Cooperation in International Waters in Africa

WORLD BANK GROUP
Water

July 2-5, 2019 | Tunis

CIWA

Africa's Water Challenges

- Africa's growth and poverty reduction are highly dependent on water: (food security, energy, health etc)
- Africa is vulnerable to water-related shocks: (Droughts and floods)
- High degree of variability in rainfall across countries, within countries, and across seasons
- 90% of surface water shared across countries

The ten major river basins in Africa

Africa's Water Challenges

- Cooperation in shared waters is important as demand grows, increasing pressure on the resource base

- CIWA was founded in 2011 to support Sub-Saharan countries in taking a cooperative approach and ensure sustainability of the water resource base

- CIWA's objective is to strengthen cooperative water resources management and development to enable sustainable, climate resilient economic growth in the region

CIWA's Strategic Positioning

Objective	Assist riparian governments in Sub-Saharan Africa to unlock the potential for sustainable, climate resilient growth by addressing constraints to cooperative water resources management and development
Vision	A 10+ year $200m program aiming to: • Influence $10 billion in investments • Benefit 50 million people
Formula	• Supporting information, institutions, and investments… • Primarily through recipient-executed **grants**… • Implemented by RBOs, RECs, CSOs, or Countries…

CIWA Supports Investments, Institutions and Information

Investments	Information and Institutions
Facilitating Agreement	River Basin Planning
Scoping	Monitoring Systems
Pre-identification	Analytical tools
Feasibility	Stakeholder Participation
Environmental and Social Assessments	Institutional Frameworks
Detailed Design	Transboundary Operating Rules
Transaction and Legal Support	Regional Financing Mechanisms

