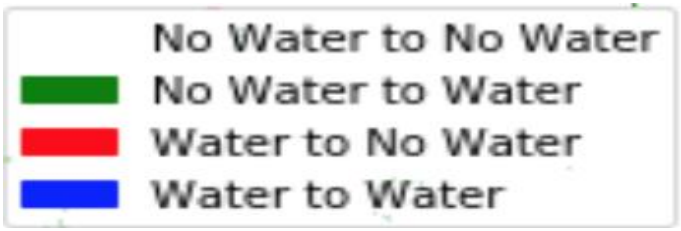
Announcement in March 2019, that almost $18m USD has been raised to support the launch of Digital Earth Africa.

SDG 6.6.1 - Water Extent

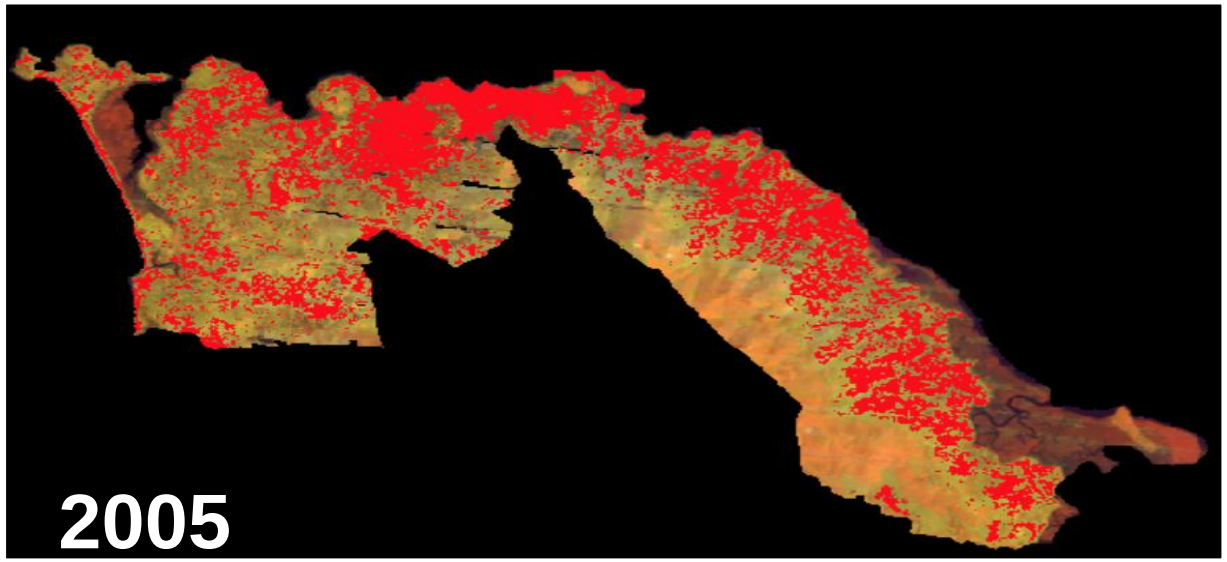


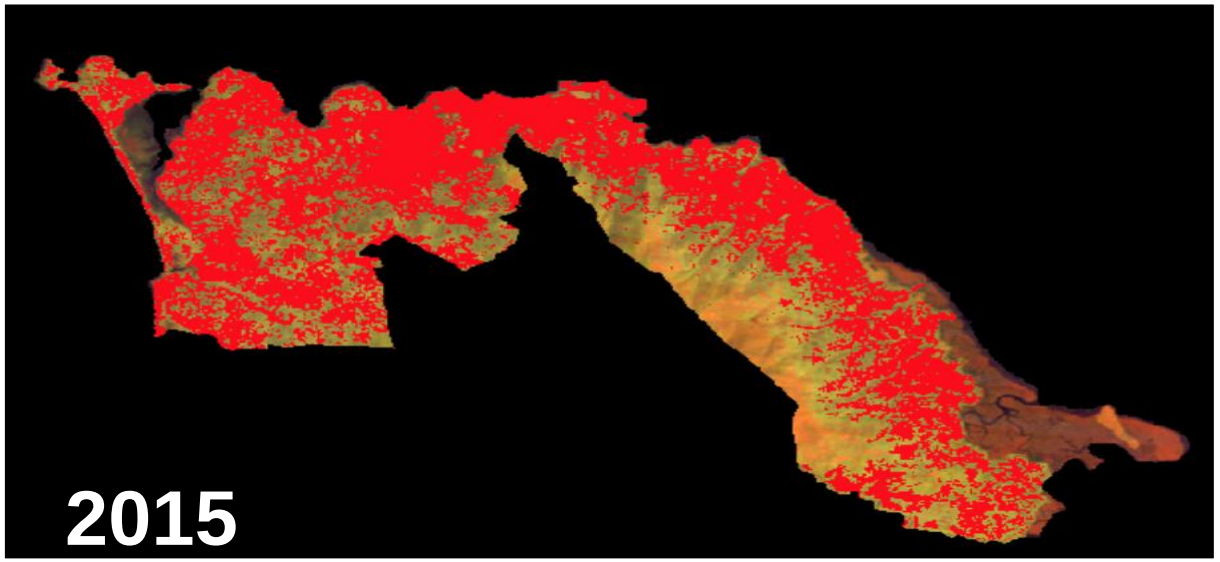
Lake Sulunga in Tanzania

net loss of 3.8%



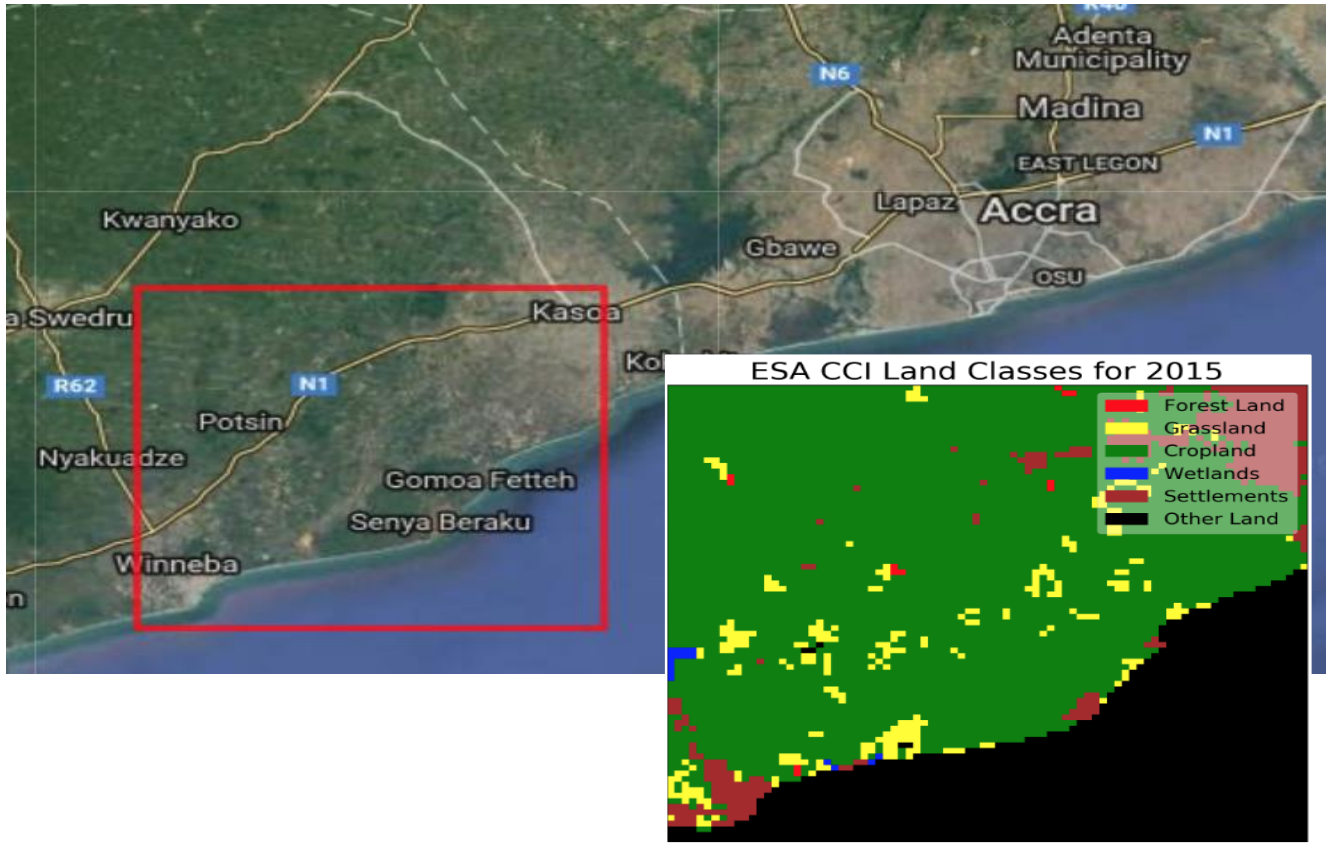
SDG 11.3.1 - Urbanization

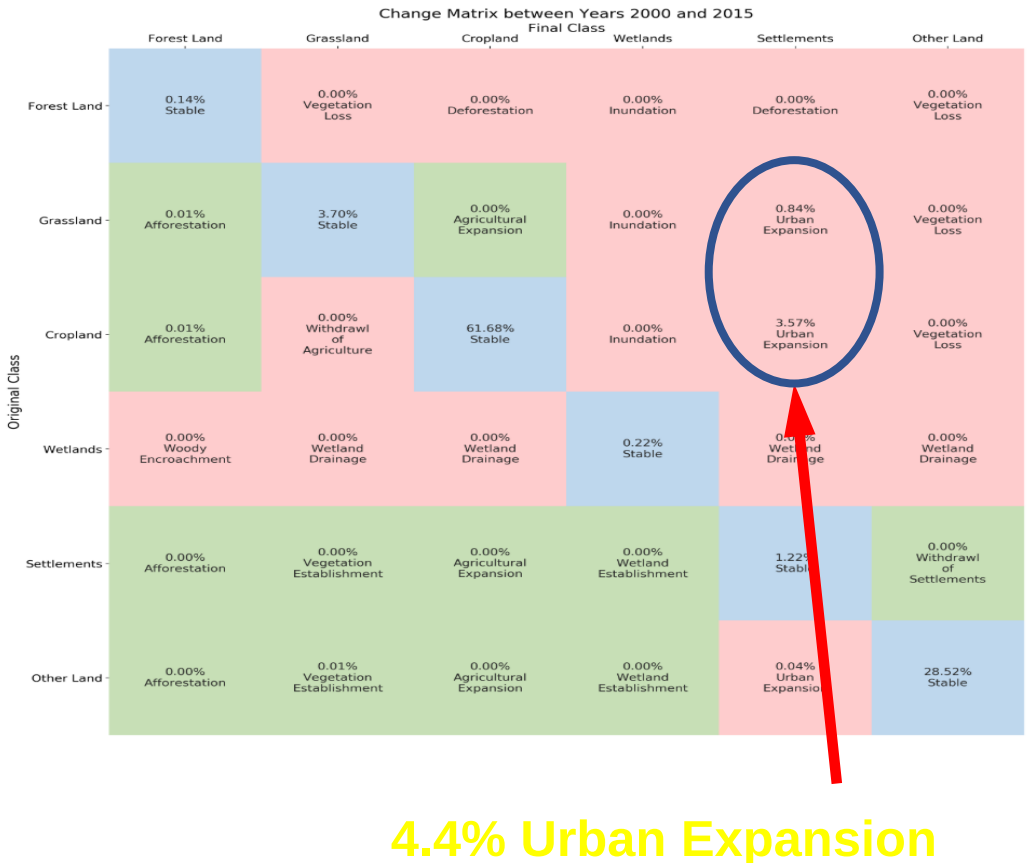




Urbanization in Freetown, Sierra Leone – 2005 to 2015

SDG 15.3.1 – Land Degradation





4.4% Urban Expansion

GEO WEEK 2019

MINISTERIAL SUMMIT

4 - 9 NOVEMBER / CANBERRA, AUSTRALIA / #GEOWEEK19

Australian Government

GEO GROUP ON EARTH OBSERVATIONS

GEO WEEK 2019 EVENTS

Monday 4/11	Tuesday 5/11	Wednesday 6/11	Thursday 7/11	Friday 8/11	Saturday 9/11
Side Events		GEO-XVI Plenary		Ministerial Summit	Executive Committee Meeting
	Executive Committee Meeting	Industry Track		Press Conference	
		Exhibition			
		Gala Dinner	Ministerial Roundtable		
			Ministerial Dinner		

GEO WEEK 2019
MINISTERIAL SUMMIT

Canberra Ministerial Summit 2019

"Earth observations: investments in the digital economy"

The importance of 2019 to GEO

Four years on from Mexico City

In 2015, Ministers adopted a new Strategic Plan for GEO focussed on three key priorities: sustainable development, climate change and disaster risk reduction.

From 2015-2018, the GEO community has restructured itself around these priorities.

In 2019, Ministers and the broader GEO community will decide how they will step up and accelerate delivery of the GEO strategy.

