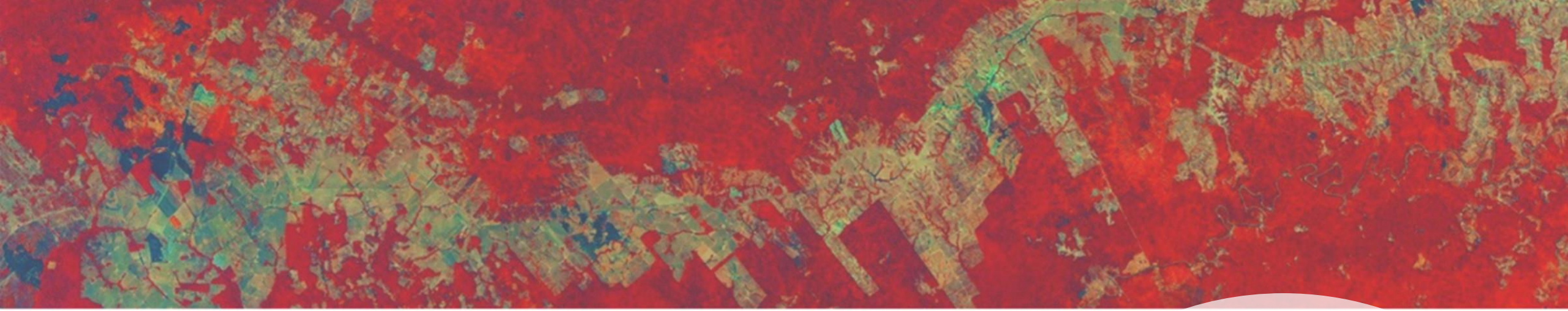

GEO CLIMATE WORKSHOP
POLICY + FINANCE

21-23 SEPTEMBER 2021

Welcome!

The meeting is starting soon

Since 2019 Dr Sara Venturini has been leading GEO's work to advance the use of Earth observations in support of climate action by UN member countries and partners. She has over 12 years' professional experience collaborating with UN bodies and advising governments and organisations on developing climate change adaptation policies, accessing climate finance, and participating in multilateral negotiations under the United Nations Framework Convention on Climate Change (UNFCCC) and the Intergovernmental Panel on Climate Change (IPCC). As a climate change advisor, she has worked with countries in the Caribbean and Indian Ocean, the Western Balkans, Central Asia, the Middle East, and Europe. She put her scientific expertise at the service of art projects, including the film anthology "Interdependence" that premiered at the Film Festival of Rome in 2019. She holds a PhD in Climate Change Science and Management from Ca' Foscari University of Venice, Italy.

Sara Venturini
Climate Coordinator
GEO Secretariat

Yana Gevorgyan is the Director of GEO Secretariat since July 2021. Ms. Gevorgyan is an expert in international relations whose career spans humanitarian relief and development, international think tanks, and government organizations. Prior to her selection as the next Director of GEO Secretariat, Ms. Gevorgyan was the GEO Program Manager at the U.S. National Oceanic and Atmospheric Administration's (NOAA). She had represented the United States to GEO in many capacities, including as a Co-Chair of the GEO Programme Board until May 2021. As a member of the United States delegation, Ms. Gevorgyan spearheaded several key initiatives in GEO, including the landmark policy on GEO Associates, the GEO Awards and GEO Pledge Campaign.

Yana Gevorgyan
Director
GEO Secretariat

GEO CLIMATE POLICY AND FINANCE WORKSHOP

Welcome by the GEO Secretariat

Yana Gevorgyan, Director, GEO Secretariat
21 September 2021

GROUP ON EARTH OBSERVATIONS

#EO4IMPACT

GEO Climate Policy + Finance Workshop

Structure

	Tuesday, 21 September 2021	Wednesday, 22 September 2021	Thursday, 23 September 2021
9.00 – 12.00 CEST			**Day 3:** **EO for climate finance decisions**
12.00 – 15.00 CEST	**Day 1:** **EO for national climate action**		
15.00 – 18.00 CEST		**Day 2:** **EO for collective ambition on climate**	

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GEO CLIMATE POLICY AND FINANCE WORKSHOP

Day 1 : Earth observations for national climate action

Opening of Day 1 and Welcome		
12.00-12.05 (5 min)	Introduction	**Sara Venturini** Climate Coordinator, GEO Secretariat
12.05-12.10 (5 min)	Welcome by the GEO Secretariat	**Yana Gevorgyan** Director, GEO Secretariat
Session 1: Countries' EO needs to support climate action		
12.10-12.20 (10 min)	Briefing on upcoming international UN Climate Change Conference - COP26	**Ailsa Stroud** Earth Observations Policy Lead, Chief Scientific Adviser's Office, Defra, UK
12.20-12.30 (10 min)	Setting the scene: importance of EO for national climate action on adaptation	**Paul Desanker** Manager, Adaptation Division, UNFCCC Secretariat
12.30-12.35 (5 min)	Perspective of LDCs	**Bapon Fakhruddin** Technical Director- DRR and climate resilience, Tonkin + Taylor, ARA network
12.35-12.40 (5 min)	Perspective of SIDS	**Stuart Minchin** Director-General, SPC
12.40-12.45 (5 min)	Perspective of LAC	**Rafael Monge Vargas** Director, CENIGA, MINAE, Costa Rica
12.45-12.50 (5 min)	Perspective of mountain nations	**Mandira Shrestha** Programme Coordinator, Climate Services - Mountain Environment Regional Information System, ICIMOD
12.50-12.55 (5 min)	Perspective of indigenous peoples	**James Rattling Leaf Sr.** Co-founder, GEO Indigenous Alliance
12.55-13.20 (25 min)	Open discussion: • What are the most critical EO needs to support climate action at the national level? • And how should they be addressed / prioritised by the EO community?	All speakers Moderator: **Steven Ramage** Head of External Relations, GEO Secretariat
Short break		

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GEO CLIMATE POLICY AND FINANCE WORKSHOP

Day 1 : Earth observations for national climate action

Session 2: GEO Work Programme activities supporting national climate action

13.30-13.40 (10 min)	Mapping of GEO Work Programme activities - initial results	**Virginia Burkett** GEO CC-WG Co-chair, USGS **David Borges** GEO DRR-WG Co-chair, NASA **Rui Kotani** DRR Coordinator, GEO Secretariat **Allison Craddock** GEO CD-WG Co-chair, IAG **Pat Cummens** Director of Government Strategy and Policy Solutions, ESRI
13.40-13.50 (10 min)	GEOGLAM: integrating EO into national adaptation efforts in agriculture in Uganda	**Ian Jarvis** Director, GEOGLAM Secretariat
13.50-14.00 (10 min)	GEOGloWS-ECMWF Streamflow Forecast: assisting Honduras in flood risk management	**Angelica Gutierrez** Co-Chair of GEOGloWS, NOAA
14.00-14.10 (10 min)	GEO Blue Planet - Dynamic Coast: supporting climate change adaptation of the coast	**James Fitton** Senior Postdoctoral Researcher, GEO Blue Planet, MaREI Centre, UCC
14.10-14.20 (10 min)	Supporting climate action at the national level: hints from the SCO	**Frédéric Bretar,** Head of SCO, CNES
14.20-14.30 (10 min)	Digital Earth Africa: a platform to support climate action in Africa	**Shanti Reddy** Senior Partnership and Implementation Manager, DE AFRICA
14.30-14.50 (20 min)	Q&A Open discussion: • How can GEO most effectively support national climate action with EO-based products? • What should be the “GEO niche” in supporting the implementation of the Paris Agreement (adaptation/mitigation/other)? • Are there any perceived gaps/synergies in the GEO WP to address national climate action? If so, how should these be addressed / exploited?	All speakers Moderator: **Virginia Burkett** GEO CC-WG Co-chair, USGS
14.50-15.00 (10 min)	Wrap-up of Day 1	**Sara Venturini** Climate Coordinator, GEO Secretariat

Workshop protocol

- Change your name into ‘Organisation: Name Surname’
- Participants: use the Q&A box for questions
- Speakers: keep within time limits
- Be aware that the meeting will be recorded for workshop report
- Twitter **#EO4IMPACT** and follow @GEOSEC2025

Session 1

Countries' EO needs to support climate action

Ailsa is the Head of Earth Observations Policy in the Chief Scientific Adviser's Office at Defra. She takes the lead in UK EO policy; developing the UK's cooperation with regional and international partners and engaging with a full range of initiatives to support Defra's use of EO data and tools. She manages the Defra Earth Observation Centre of Excellence (EOCoE) and has built a network of UK users of EO to respond to the needs of Defra and wider policy applications.

Prior to her current role Ailsa worked on the UK Ecosystem Impacts of Air Quality & Future Modelling Programme and on the UK's Greenhouse Gas Inventory Improvement Programme. Before joining Defra, Ailsa was an Ice Core Analytical Scientist with the British Antarctic Survey measuring chemicals present in ice cores retrieved from Antarctica and Greenland. This included 75 days in Antarctica drilling three 140m ice cores at three sites at 74° South, and 6 weeks at a deep ice core comprehensive drilling and analysis campaign at 77° North. Ailsa holds a PhD in Atmospheric Chemistry from the University of Cambridge.