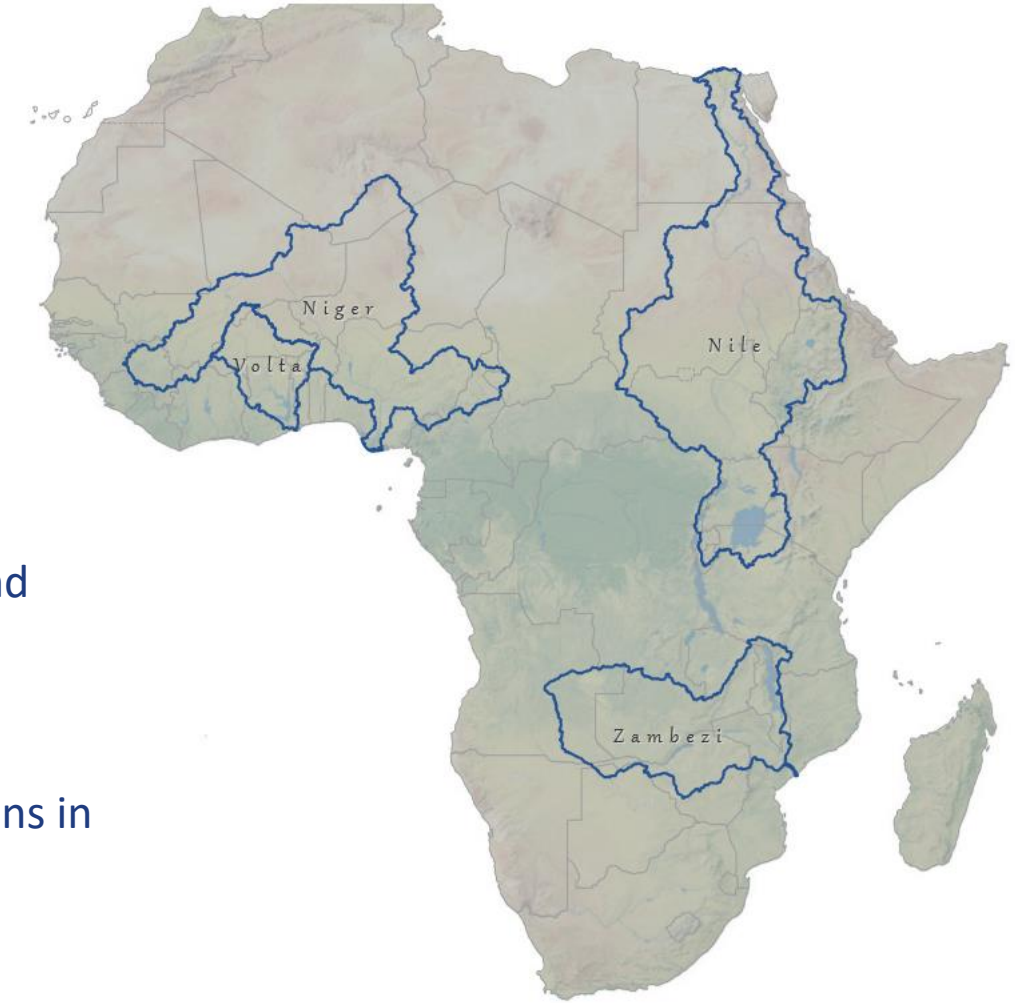
CIWA Sustained Engagements

Niger:

- Climate Resilience Investment Plan endorsed, - basin wide approach to climate resilience planning

Volta:

- Advancing water charter and communications plan – institutional framework for cooperative action
- Implementing priority actions in all six countries



Nile:

- Maintaining a platform for cooperation
- WRM capacity: flood early warning, dam safety
- Advancing prioritized investments

Zambezi:

- Basin-wide information systems
- Advancing long-term strategic planning – concept approved for basin-wide plan

CIWA Catalytic Engagements

- Catalytic Work Program – aims to generate and share knowledge that can facilitate cooperative development and management of international waters; explore potential high impact collaborative investment opportunities in defined basins and regions;
  - IGAD Groundwater Initiative Recipient Executed Grant

- Digital Data Initiative

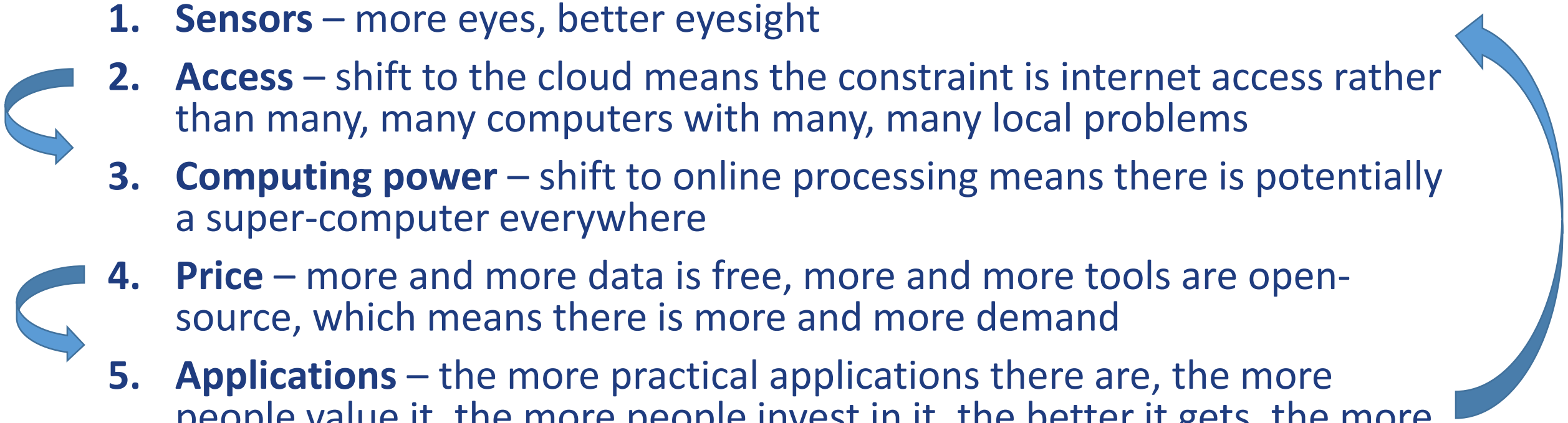
  - Potential area of collaboration between CIWA, ANBO, RBO, GPSDD

  - Harness the Data Revolution, building upon existing knowledge and systems

Virtuous Cycle of Innovation Underway

TRENDS:

1. **Sensors** – more eyes, better eyesight
2. **Access** – shift to the cloud means the constraint is internet access rather than many, many computers with many, many local problems
3. **Computing power** – shift to online processing means there is potentially a super-computer everywhere
4. **Price** – more and more data is free, more and more tools are open-source, which means there is more and more demand
5. **Applications** – the more practical applications there are, the more people value it, the more people invest in it, the better it gets, the more practical applications there are…