Policy issues that need Ministerial attention

Ministerial Summits enable Ministers to connect GEO to the bigger picture

Topics will include:

- Engagement of GEO with the multilateral economic cooperation architecture
- Engaging with vulnerable and developing nations
- Future of Work
- Trade in Digital Services
- Privacy in a Big Data World
- Sharing Economy

JOIN US ON THE ROAD TO CANBERRA

www.earthobservations.org/geoweek19

#GEOWEEK19

GEO WEEK 2019
MINISTERIAL SUMMIT

Contact

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#GEOWeek19

Collaborate and communicate with GEO:

Department for International Development

Department for International Development

UKaid from the British people

UKaid from the British people

Towards the Sustainable Development Goals

Improving the earth observation ecosystem in the United Kingdom

Ian Coady
UK Department for International Development


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Sustainable Development Goals in the UK

Department for International Development

UKaid from the British people

UK First Voluntary National Report

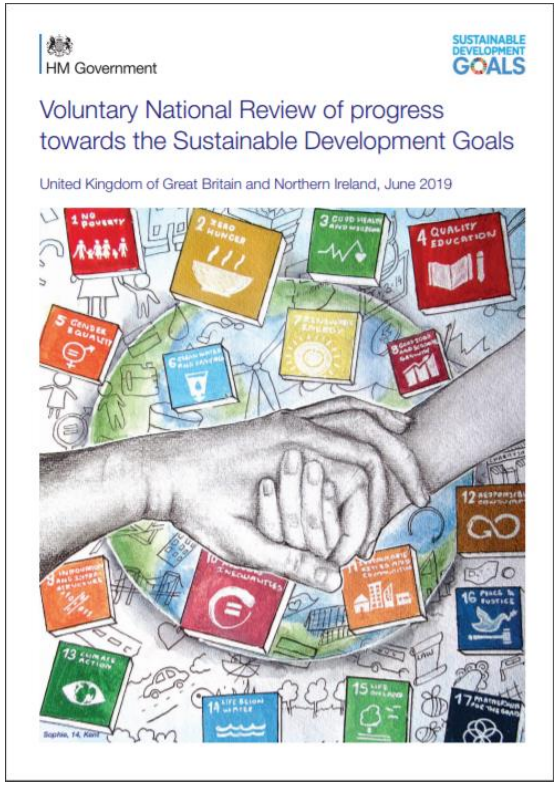
74% of indicators have data (180 of the total 244) as of June 2019

Significant progress made against:

- high-quality health service;
- high and rising standards of education;
- increasing employment – women and disabilities;
- climate and the environment.

Disaggregation highlighted as a major gap in the data

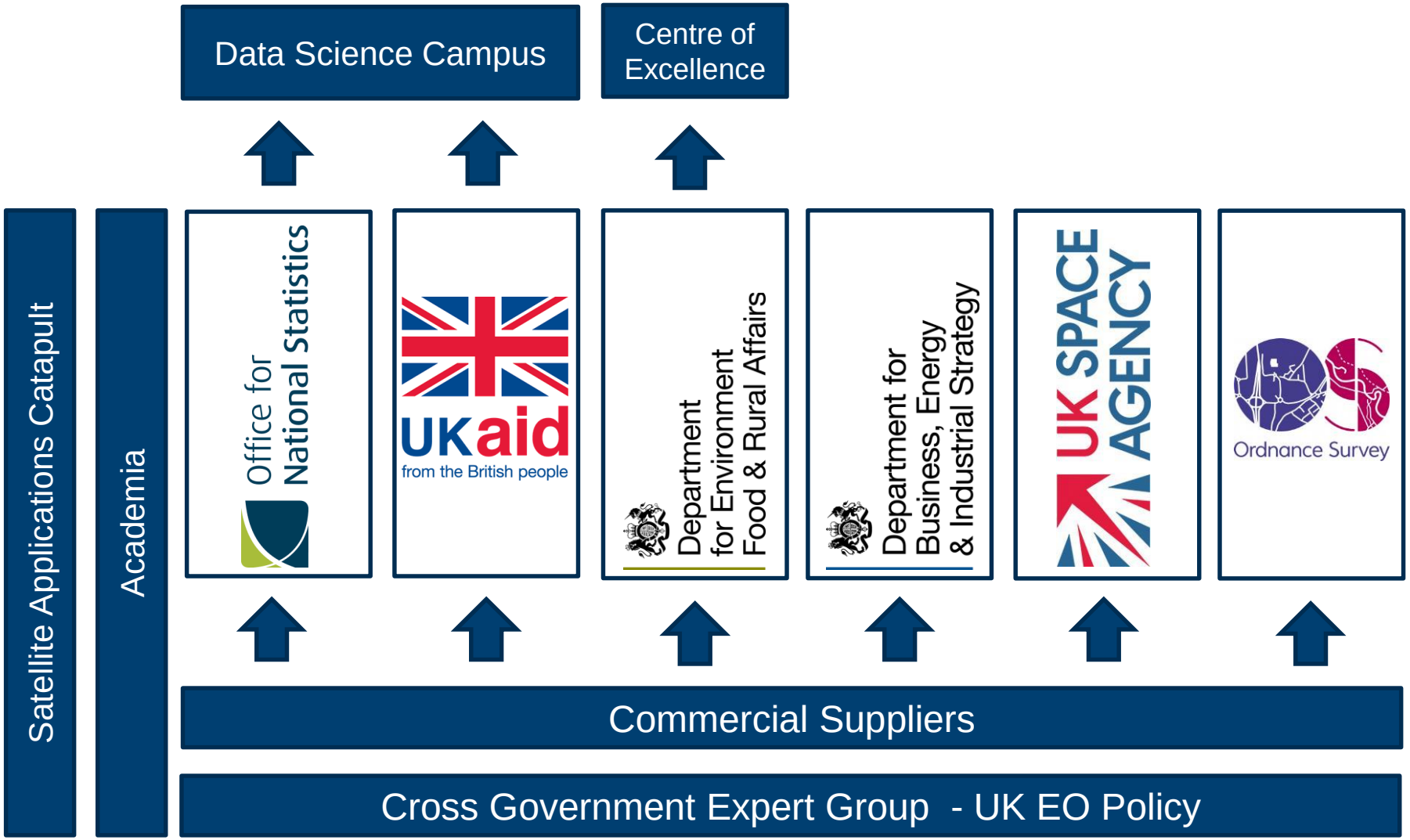
UK remains committed to 0.7% GNI on development to support delivery of the Goals



Department for International Development

Earth Observation in the UK

UKaid from the British people



Department for International Development

UKaid from the British people

Classifying urban vegetation

Joint project between OS and Ordnance Survey

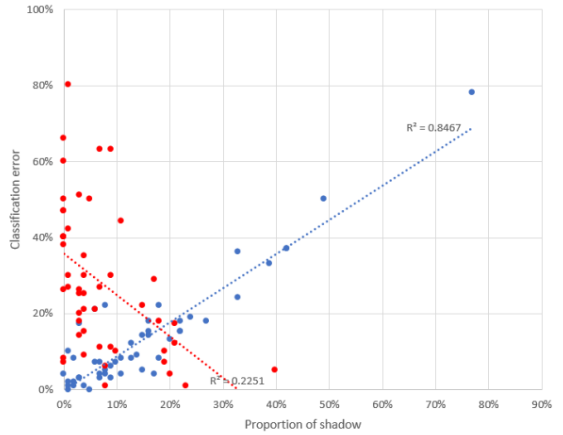
Aiming to identifying the proportion of vegetation for urban residential gardens in Great Britain.