Dr. Ailsa Stroud

Earth Observations Policy Lead, Department for Environment, Food and Rural Affairs - UK

GEO CLIMATE POLICY AND FINANCE WORKSHOP

Briefing on upcoming international UN Climate Change Conference - COP26

Dr. Ailsa Stroud, Department for Environment, Food and Rural Affairs, UK

21 September 2021

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COP26 Schedule

Week 1	Events	Week 2	Events
Monday 1st	World Leaders Summit	Monday 8th	Adaptation, loss and damage
Tuesday 2nd	World Leaders Summit And Earth Info Day	Tuesday 9th	Science and innovation And Gender
Wednesday 3rd	Finance for adaptation and mitigation	Wednesday 10th	Transport
Thursday 4th	Energy	Thursday 11th	Cities, regions and built environment
Friday 5th	Youth and Public Empowerment	Friday 12th	Closure of negotiations
Saturday 6th	Nature		

COP26 Goals

1. Secure global net zero by mid-century and keep 1.5 degrees within reach
2. Adapt to protect communities and natural habitats
3. Mobilise finance
4. Work together to deliver

Working together* to deliver

*illustrative, not exhaustive

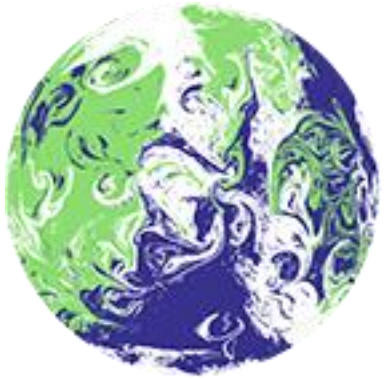
Department for Environment Food & Rural Affairs

NASA

Department for Business, Energy & Industrial Strategy

GEOGLAM
Global Agricultural Monitoring

UK SPACE AGENCY



UN CLIMATE CHANGE CONFERENCE UK 2021
IN PARTNERSHIP WITH ITALY

SPACE4CLIMATE

esa

Foreign, Commonwealth & Development Office

UN CLIMATE CHANGE CONFERENCE UK 2021
IN PARTNERSHIP WITH ITALY

Thank You!

Ailsa Stroud / 21 September 2021
LinkedIn: Ailsa Stroud/ Ailsa.Stroud@defra.gov.uk

#EO4Impact

Paul is a Manager in the Adaptation Division of the secretariat of the United Nations Framework Convention on Climate Change (UNFCCC), and oversees the work on support to the LDCs; National Adaptation Plans (NAPs); and Loss and Damage under the Convention and Paris Agreement. He has extensive experience working on issues related to adaptation to climate change, ecological modeling, remote sensing, integrated assessment, and has served as Coordinating Lead Author of the Third Assessment Report of the IPCC. Prior to his current position, he served as a member and Chair of the LDC Expert Group, was an Associate Professor of Geography at Penn State University after working as a Research Assistant Professor at University of Virginia, in the USA. He run the Miombo Network under the IGBP and START from 1994 to 2006, which had an active GOFC-GOLD involvement. Paul holds a Masters degree in Mathematics and a PhD in Forest Biometrics from Michigan Technological University, USA.

Paul V. Desanker

Response, Adaptation Division

UNFCCC

GEO CLIMATE POLICY AND FINANCE WORKSHOP

Setting the scene: importance of EO for national climate action on adaptation

Dr. Paul V. Desanker, Adaptation Division, UNFCCC

21 September 2021

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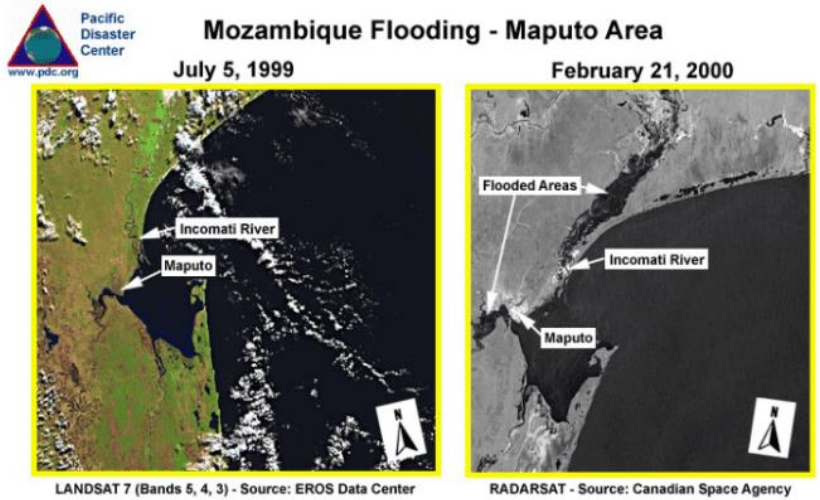
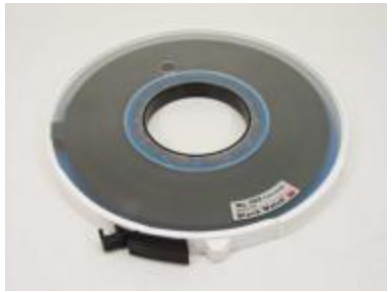
Some early experiences

- Mozambique floods of 1999
- Data archives via hard drives
- Data rescue from old media





The NAP development cycle: objectives, steps, support

In 2010 Decision 1/CP.16, para 15*: Decides to hereby* ***establish a process to enable least developed country Parties to formulate and implement national adaptation plans,*** *… ;*

Decision 5/CP.17: ***Decided on Objectives; initial guidelines for the formulation of NAPs*** *and invitations to relevant organizations to support developing countries in the process to formulate and implement NAPs*

At the same COP 17, the GCF governing instrument was adopted and mandated to support National Adaptation Plans (NAPs)

Then at COP 21 in Paris, the COP requested GCF to expedite this funding, in decision 1/CP.21, para 46:

Further requests the Green Climate Fund to expedite support for the least developed countries and other developing country Parties ***for the formulation of national adaptation plans****, consistent with decisions 1/CP.16 and 5/CP.17, and* ***for the subsequent implementation of policies, projects and programmes identified by them****;*

GCF responded to the **first part of this request** in how they would provide funding for the formulation of NAPs > **3M per country for the formulation of NAPs**

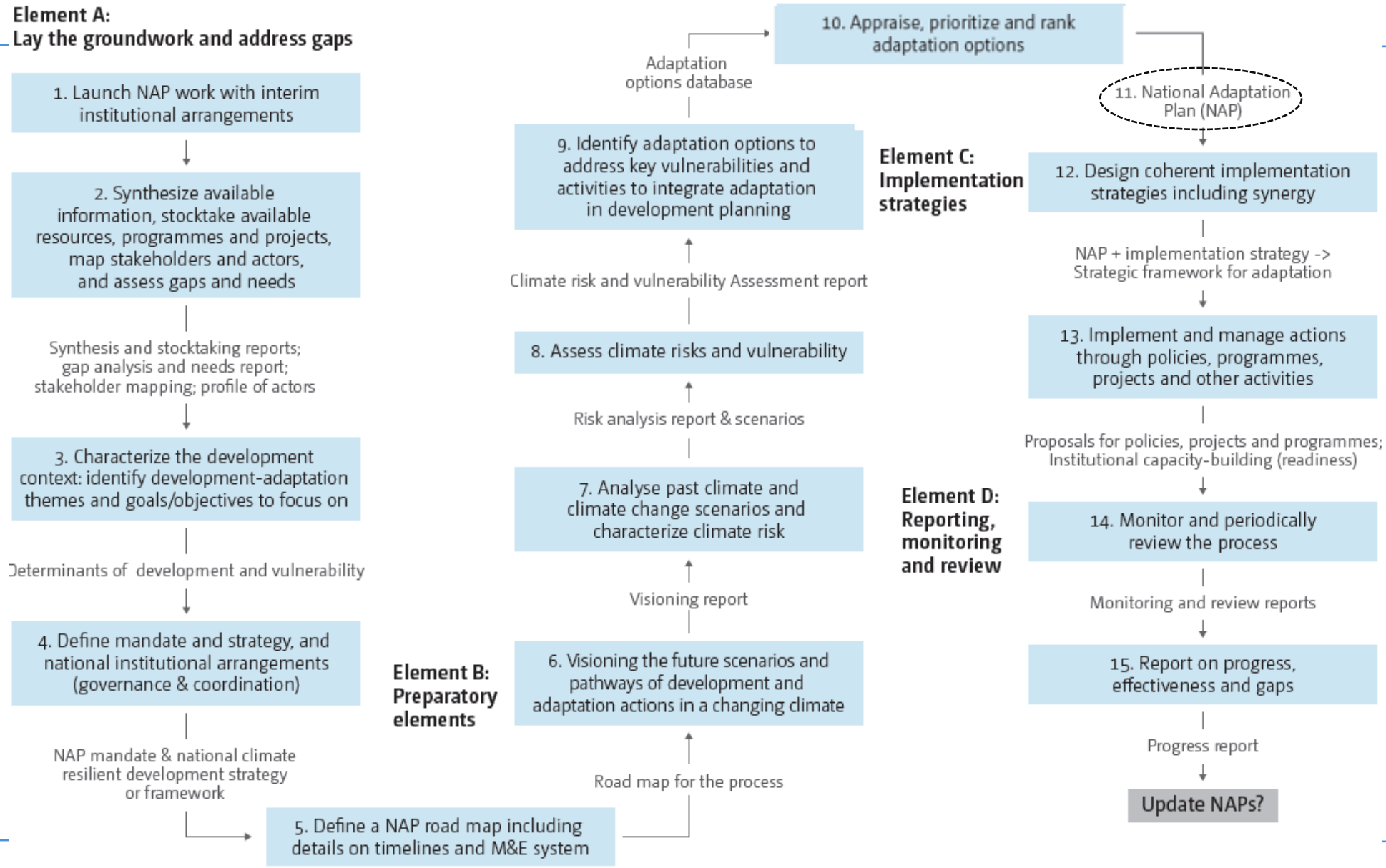
Response on supporting implementation expected, beyond normal windows for adaptation projects

- **Objectives of the NAP process (decision 5/CP.17) are:**
  a) To **reduce vulnerability** to the impacts of climate change, by **building adaptive capacity** and **resilience**;
  b) To **facilitate the integration of climate change adaptation**, in a coherent manner, into relevant new and existing policies, programmes and activities, in particular development planning processes and strategies, within all relevant sectors and at different levels, as appropriate.