Digital Data Initiative: Grow Organically

Build Operational Partnerships:

- Understand data needs of user groups – AMCOW, ANBO, etc.
- Collaborate with Technical Partners in the Africa Data Cube - GPSDD
- Support CIWA clients – Basin authorities and RECs
- Develop Applications, tools in collaboration with users, stakeholders

Global Partnership for Sustainable Development Data

AFRICA REGIONAL DATA CUBE

Davis Adieno
Regional Director for Africa
Global Partnership for Sustainable Development Data

Global Partnership for Sustainable Development Data

Africa Regional Data Cube

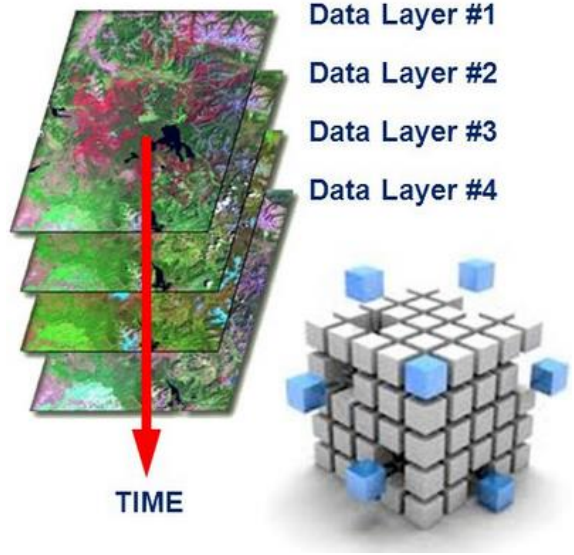
CIWA

The data cube provides analytically ready data across decades allowing for easily accessible geospatial analysis on priority thematic sectors. Initial focus for the data cube will be on algorithms to address priorities identified by GPSDD partners across **5 countries**:

Ghana | Kenya | Senegal I Sierra Leone | Tanzania

Kenya Government

Strathmore UNIVERSITY



NASA

CEOS Committee on Earth Observation Satellites

esa

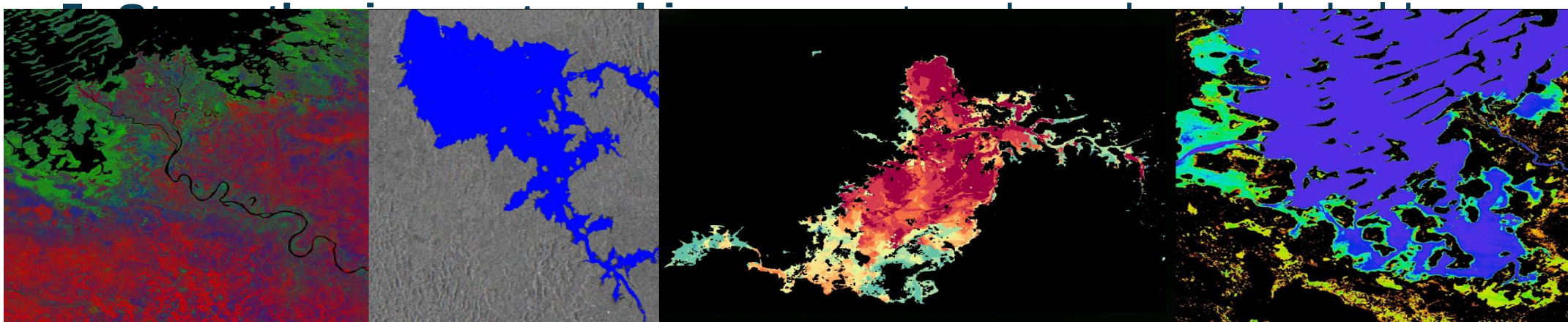
GEO GROUP ON EARTH OBSERVATIONS

Global Partnership for Sustainable Development Data

Breaking New Barriers

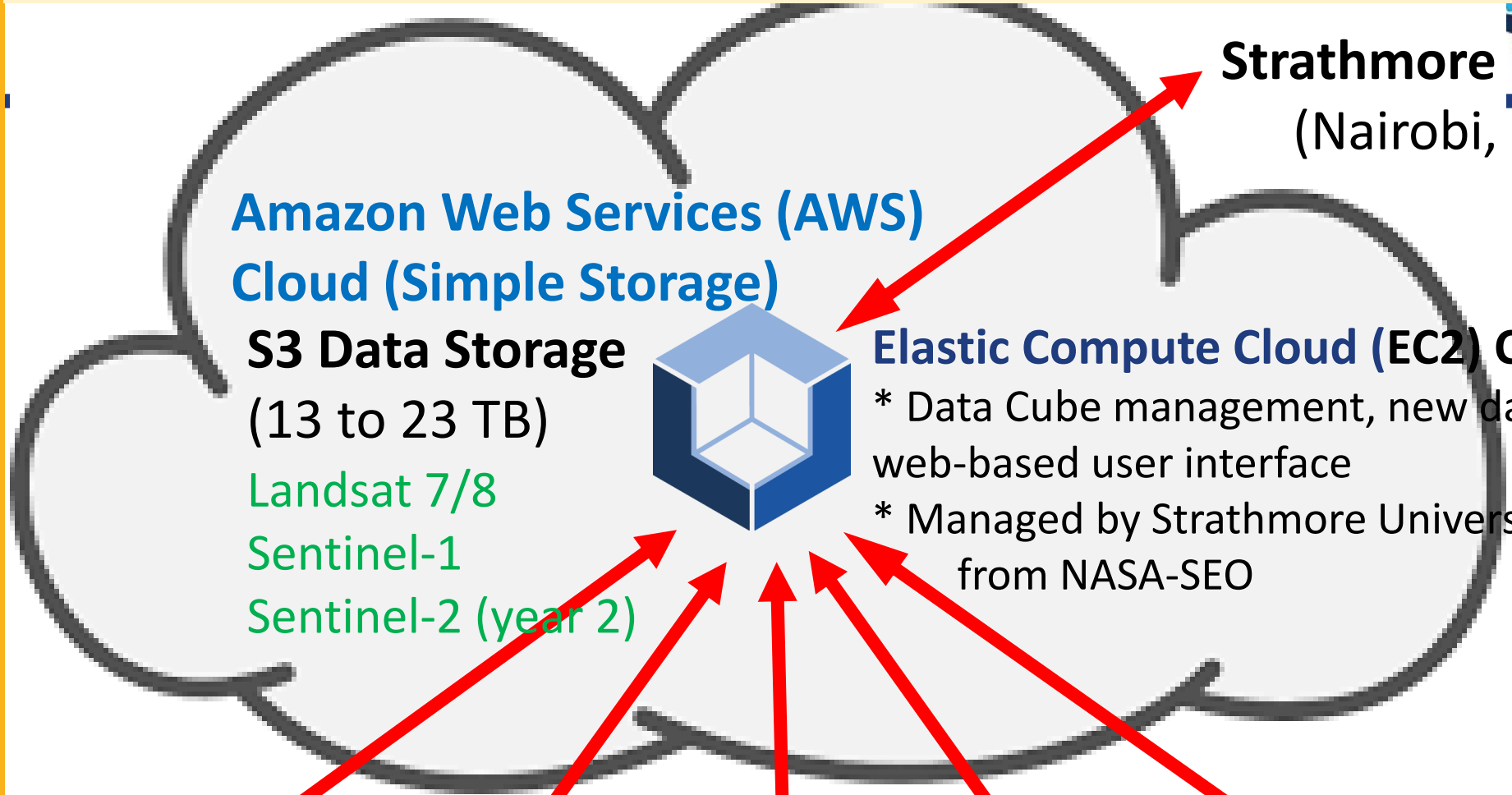
CIWA

- A regional, demand-driven data solution
- Availing satellite **data free and open source** to countries (initially based on Landsat ARD (year 2000 to 2018), with Sentinel-1, Sentinel-2 and ALOS coming soon)
- Implementation is in the cloud with a wide-range of applications
- Facilitating data and analytics (algorithms) sharing among users
- Increasing regional and global capacity to use satellite data (**skills**)
- Supporting the delivery of the SDGs & other development goals