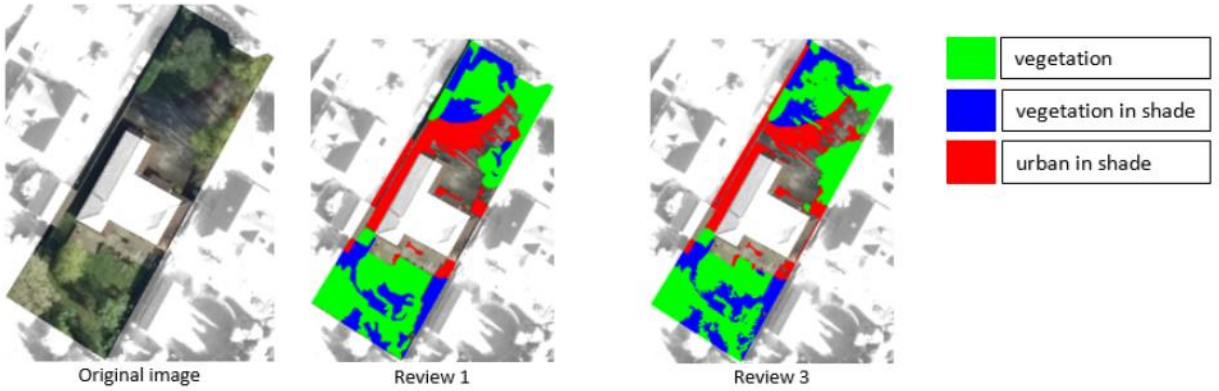
Used remote sensing and machine learning techniques with high-quality aerial and satellite imagery

Developed a tool able to classify the contents of an image with accuracy – a neural network classifier

estimate that 62% of garden space is vegetation.

In urban areas this drops to between 45% and 54%





Future-proofing of arabica coffee production in Ethiopia

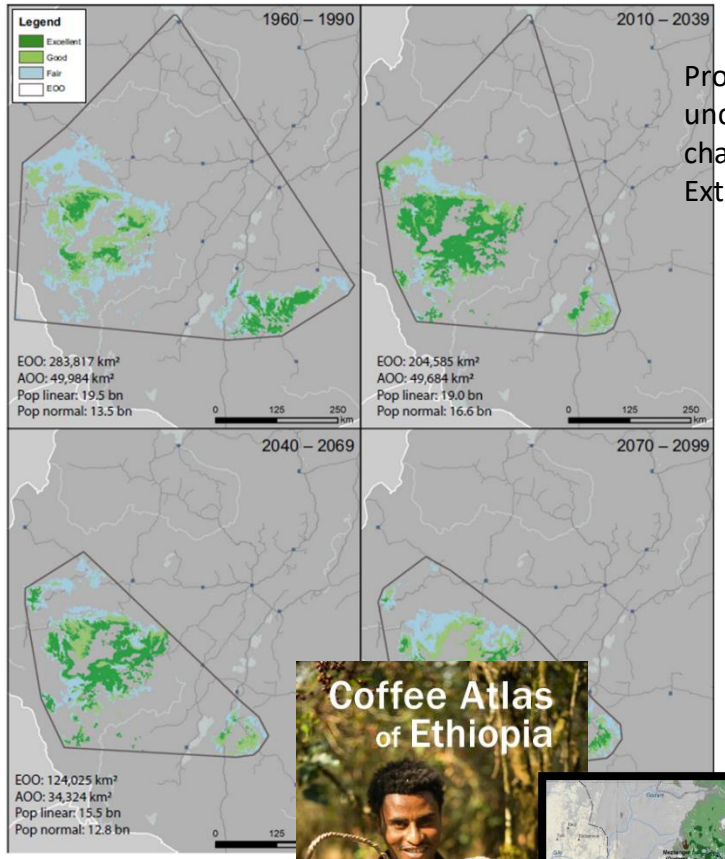
Arabica coffee is a critically important crop for Ethiopia and worldwide. Coffee as a whole it the second most traded commodity after oil.

Kew's research has been fundamental in understanding climate change threats and opportunities for this species, and particularly in Ethiopia.

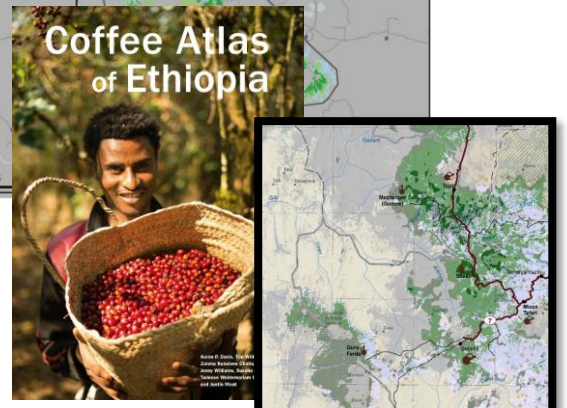
The outputs from the research include: (1) rigorous assessment of risks and opportunities for wild and farmed Arabica in Ethiopia; (2) documents and resources for decision makers; (3) resources and analyses for intervention planning and action.

Impacts:

- NGOs in Ethiopia are making decision on where and when to invest
- Ethiopian government is putting in place strategies for coffee production until 2100, based on Kew's science data and expertise
- The science is now taught at Universities
- First set of Coffee Atlas sold out



Projections under climate change
Extinction risk



Cefas' earth observation case study: Commonwealth Marine Economies Programme - Pacific

UK Government programme in Caribbean and Pacific Small Island Developing States.

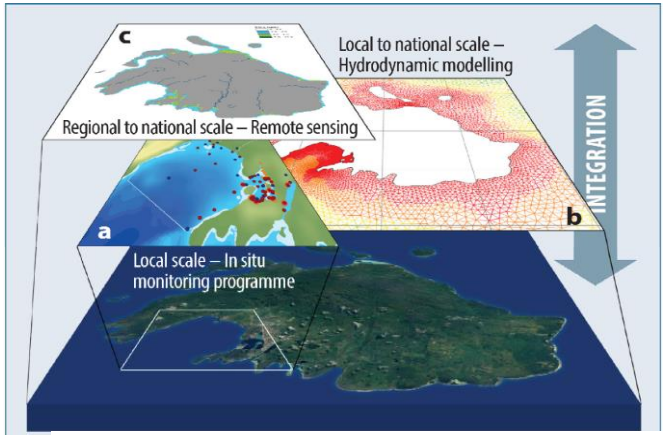
Supports sustainable initiatives to promote marine economic growth and prosperity.

Key Pacific issues include marine pollution and human health impacts, climate change and blue carbon potential (mangroves and seagrass).