- **Global goal of adaptation (Article 7 of the Paris Agreement)**

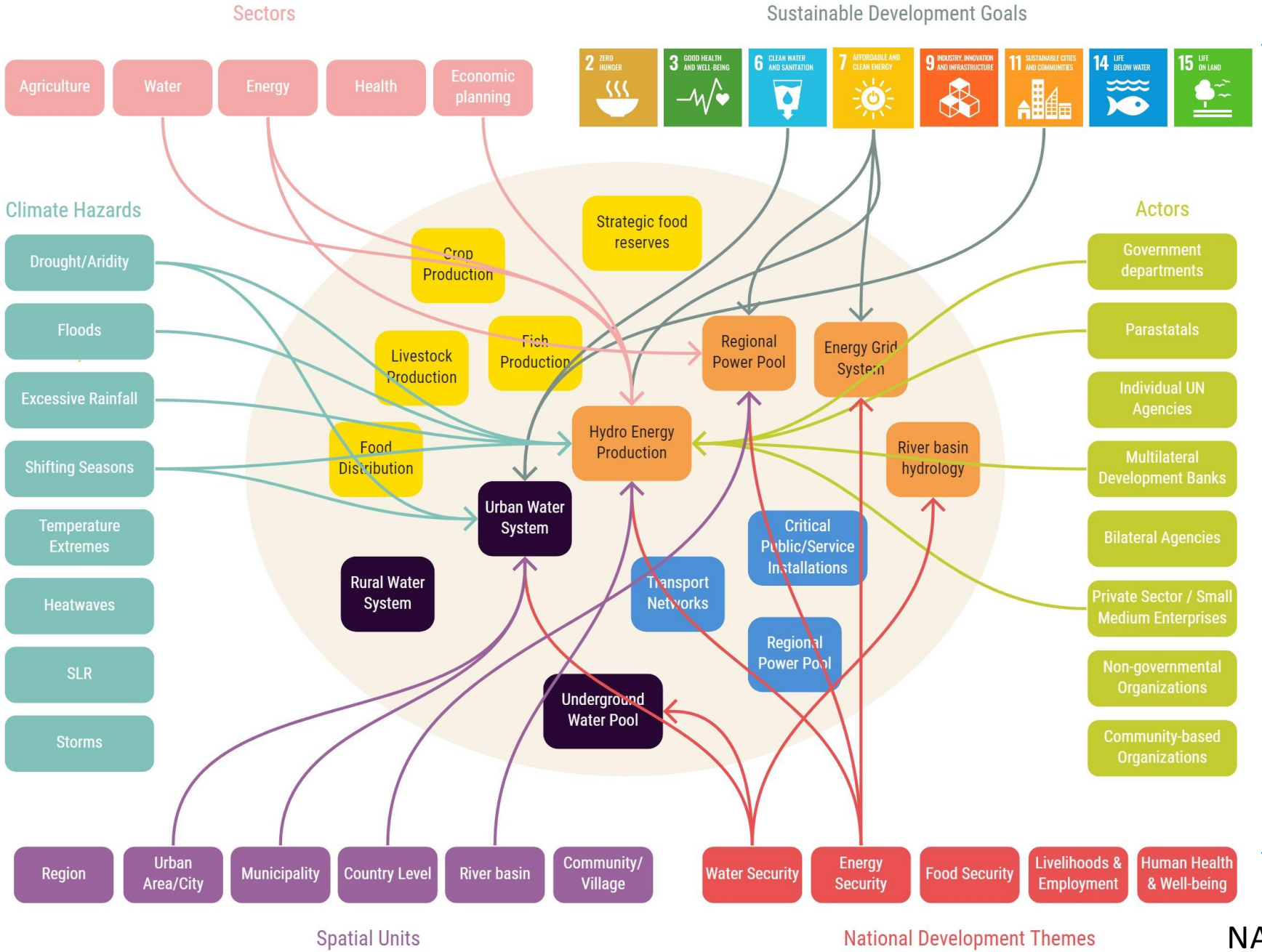
  Enhancing adaptive capacity, strengthening resilience and **reducing vulnerability** to climate change**,** with a view to contributing to **sustainable development** and ensuring an adequate adaptation response in the context of the **global temperature limit of less than 2°C.**

UNFCCC sample process to formulate and implement a National Adaptation Plan

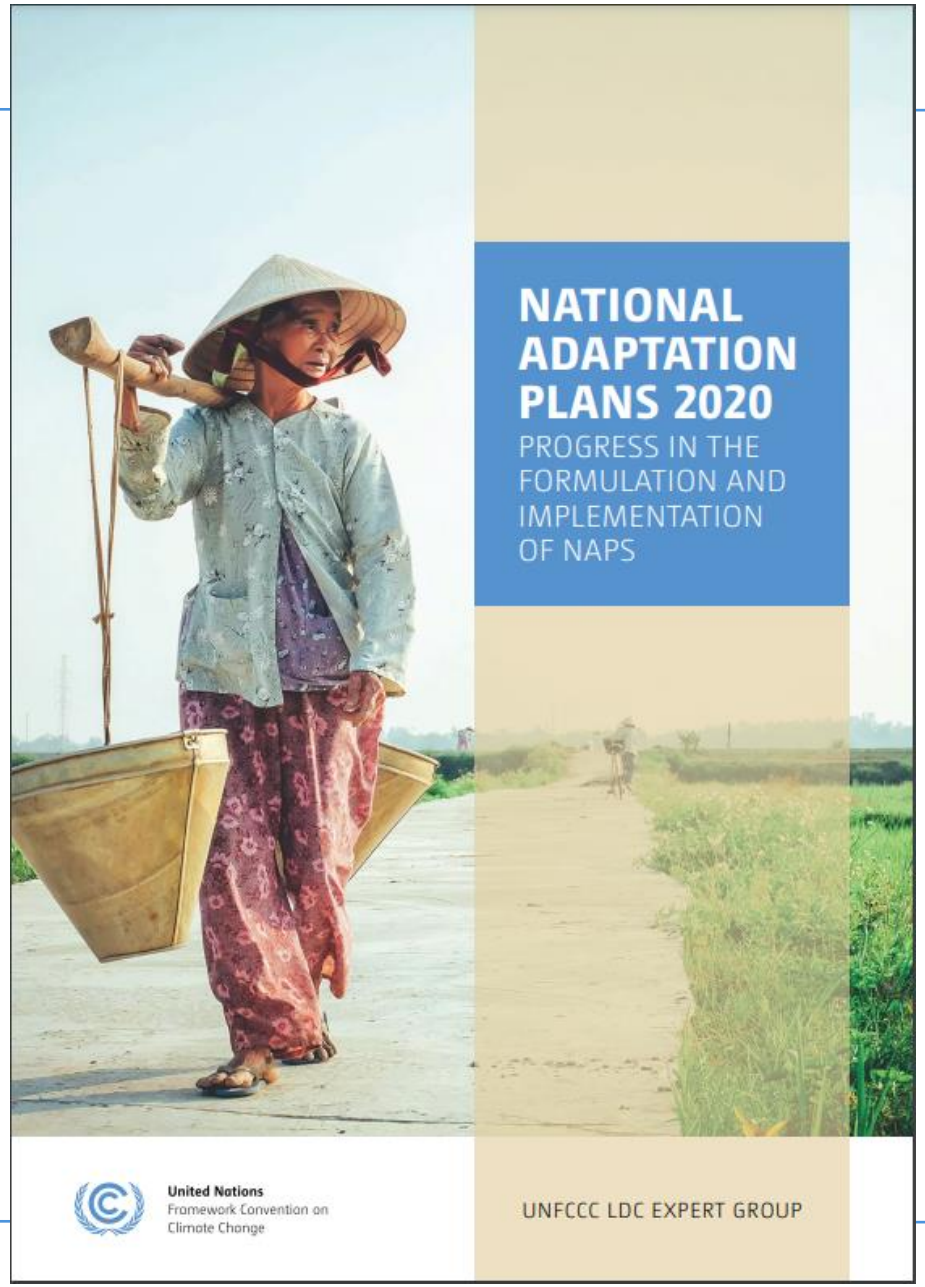


Note: Steps (in boxes) and their outputs that act as inputs for subsequent steps are shown.
Abbreviations: M&E = monitoring and evaluation, NAP = national adaptation plan.

A systems approach in NAPs focuses on essential systems deemed important for a national/local context. Data should align to specifics



NAP-SDG iFrame



https://unfccc.int/documents/273920

Opportunities for supporting adaptation

- **Baseline**: Establish exposure to climate impact drivers in past years
- **Trends over time**: Identify vulnerable areas and regions and changing vulnerability and risk, and estimation of losses
- **Data fusion to quantify risk, vulnerability, exposure:** Improve assessment of risk with better spatial and temporal coverage in data, including regional aspects
- **Decision support:** Support active decision-making through early warning systems such as the Crop Monitors
- **Replace point measurements:** Many countries are now transitioning to remotely sensed data to overcome limited ground measurements for weather data
- **Required outreach and capacity-development:** human capacity-development and concrete examples to show decision/policy-makers how EO can transform their operations

Thank You!

Paul Desanker / 21 September 2021
pdesanker@unfccc.int / unfccc.int

#EO4Impact

Dr Fakhruddin is an eminent hydro-meteorologist and disaster risk assessor with 20 years' global experience in water resources and climate resilience projects.
His key areas of expertise are hazards forecasting, climate and multi-hazard risk assessments and coastal community resilience.
His most high-profile work is evidenced in the development of multi-hazard warning systems – including a tsunami warning system developed for Indian Ocean countries following the deadly 2004 Boxing Day tsunami.
He has since designed and helped to implement climate change and disaster risk projects for more than 25 countries across Asia and the Pacific. Dr Fakhruddin has played a pivotal role in the design and implementation of multi-hazard early warning systems for floods, cyclones and tsunami, crucial to saving lives and livelihoods, while reducing property damage.