AFRICA REGIONAL DATA CUBE

African Regional Data Cube (ARDC) Operational Model



Strathmore University
(Nairobi, Kenya)

Kenya **Sierra Leone** **Senegal** **Ghana** **Tanzania**

Each country has its own EC2 Computing "instance" for analysis purposes (User Interface and Jupyter Notebooks), but S3 data storage is shared among countries in the AWS cloud

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ARDC – 20+

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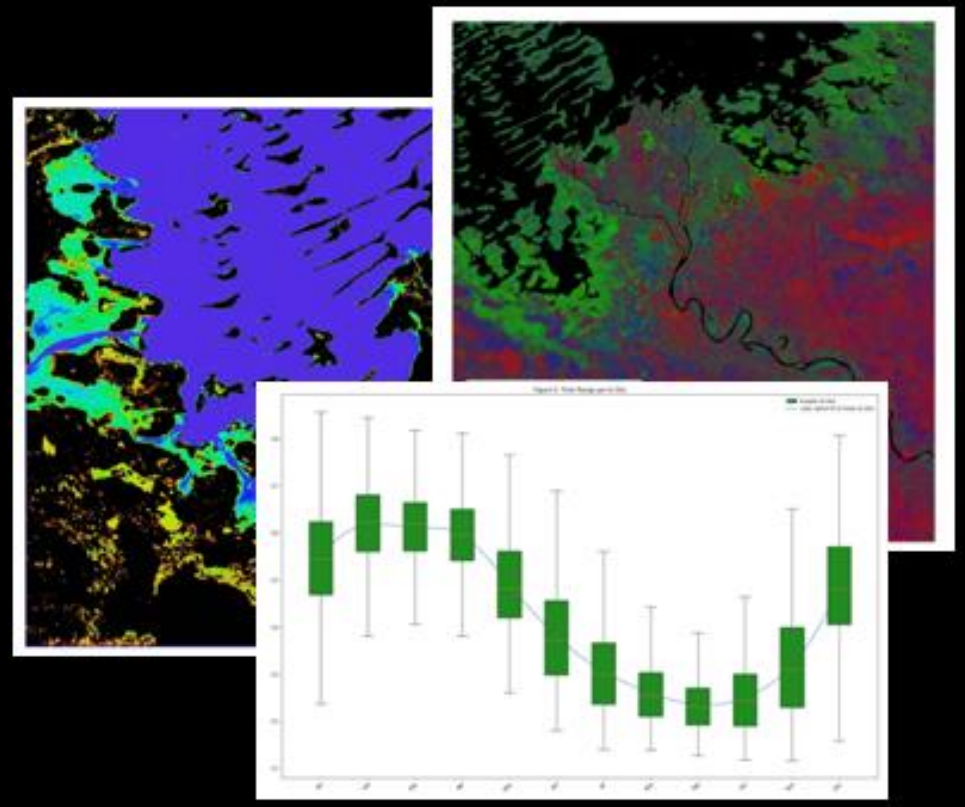
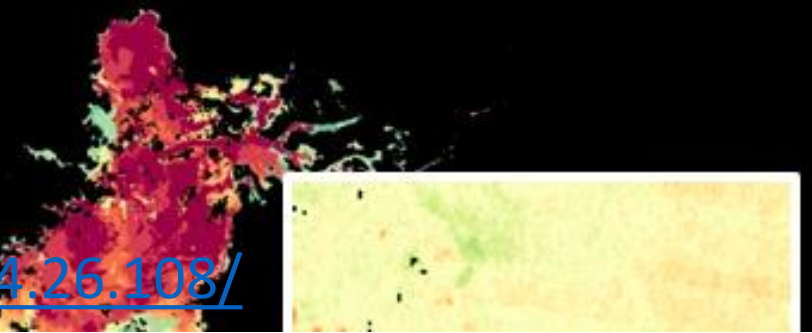
- Cloud-free Mosaics: Recent Pixel, Median, Geomedian, Max-NDVI
- Spectral Indices: NDVI, NDBI, NDSI, NDWI, SAVI, EVI, Fractional Cover
- Land Classification: K-Means, Random Forest
- Water: Landsat WOFS (Australia), Sentinel-1 WASARD (NASA), Quality - Total Suspended Matter
- Land Change: PyCCD (USGS), Spectral Threshold Anomaly, Coastal Change