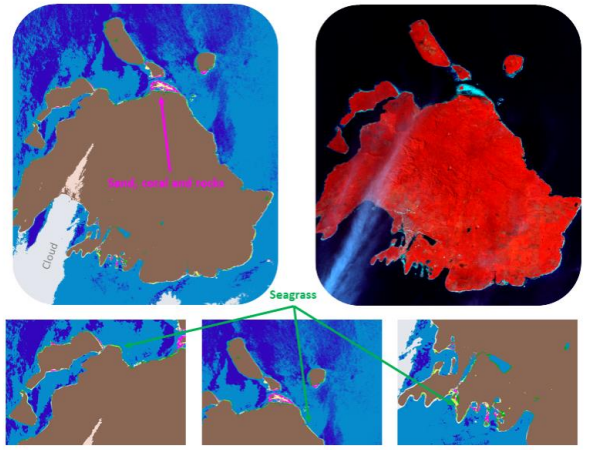
Pacific: Earth observation for pollution and blue carbon

Combine:
- EO (satellites/drones)
- *In-situ* monitoring
- Ocean modelling

- Monitor on local and national scales
- Assess current situation, explore future scenarios

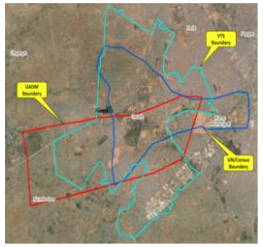


Assessing blue carbon habitats using satellite data: seagrass habitat map (left) of Efate Island, Vanuatu, derived from satellite colour data (right; false-colour image).



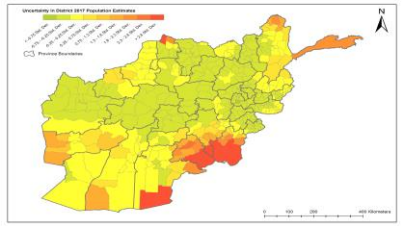
Enable all governments to collect, use and share geospatial data on population, settlement and infrastructure

Infrastructure mapping



validation of admin boundaries

Comprehensive, systematic identification of settlements



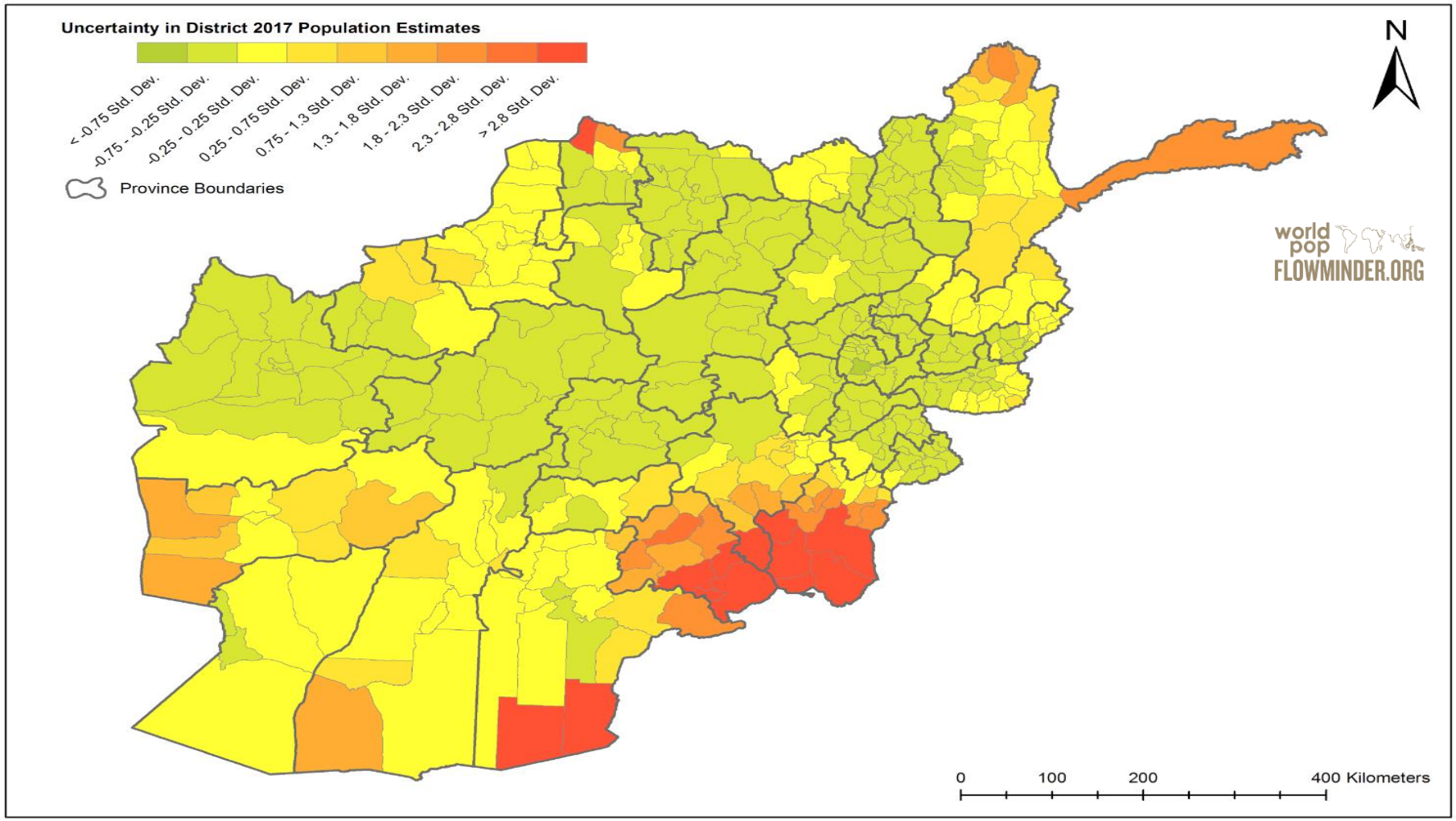
Population modelling

Inform service delivery

Improve national sampling frames

Map & disaggregate SDG indicators

Hybrid census, where needed


Uncertainty in District 2017 Population Estimates
< -0.75 Std. Dev.
-0.75 - -0.25 Std. Dev.
-0.25 - 0.25 Std. Dev.
0.25 - 0.75 Std. Dev.
0.75 - 1.3 Std. Dev.
1.3 - 1.8 Std. Dev.
1.8 - 2.3 Std. Dev.
2.3 - 2.8 Std. Dev.
> 2.8 Std. Dev.
Province Boundaries
N
world pop
FLOWMINDER.ORG
0
100
200
400 Kilometers

Department for International Development

UKaid from the British people

Counting cattle using high resolution imagery

Estimate the post-war economy in South Sudan

Triangulate ground surveys and tether counts

Analysis options:

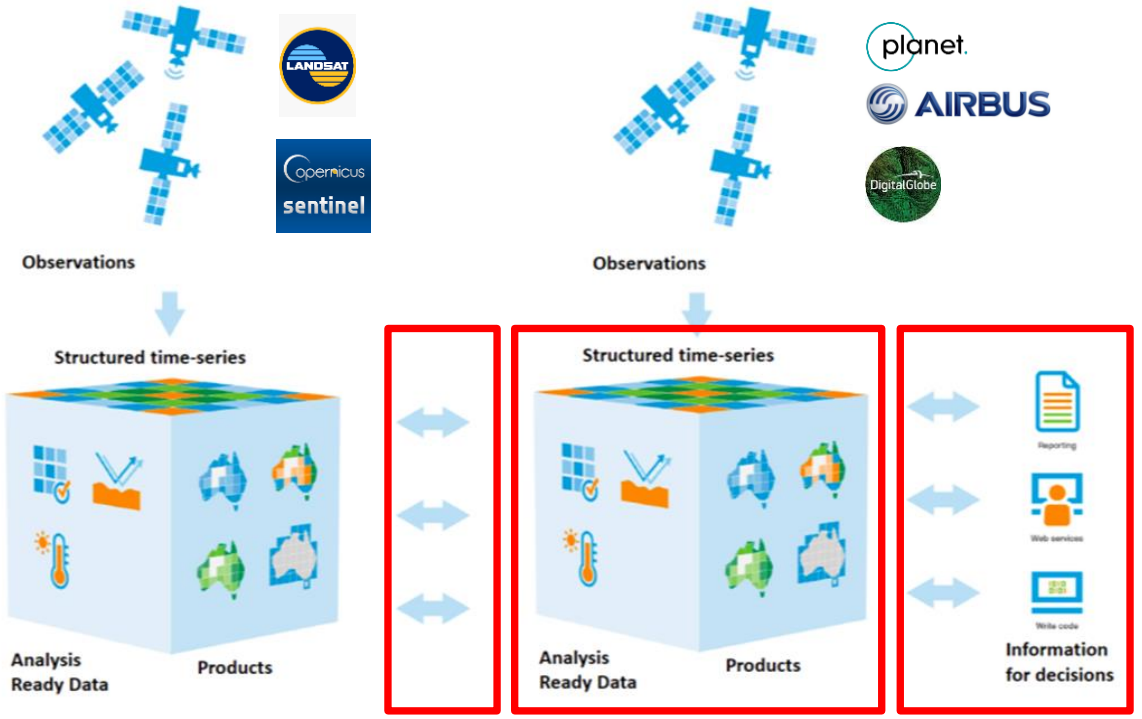
- Feature extract heads of cattle
- Feature extract herds of cattle and estimate based on density and distribution pattern
- Identify change between an image with cattle and an image without

Collaboration between ONS and DFID using the Data Science Campus

Department for International Development

UKaid from the British people

Digital Earth AFRICA
www.digitalearthafrica.org



Potential to underpin a greater exploitation of EO data across DFID's range of programmes

Department for International Development

UKaid from the British people

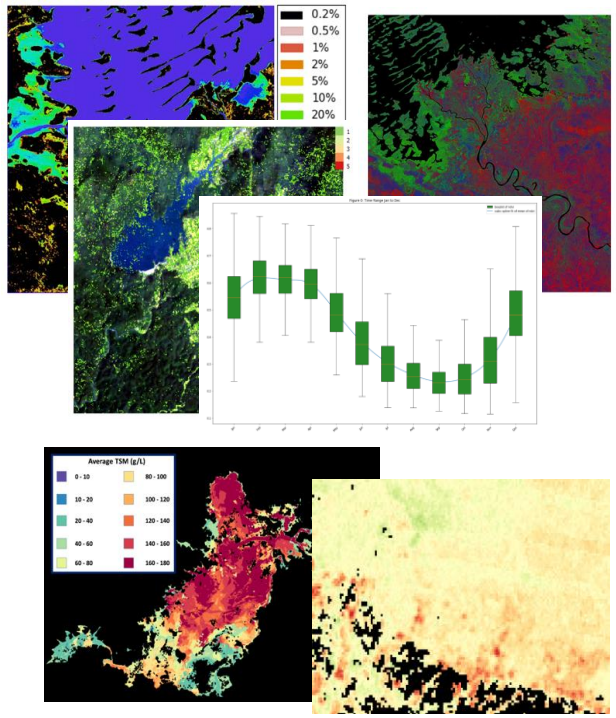
Africa Regional Data Cube

Decades of analytically ready data allowing easily accessible geospatial analysis. Initial focus on algorithms to address priorities identified by **5 countries**:

Ghana | Kenya | Senegal l Sierra Leone | Tanzania

20+ algorithms & 17+ years of data

- **Cloud-free Mosaics**
- **Spectral Indices**
- **Land Classification**
- **Water**
- **Land Change**



GEO GROUP ON EARTH OBSERVATIONS

Strathmore UNIVERSITY

Kenya Government

CEOS Committee on Earth Observation Satellites

esa

Department for International Development

International Partner Programme

UKaid from the British people

Deforestation / land use	Deforestation prevention	Vivid Economics	Côte d'Ivoire
	Forestry Management And Protection (FMAP) system	Astrosat	Guatemala
	Forests 2020	Ecometrica	Brazil, Mexico, Indonesia, Colombia, Ghana, Kenya
	Land-use interventions	Vivid Economics	Peru
	Peatland Assessment in SE Asia by Satellite (PASSES)	CGI IT UK Ltd	Indonesia, Malaysia
Agriculture	Advanced Coffee Crop Optimisation for Rural Development (ACCORD)	Earth-i	Rwanda, Kenya
	Crop Observation, Management and Production Analysis Services System (COMPASS)	Rezatec	Mexico
	EcoProMis	Rothamsted Research	Colombia
	EO4Cultivar	Environment Systems	Peru, Colombia
	Pest Risk Information SErvice (PRISE)	CAB International	Kenya, Zambia, Ghana
Climate/ Disaster resilience	CommonSensing	UNITAR	Fiji, Solomon Islands, Vanuatu
	Drought and Flood Mitigation Service (DFMS)	Rheatech	Uganda
	Earth and Sea Observation (EASOS)	Satellite Applications Catapult	Malaysia
	Flood and Drought Resilience	Airbus Defence & Space	Ethiopia, Kenya
	FireSat	Clyde Space	South Africa, Kenya, Namibia
	Modelling Exposure through Earth Observation Routines (METEOR)	British Geological Survey	Nepal, Tanzania
	SatComs for natural disasters	Inmarsat	Philippines
	Recovery and Protection in Disaster (RAPID)	Astrosat	Vietnam
	Satellite Enablement for Disaster Risk Reduction in Kenya (SatDRR Kenya)	Avanti Communications	Kenya
	SIBELIUs: Improved resilience for Mongolian herding communities	eOsphere Limited	Mongolia
Urban, infrastructure and industry	Space-based dam monitoring	HR Wallingford	Peru
	Property database for Dakar City	Airbus Defence and Space	Senegal
	Renewable Energy Space Analytics Tool (RE-SAT)	Institute for Environmental Analytics (IEA)	Seychelles, Mauritius, Montserrat, St. Lucia
	Spaced Enabled Monitoring of Illegal Gold Mining	Satellite Applications Catapult	Colombia
Maritime	Coastal Risk Information Service (C-RISE)	Satellite Oceanographic Consultants (SatOC)	Madagascar, Mozambique and South Africa
	Improved Situational Awareness in Fisheries (ISAIF)	Janus TCD	Philippines
	Satellite Enabled Maritime Domain Awareness (SEMDAC)	Satellite Applications Catapult	Chile
	South Africa Safety Initiative for Small vessels' Operational Take-up (OASIS-TU)	exactEarth	Madagascar, South Africa
	Satellites for sustainable fishing	Inmarsat	Indonesia
Education	iKnowledge	Avanti Communications	Tanzania
Health	Dengue fever Early Warning System (DEWS)	HR Wallingford	Vietnam
	SatCom for Nigerian Health Services	Inmarsat	Nigeria