Bapon Fakhruddin, PhD
Technical Director-
DRR and Climate Resilience
Tonkin + Taylor, New Zealand

GEO CLIMATE POLICY AND FINANCE WORKSHOP

EO Role in Climate Actions- LDCs Perspectives

Dr Bapon Fakhruddin / CODATA TG Chair - FAIR Data for DRR

21 September 2021

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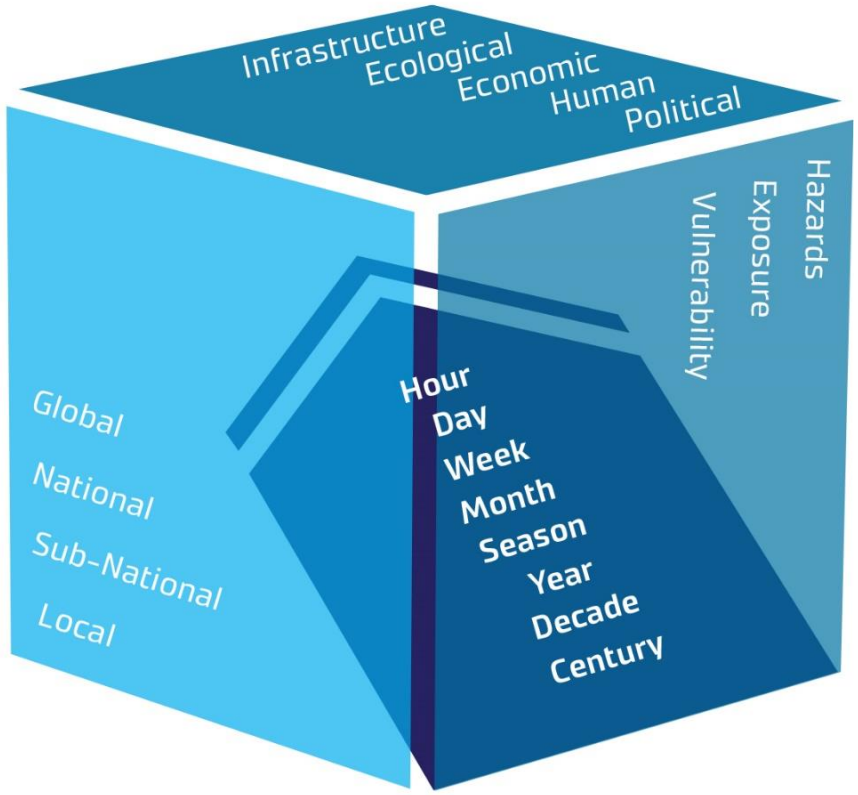
EO needs to support climate action-LDCs

- LDCs (46 countries) are confronting severe structural impediments to sustainable development are highly vulnerable

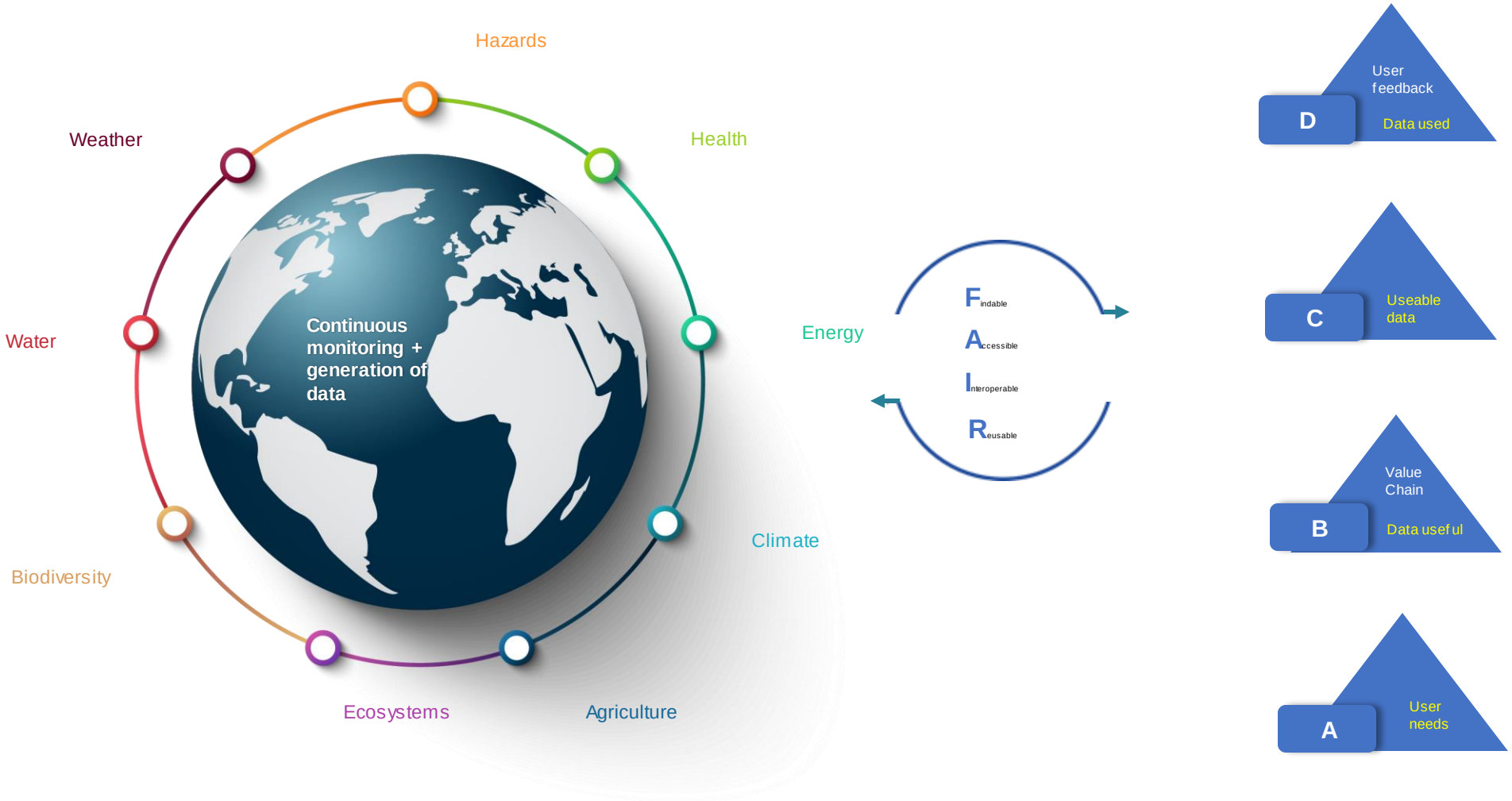
- Our technology is moving rapidly to ensure creativity and common purpose

- As climate risk evaluation contains inherent uncertainty, reviewing data on varying timescales provides refinement of decision making.



Challenges - EO to support climate action-LDCs

- **Policy**: Enhance open data policy and national policy on disaster related data
- **Coordination**: A lack of coordination and information-sharing between institutions (in countries and regionally)
- **FAIRness of data in risk assessment**: Difficulties centralising, securing and sharing different types of data across institutions
- **Resource**: High cost of data collection and processing
- **Knowledge**: Limited awareness, capacity and capabilities for using EO data


Hazards
Weather
Health
Water
Energy
Climate
Biodiversity
Ecosystems
Agriculture
Continuous monitoring + generation of data
Findable
Accessible
Interoperable
Reusable
D
User feedback
Data used
C
Useable data
B
Value Chain
Data useful
A
User needs

Recommendations

- **Mitigation**: Support the design of NDCs and related plans, strengthen the implementation of NDCs across sectors
- **Adaptation**: Support the design of NAPs and related plans, strengthen the implementation of NAPs across sectors
- **Means of implementation**: Improving access to climate finance, through strengthening proposal development and design
- Utilising EO in projects has the potential for enhancing bankability and therefore increasing financial flows, including from private sector financiers
- Strengthening capacity of government officials, particularly in relation to existing institutional and capacity gaps
- Providing technologies to support with implementation of the Paris Agreement, including for data collection, processing and interpretation

Thank You!

Bapon Fakhruddi / 21 September 2021
@shmfakhruddin / bfakruddin@tonkintaylor.co.nz

#EO4Impact

Before he joined the Pacific Community (SPC) on 23 January 2020, Dr Minchin previously served as Chief of the Environmental Geoscience Division of Geoscience Australia, a centre of expertise in the Australian Government for environmental earth science issues and the custodian of national environmental geoscience data, information and knowledge.

He has represented Australia in key international forums and has been the Principal Delegate to both the UN Global Geospatial Information Management Group of Experts (UNGGIM) and the Intergovernmental Group on Earth Observations (GEO).

The Pacific Community is an international development organisation owned and governed by its 26 country and territory members. The organisation's headquarters are in Nouméa, New Caledonia.