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Water Extent

Lake Baringo in Kenya, Africa

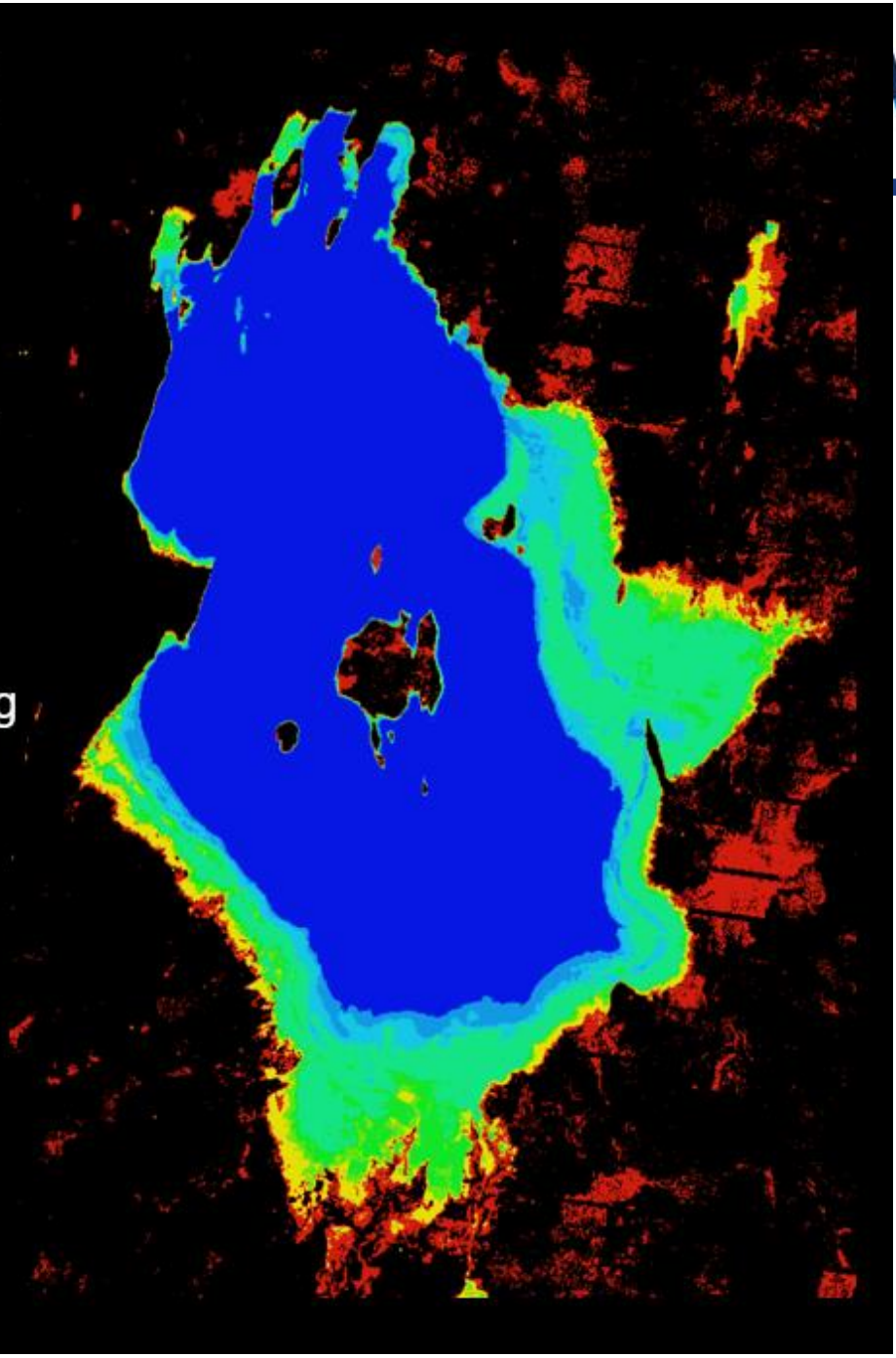
A critical habitat and refuge for more than 500 species of birds and fauna. Water levels have been reduced by droughts and over-irrigation and the lake is commonly turbid with sediment.

A 17-year time series (2000 to 2017) showing the % time that every pixel has observed water.