Department for International Development

International Partner Programme

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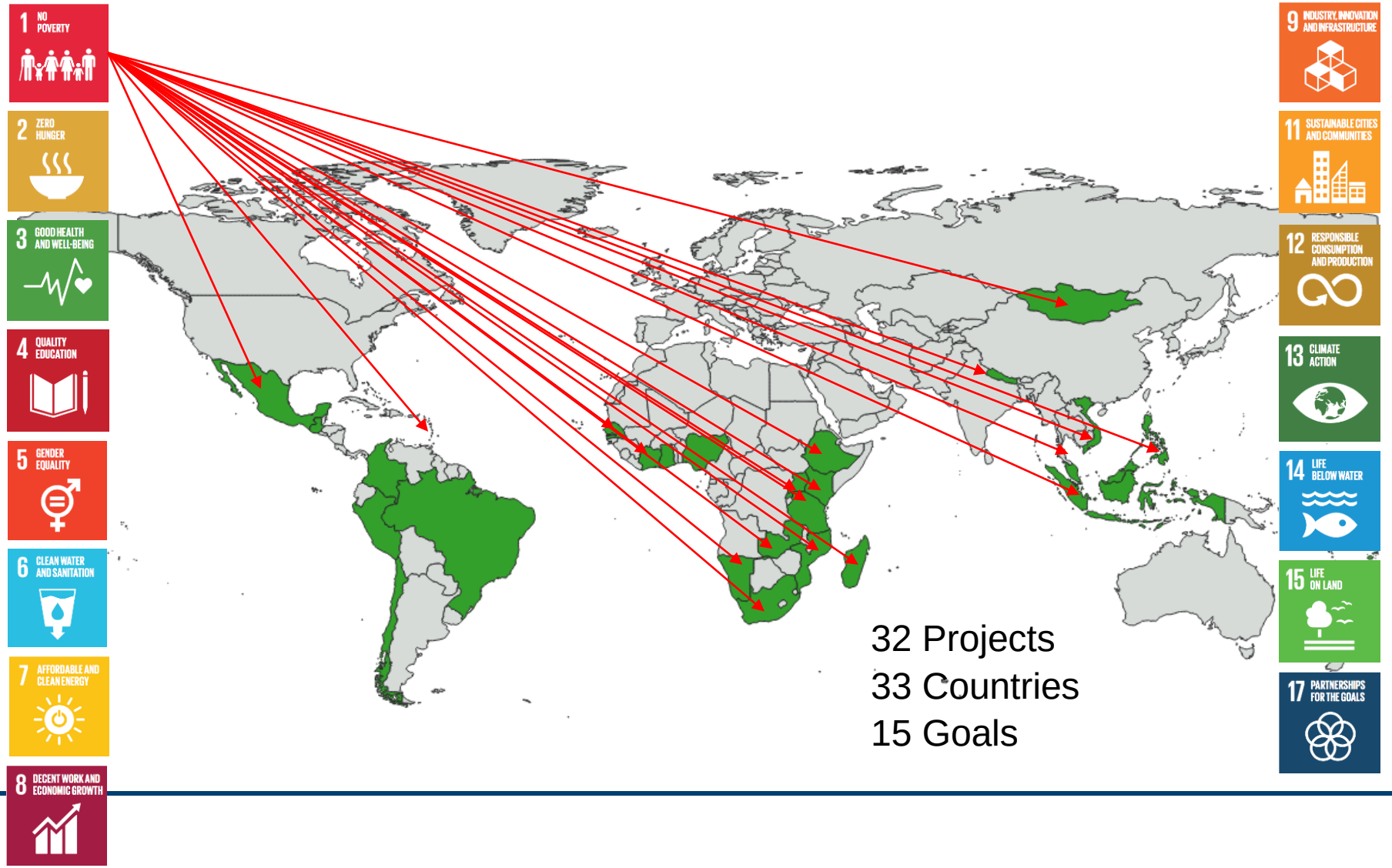
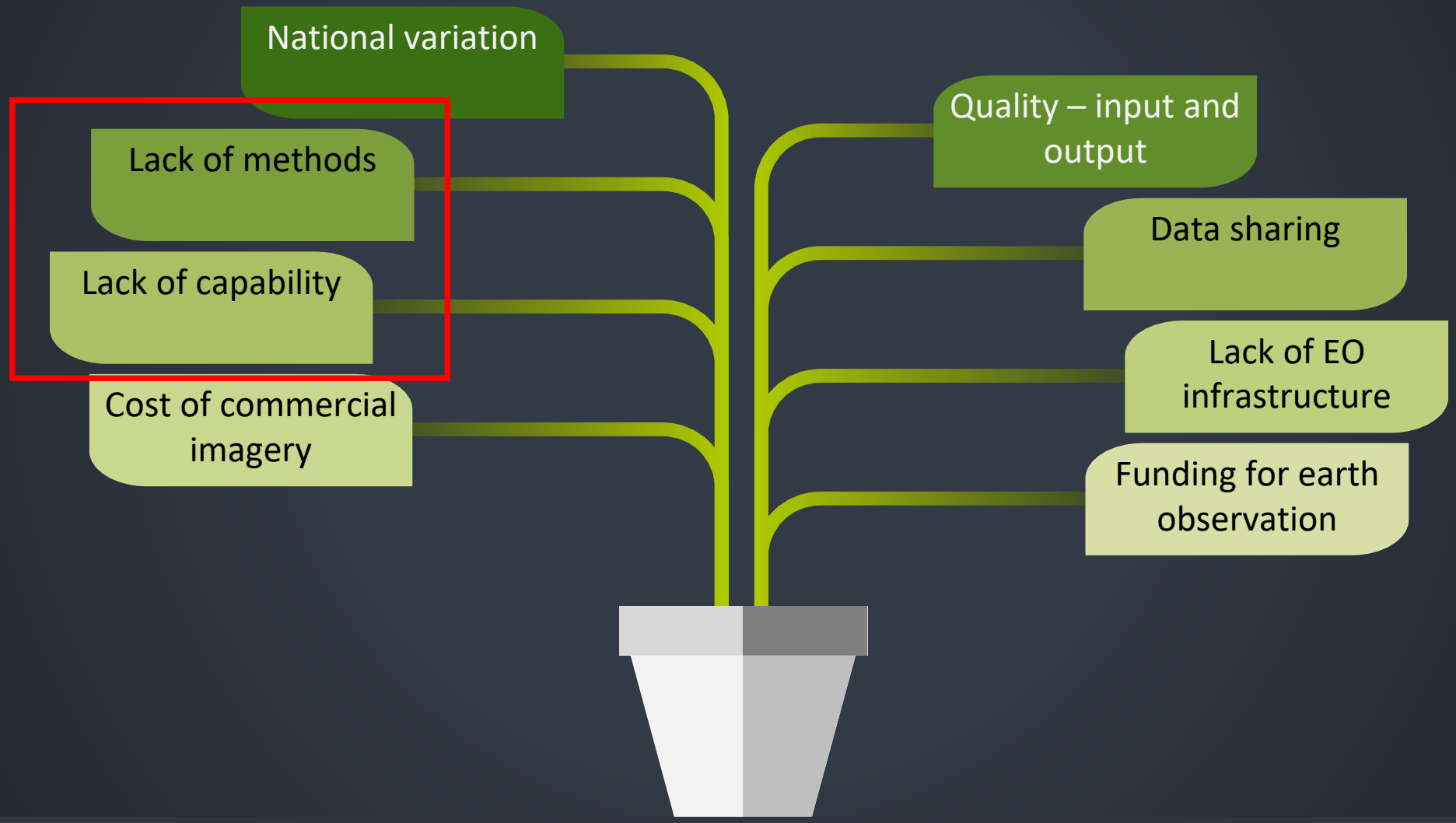
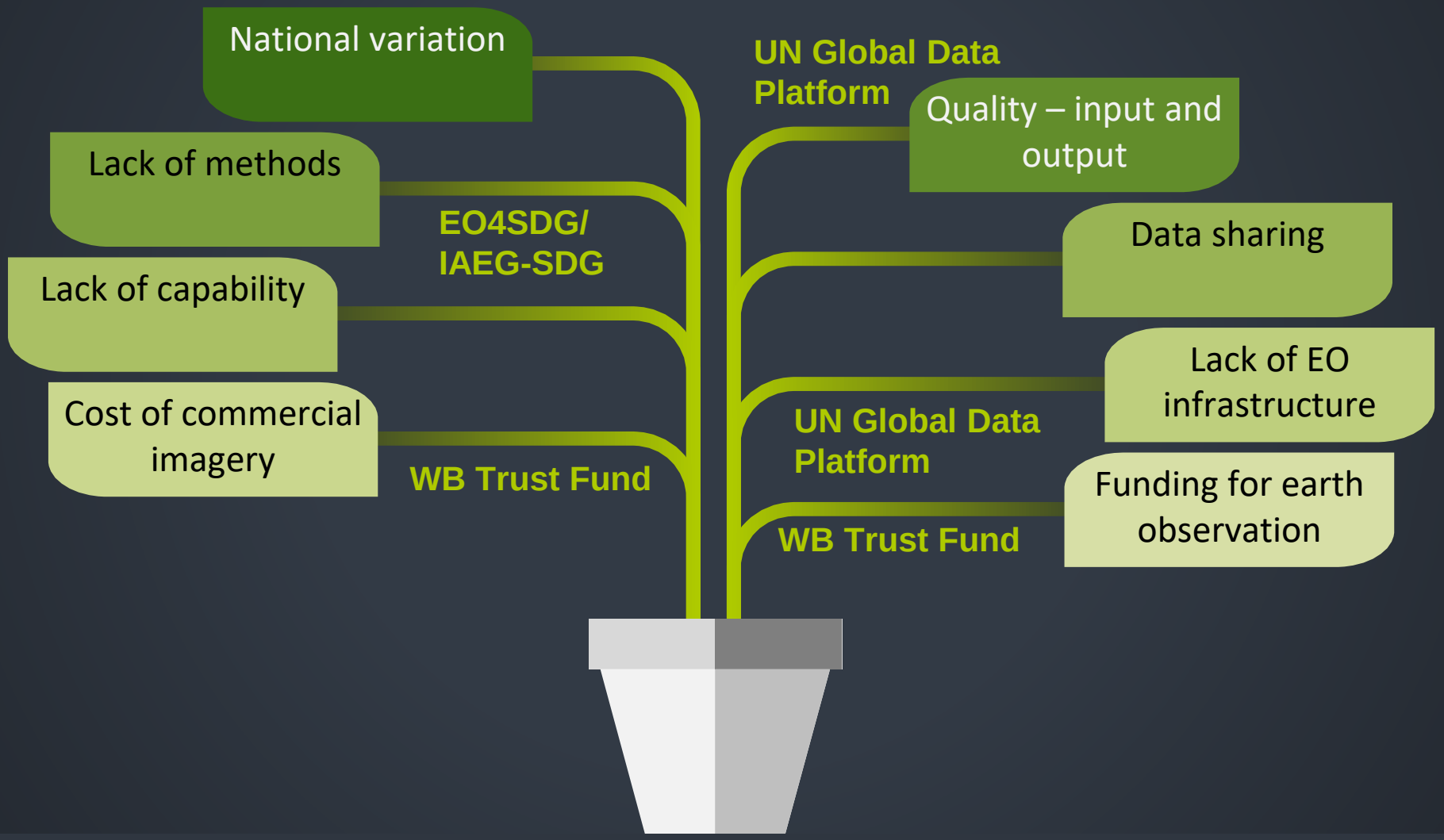


Growing the use of earth observation: Challenges



Growing the use of earth observation



Conclusion

Need more consideration of earth observation capability as an end-to-end process rather than just developing methodology and storage

UK should work towards collaborative test-beds for earth observation projects rather than siloed projects

Greater support is needed for technical infrastructure – difficult as tied to organisation specific architecture

How do we work collaboratively across other spheres of influence – statistical agencies, development agencies, geospatial agencies etc

FOCUS ON IMPACTS AND OUTCOMES

ANY QUESTIONS?

GROUP ON EARTH OBSERVATIONS

Questions & Moderated Discussion

Earth Observations for Sustainable Development Goals (EO4SDG)
Annual Meeting 2019 — Open Session
9th Session of UN-GGIM

http://eo4sdg.org
@EO4SDG

5 August 2019 / New York, U.S.A.