Stuart Minchin
Director General
Pacific Community

GEO CLIMATE POLICY AND FINANCE WORKSHOP

Perspective of SIDS

Dr Stuart Minchin, Director General, Pacific Community
21 September 2021

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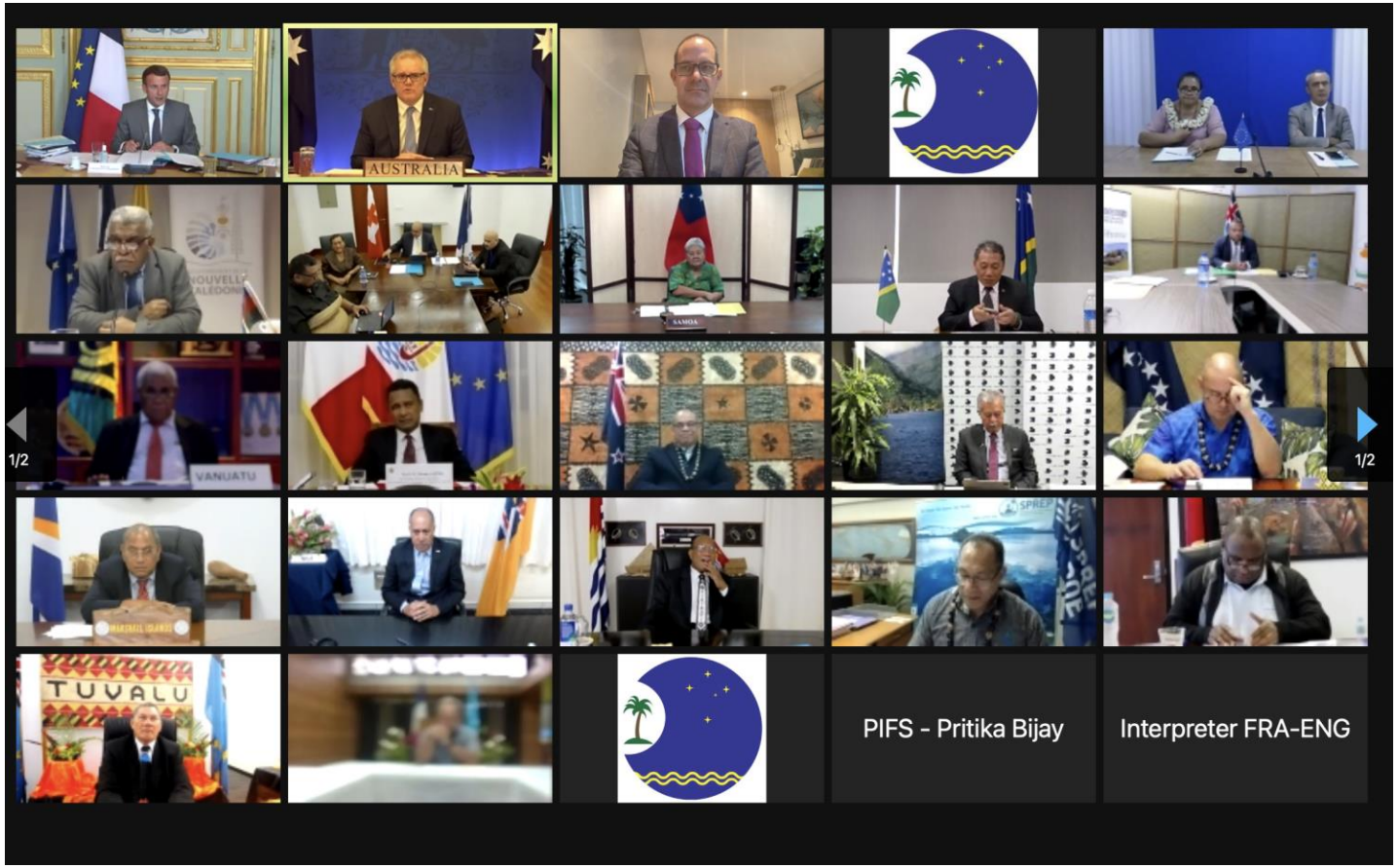
The Pacific Community

- Large ocean states
- 98% Ocean
- 30% global EEZ
- >50% annual global tuna supply
- Highly dependent on coastal & Oceanic resources
- Extreme exposure to climate change

France-Oceania Summit

- Climate change focus
- 9 country leaders expressed urgent need for better observations systems to support climate adaptation
- Region under-utilizes EO at this time



DIGITAL EARTH PACIFIC – OPERATIONAL EO FOR THE PACIFIC

Pacific Community
Communauté du Pacifique

- Climate Change impacts
- Coastal change/ inundation
- Coral bleaching
- Maritime surveillance
- Marine water quality
- Agriculture
- Water
- Vegetation change

Thank You!

Dr Stuart Minchin
Twitter: @sminchin
Email: stuartm@spc.int

#EO4Impact

Rafael Monge is an economist at the Ministry of Environment of Costa Rica, where he is director of the National Center of Geoenvironmental Information (CENIGA), a technical unit specialised in the management and coordination of Costa Rica's National Environmental Information System (SINIA). He has also led the design and implementation of Costa Rica's National Land Use, Land Cover and Ecosystems Monitoring System (SIMOCUTE), officialised by an executive decree, in May 2021.

He is an active member of the global GEO community, leading innovative projects in Costa Rica, linked to GEO programs, that seek to leverage the use of earth observations to address major sustainability challenges. In addition, he actively participates in AmeriGEO activities and has been part of the development and implementation of the Aguascalientes Declaration Joint Action Plan.

Rafael Monge
Director, National Center of Geoenvironmental Information, Ministry of Environment and Energy of Costa Rica

GEO CLIMATE POLICY AND FINANCE WORKSHOP

Countries' EO needs to support climate action in LAC Region

Rafael Monge /Ministry of Environment and Energy, Costa Rica
21 September 2021

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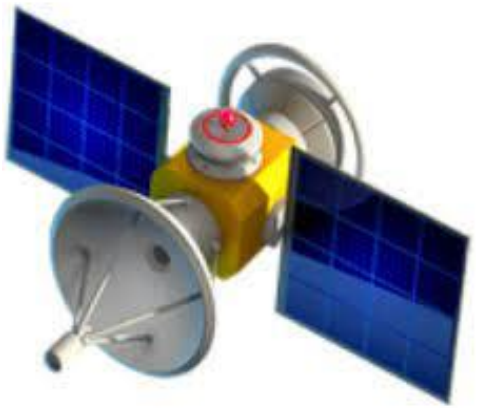
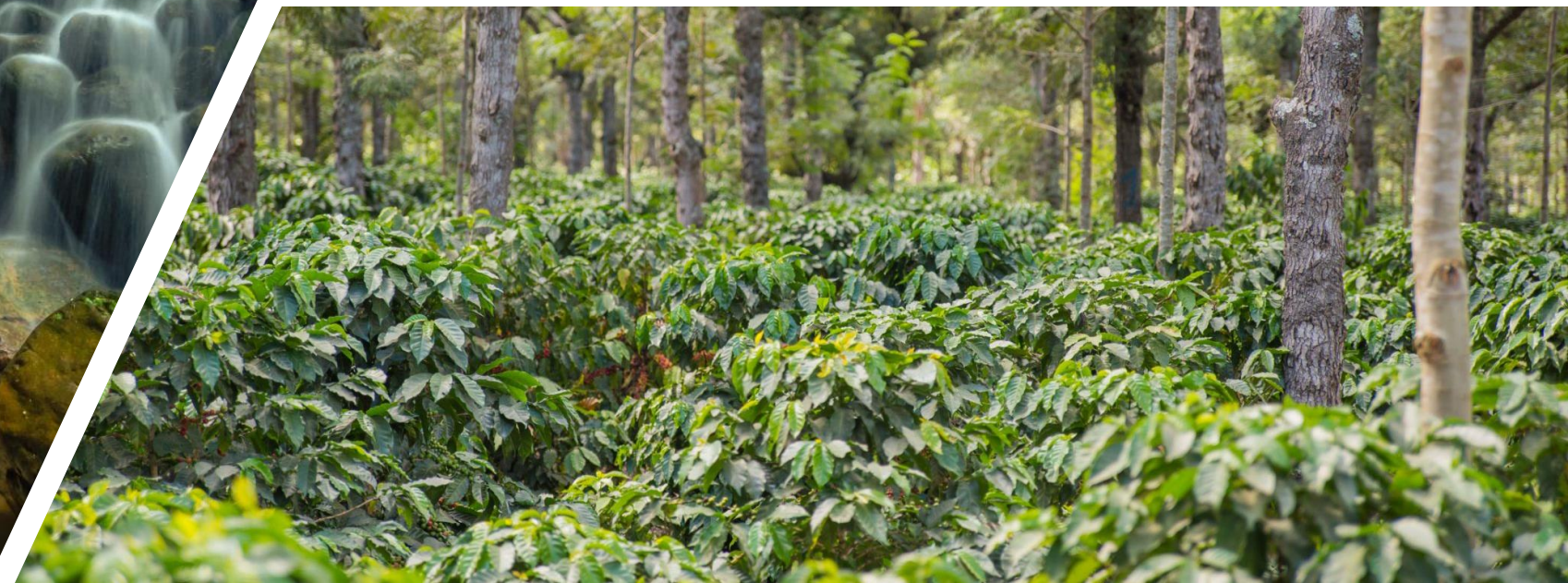
Countries' EO needs to support climate action – Perspective of LAC