Normalized Water Percentage

Water observations / Clear observations

0% - 5%	40% - 55%
5% - 20%	55% - 70%
20% - 30%	70% - 85%
30% - 40%	85% - 100%



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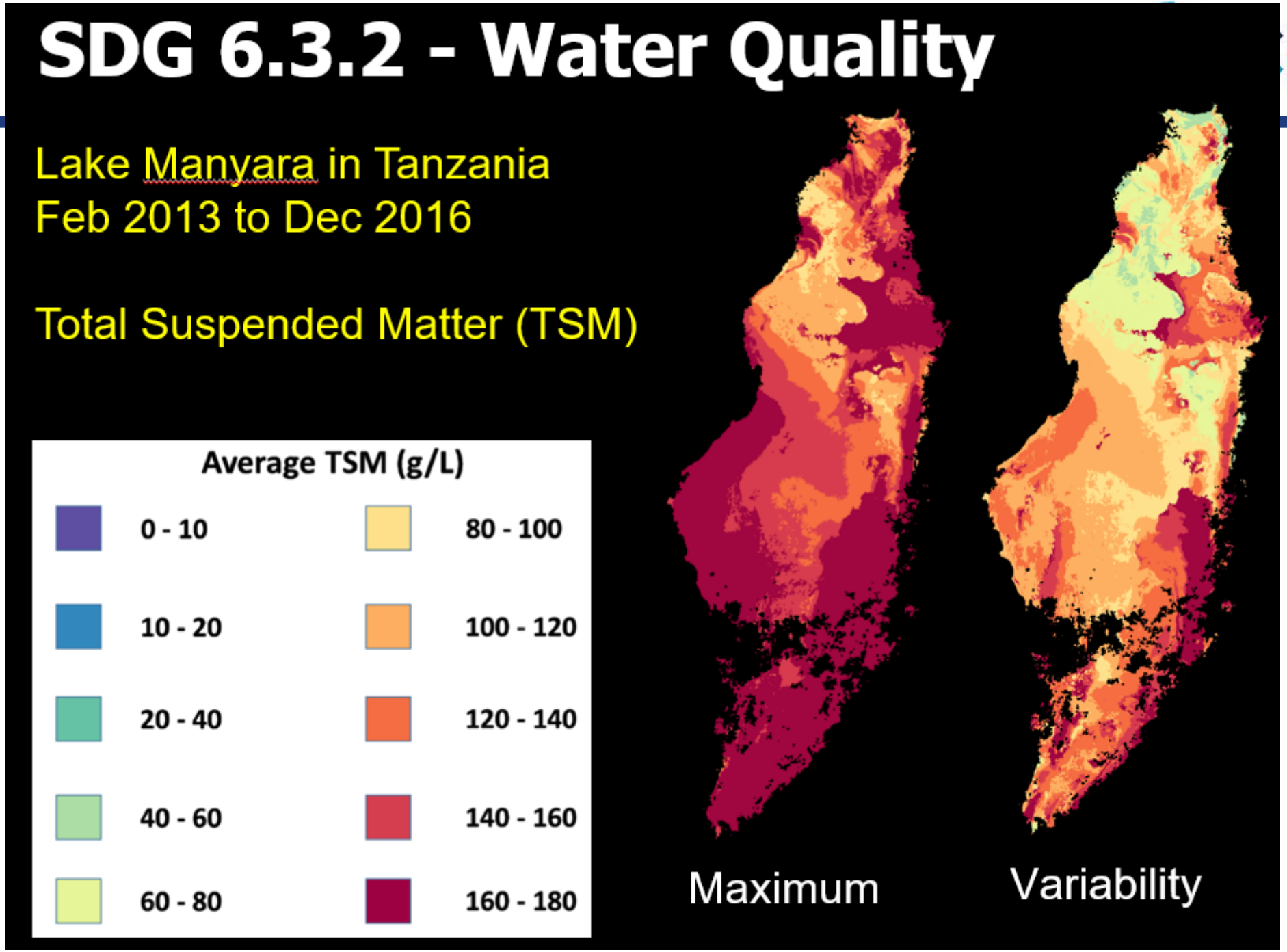
SDG 6.3.2 - Water Quality