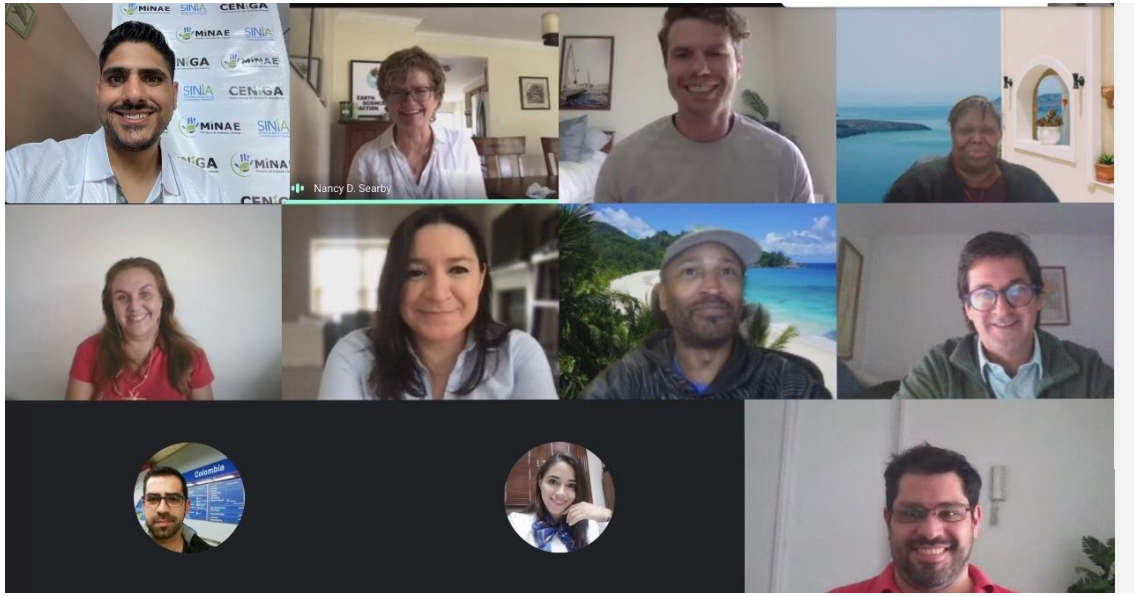






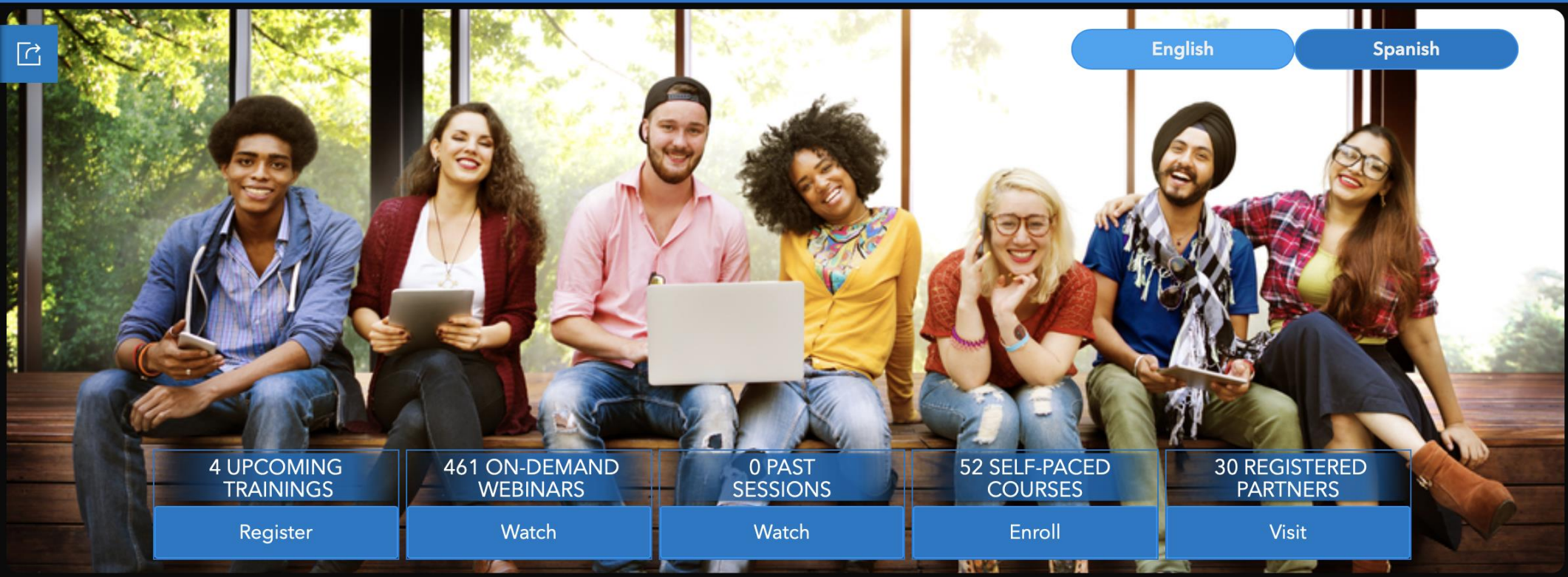
Joint Action Plan (2021 - 2024): Outcomes of the Aguascalientes Declaration

Version 1.0



Prepared by:

Participants of the 2020 Americas Symposium



Welcome to the Inter-American Academy of Geosciences & Applications

Partners in the Inter-American community are working to build capacity to advance the use of Statistical, Earth Observation, Geospatial and other Data to improve understanding and promote data-driven decision-making.

AmeriGEO is proud to host the Inter-American Academy of Geosciences & Applications on behalf of a growing network of public and private institutions, academia, and commercial partners.

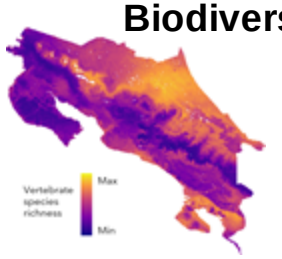
Our Partners

GEO CLIMATE POLICY AND FINANCE WORKSHOP

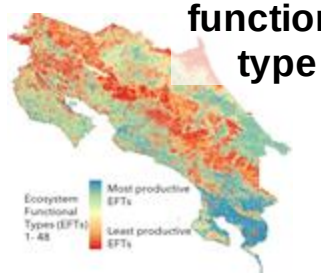
Building partnerships

A modeling system for natural capital accounting in Costa Rica

Biodiversity

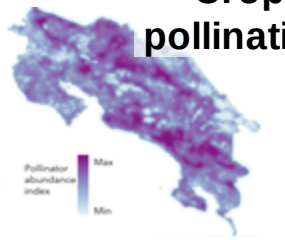


Ecosystem functional type

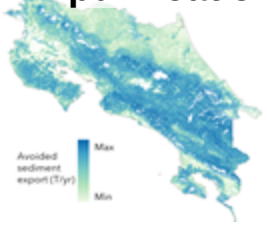


Wildlife-based tourism

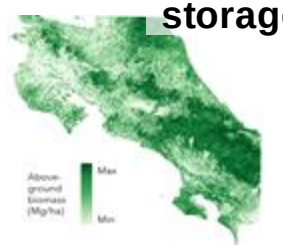
Crop pollination



Water purification



Carbon storage



Tackling Deforestation and Forest Degradation

New Urban Agenda

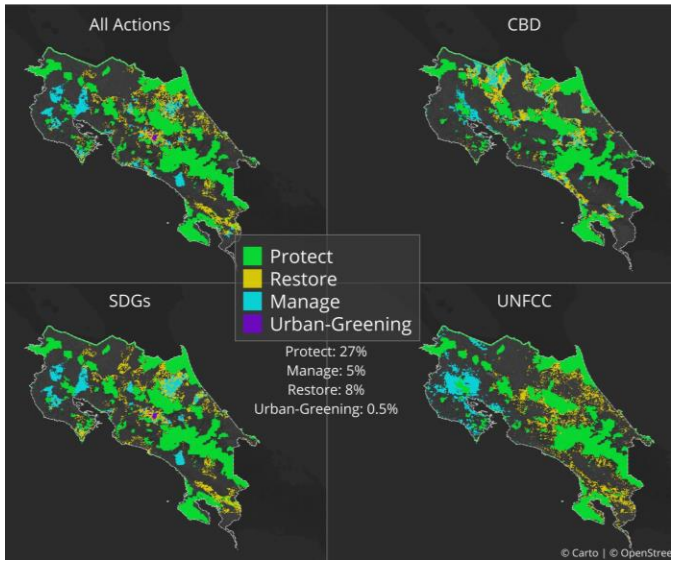
Earth Observations Toolkit for SUSTAINABLE CITIES AND HUMAN SETTLEMENTS

Reporting on the State of the Environment

SINIA Sistema Nacional de Información Ambiental

SIMOCUTE

Mapping Essential Life Support Areas



MINISTRY OF ENVIRONMENT AND ENERGY OF COSTA RICA

THE 2020 GEO SUSTAINABLE DEVELOPMENT GOALS AWARD for GEO Member

GEO GROUP ON EARTH OBSERVATIONS

EARTH OBSERVATIONS FOR THE SUSTAINABLE DEVELOPMENT GOALS

Case study - Costa Rica

Costa Rica

Costa Rica has developed a National Land-Use, Land Cover and Ecosystem Monitoring System known as SIMOCUTE.

Ownership of SIMOCUTE* comes under the Ministry of Environment and Energy and the Ministry of Agriculture and Livestock.

SIMOCUTE is a decentralized system where different institutions and entities share their data and information, according to their mandates and roles, and on the basis of established requirements and standards.

This provides more consistent, accurate, comparable, complete and transparent information on the land-use sector at national scale.

The success factors of this project

Thank You!

Rafael Monge / 21 September 2021
@rafaelmongecr / rmonge@minae.go.cr

#EO4Impact

Dr. Mandira Singh Shrestha is a Programme Coordinator of Climate Services initiative at ICIMOD. She has over 20 years of research experience that cover broad areas of climate services, water induced disaster risk reduction and water resources management. Her research interests center on transboundary flood forecasting and monitoring, application of satellite-based products and end user engagement for reduced flood risks. Her current research focuses on localizing climate services for Agriculture and Tourism. She has coordinated the development of a web based regional flood information system in the Himalayan region where the countries are sharing real-time data and information for flood risk reduction thereby strengthening regional cooperation. Ms. Shrestha holds a Doctor of Engineering from the University of Kyoto, Japan and a Masters in Civil Engineering from the University of Washington, Seattle, USA.

Mandira Singh Shrestha
Programme Coordinator: Climate Services, ICIMOD

GEO CLIMATE POLICY AND FINANCE WORKSHOP

Perspective of mountain nations: EO for climate action and disaster risk reduction in the Hindu Kush Himalayas

Mandira Singh Shrestha/ICIMOD

21 September 2021

GROUP ON EARTH OBSERVATIONS

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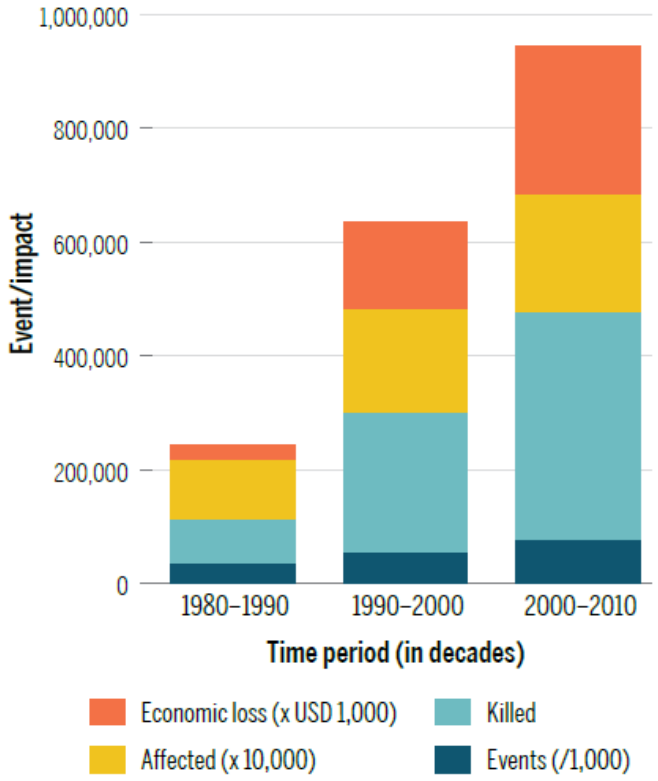
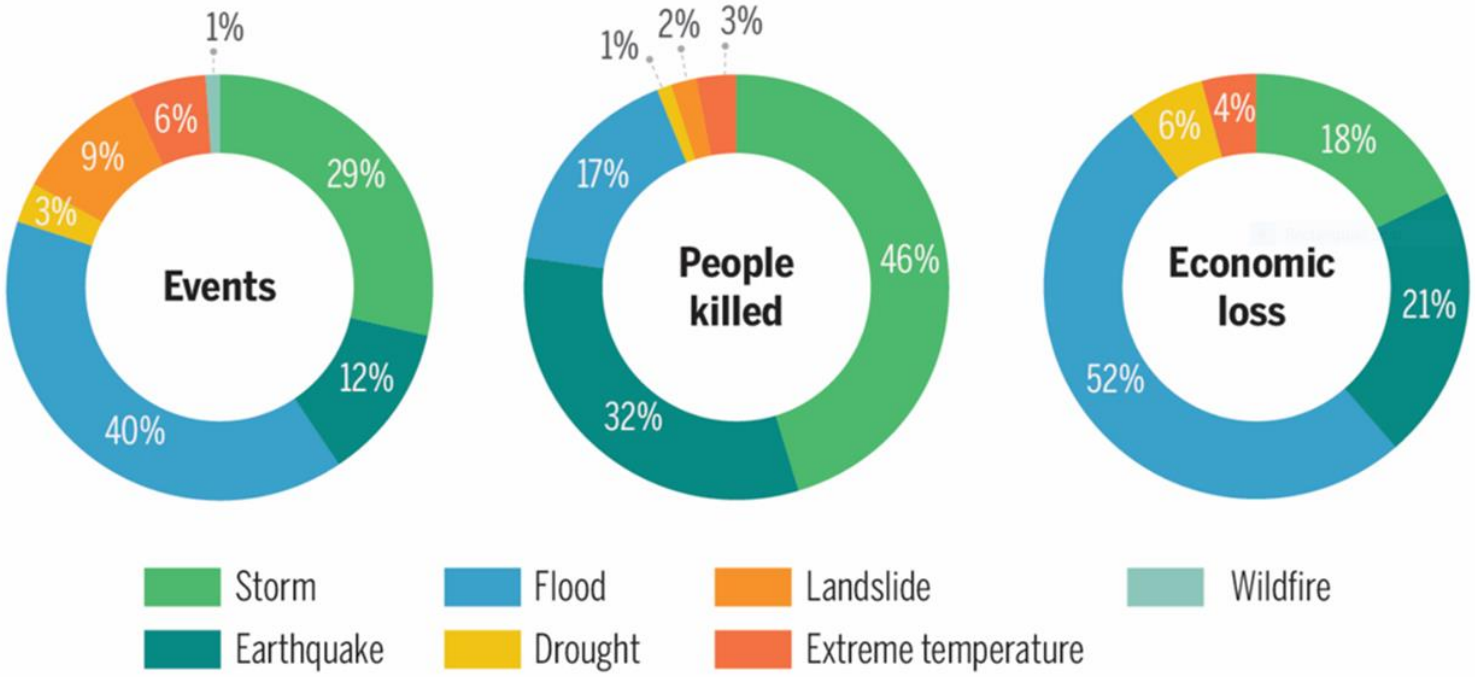
Key issues in disaster risk reduction in the mountains

- Multi-hazard environment
- Upstream-downstream linkages
- Connectivity and physical access
- Governance
- Climate change and variability

The economic and human impacts of climate related disasters are increasing





Challenges in climate change adaptation and DRR

- Increase in intensity and frequency of climate related disasters
- Inadequate climate observing network
- Lack of sharing of data and information
- Inadequate and varying capacity to use EO
- Limited tailored climate services that is actionable and gender responsive.

Key issues and lessons to support climate action

- **Strengthen climate observing network**, data assimilation and processing techniques, and technologies to produce quality service products to support climate adaptation;
- Lack of credible data and information and limited sharing – need Policy integration for **quick access to satellite imageries to support climate action**;
- **Strengthen partnerships and institutional mechanisms** for communication and dissemination of early warning;
- **Develop capacities** of the HKH countries on the applications of EO and geospatial information for risk assessment and mountain specific issues to improve the adaptive capacity to climate change;
- **Fosters regional cooperation** to address common issues among the HKH countries to support climate action and contribute to local and global knowledge on the mountain systems.

Key messages to COP26

#HKH2Glasgow
ROAD TO UNFCCC COP26

www.icimod.org/cop26

Pulse of the planet

Recognize the HKH as the pulse of the planet - a region that is most vulnerable to the impacts of climate change

Mountains of opportunity

Invest in mountain-specific climate priorities to enhance the resilience of mountain communities

Power of 8

Harness the strength of the 8 HKH countries to enhance regional and international cooperation for climate action

Thank You!

Mandira Singh Shrestha / 21 September 2021
mandira2017@Twitter / mandira.shrestha@icimod.org

#EO4Impact

James Rattling Leaf, Sr., has over 25 years' working with the US Federal Government, Higher Education Institutions and Non-Profits to develop and maintain effective working relationships with federally and non-federally recognized American Indian tribes, Tribal College and Universities and Tribal Communities. He specializes in developing programs that utilize the interface between Indigenous People's Traditional Knowledge and Western Science. He sees a greater vision of human knowledge that incorporates the many insights of human cultures and provides a context for our better understanding of the planet and the world.

James is a founding member of the Group on Earth Observations (GEO) Indigenous Alliance that was established at GEO Week 2019 in Canberra, Australia to foster a continued, effective, respectful, and reciprocal relationship with GEO and representatives of indigenous communities from around the world. He was born on the Pine Ridge Indian Reservation and is an enrolled member of the Rosebud Sioux Tribe. His higher education comes from Sinte Gleska University.

James Rattling Leaf, Sr.
Co-Founder
GEO Indigenous Alliance

GEO CLIMATE POLICY AND FINANCE WORKSHOP

Perspective of Indigenous Peoples

James Rattling Leaf – GEO Indigenous Alliance

21 September 2021

GROUP ON EARTH OBSERVATIONS

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Overview of GEO Indigenous Alliance

- Vision
- Foundational Principles
- Current Activities
- Future Efforts
- Website: https://earthobservations.org/geo_indigenous_alliance.php#book/

Wopila Tanka - Thank You All!

James Rattling Leaf, Sr. / 21 Sept 2021

#EO4Impact

Since 2016 Steven Ramage has been leading external relations at the Group on Earth Observations (GEO) Secretariat. Steven works on the value and usefulness of Earth observations (EO) for research, policy, decisions and action, notably on the role of EO to provide insights and actionable information for the Sendai Framework, the Paris Agreement, the UN 2030 Agenda and the New Urban Agenda. This is done with a focus on open data access, sharing, policies and use. Steven worked in the private sector for 20 years before he started consulting on location strategy for the World Bank and the United Nations in 2012. He was an owner/director of 1Spatial for almost 10 years before taking on a role as Executive Director of the Open Geospatial Consortium (OGC), and then Managing Director of Ordnance Survey International. He is a Visiting Professor at the Institute for Future Cities, University of Strathclyde, Glasgow and a SASNet Fellow at the Urban Big Data Centre at the University of Glasgow, Scotland. He's also a Visiting Lecturer at the University of Geneva, Institute of Environmental Sustainability (IES) in Switzerland, a Member of the OGC Global Advisory Council and a Fellow of the Royal Geographical Society (RGS). He tweets as @steven_ramage

Steven Ramage

Head of External Relations

GEO Secretariat

Open discussion

Guiding questions

1. What are the most critical EO needs to support climate action at the national level?

2. And how should they be addressed and prioritised by the EO community?

Short break

See you in 1 minute

Session 2

GEO Work Programme activities supporting climate action

Virginia Burkett is co-chair of GEO's Climate Change Working Group. She is the Chief Scientist for Climate and Land Use Change at the U.S. Geological Survey. She served as Chief Scientist for Global Change Research at the USGS (2006-2014), USGS Associate Director for Climate and Land Use Change (2015-2017) and Chair of the U.S. Global Change Research Program (2017-2019). Dr. Burkett has published extensively on the topics of global change and low-lying coastal zones. She was as a Lead Author of the United Nation's Intergovernmental Panel on Climate Change (IPCC) Third, Fourth and Fifth Assessment Reports and the IPCC Technical Paper on Water. She was a Lead Author of the First, Second, and Third U.S. National Climate Assessments and served on the Federal Steering Committee for NCA4 (2018).

Virginia Burkett
Chief Scientist for Climate and Land Use Change,
United States Geological Survey
CC-WG Co-chair

Rui Kotani is GEO Disaster Risk Reduction (DRR) Coordinator, being responsible for supporting GEO's DRR Working Group and relevant GWP activities while working closely with UNDRR for the Sendai Framework on DRR.