Lake Manyara in Tanzania
Feb 2013 to Dec 2016

Total Suspended Matter (TSM)



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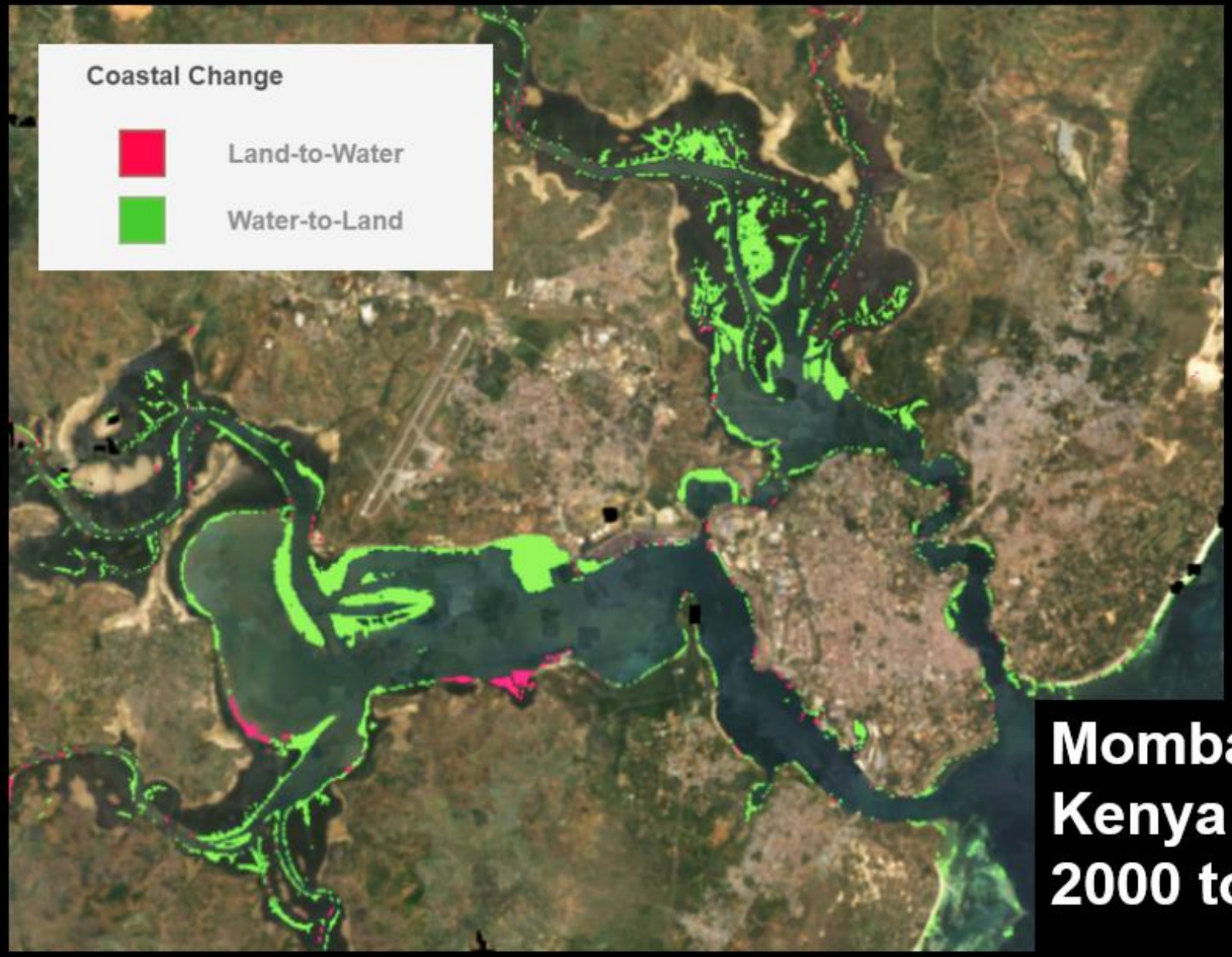
Coastal Change



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On Thursday…..

- Establishing data needs and building on current practices
- Skills and gaps assessment to leverage Earth Observations data
- Forge partnerships with political and technical stakeholders
- Interactive and participatory co-creation process to develop the water applications and EO products
- Joint testing, using and refining of water applications tools

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