Before joining the GEO Secretariat, Rui worked for an international organization and various Japanese government agencies related to the design and the implementation of STI policies on global issues in the context of international cooperation and development aid. Namely, she served as Associate Senior Administrator at Japan Aerospace Exploration Agency (JAXA) [2020-2021]; Science and Technology Specialist for the Firm Capability and Innovation Global Practice at the World Bank [2018-2020]; Deputy Director for International Affairs in the Bureau of STI Bureau at the Cabinet Office [2015-2018]; Specialist for the Environment and Energy Division of R&D Bureau at MEXT [2012-2015], and Associate Fellow at Japan Science and Technology Agency (JST) [2006-2012]. Rui received Master of International Affairs from Columbia University.

Rui Kotani
Disaster Risk Reduction (DRR) Coordinator
GEOSEC

David Borges is a Physical Scientist with the NASA Earth Applied Sciences Disasters Program at NASA Langley Research Center. He provides international project management and geospatial analytics solutions to disaster related issues on a global scale through application development and geospatial enablement of Earth observation information.

He is also an active member of the UNDRR Global Risk Assessment Framework (GRAF) WG and UN-GGIM WG-Disasters. Before joining NASA, David spent ten years in the private sector supporting a variety of clients, including the U.S. Federal Emergency Management Agency (FEMA) and Department of Homeland Security (DHS).

David Borges
Physical Scientist, NASA Langley Research Center
GEO DRR-WG Co-Chair

Allison Craddock a member of the Geodynamics and Space Geodesy Group in the Tracking Systems and Applications Section at the NASA Jet Propulsion Laboratory in Pasadena, California, USA. Her work includes advocacy and coordination for interoperable, discoverable, and openly available Global Navigation Satellite System (GNSS) data, promoting geodetic infrastructure development, and developing effective capacity building policies to support a global geodetic reference frame for sustainable development.

She is the Director of the International GNSS Service (IGS) Central Bureau, Manager of External Relations for the International Association of Geodesy's Global Geodetic Observing System, and a staff member of the NASA Space Geodesy Program.

Craddock is a representative of the International Association of Geodesy on the Group on Earth Observations (GEO) Programme Board and Executive Committee; she also serves as a co-chair of the GEO Capacity Development Working Group. She tweets as @allisonordnung.

Allison Craddock
Central Bureau (Secretariat) Director
International GNSS Service
CD-WG Co-chair

GEO CLIMATE POLICY AND FINANCE WORKSHOP

GEO Work Programme Mapping – initial results

GEO Climate Change WG, DRR WG, Capacity Development WG
21 September 2021

GROUP ON EARTH OBSERVATIONS

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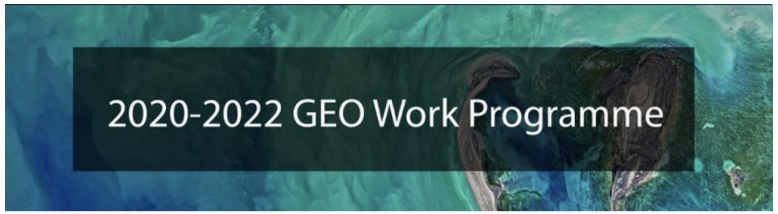
Background info

- Aim to identify potential disconnect and synergy opportunities among GWP activities to meet policy needs while contributing to next GWP
- Cross-WG effort among CC, DRR, CapD since the end of 2020
- Technical support from ESRI (Pat Cummens) and AmeriGEO (America Alvarez)
- 6 sections: 1) GEO WP activity identification, 2) scope and area of impact, 3) CC, 4) DRR, 5) CapD, 6) additional feedback
- Officially launched on 31 August through invitations to GEO WP leads (initial deadline 10 Sept)

Mapping interface and Dashboard



Section 3: Climate Action

1. Does your GEO Activity provide inputs to the United Nations Framework Convention on Climate Change (UNFCCC) and Paris Agreement process?

Yes | No

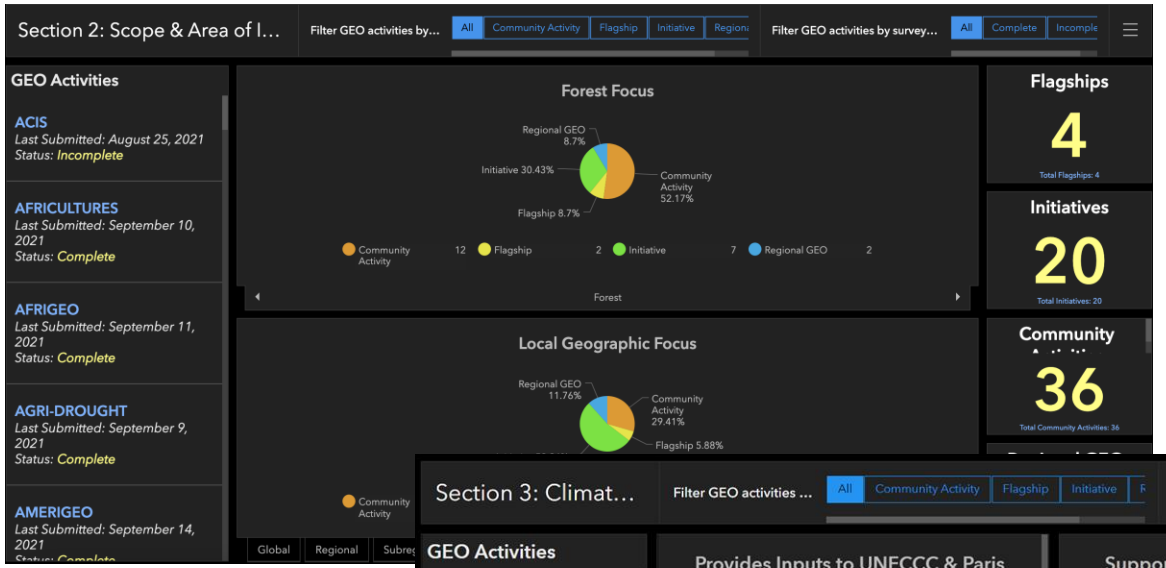
2. Are you collaborating with the UNFCCC national focal points in the countries your GEO activity operates in?

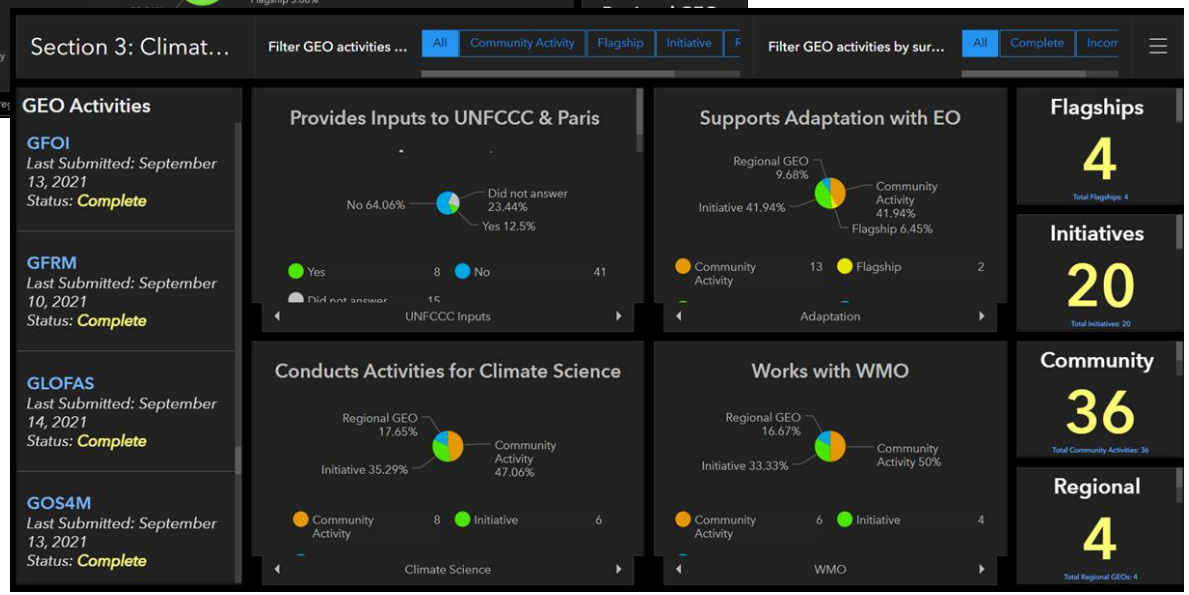
Yes | No

3. Which, if any, of these broad areas does your GEO activity support through the use of Earth observation?

Please select **all** that apply.

- [ ] Adaptation (i.e., climate change impacts, vulnerability, and adaptation measures to increase resilience)
- [ ] Loss and damage (i.e., approaches to averting, minimizing, and addressing loss and damage associated with the adverse effects of climate change)





Climate Action

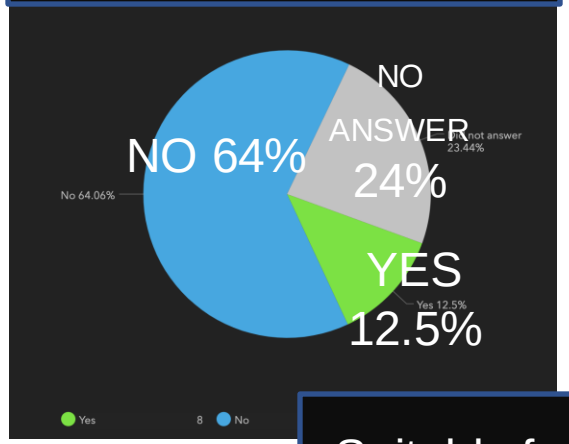
GEO WP link to climate policy is still weak

- **Input to UNFCCC/PA process:** 8 activities
- **Collaboration with UNFCCC focal points:** 5 activities
- **Support to UNFCCC Parties (e.g., reporting):** 7 activities

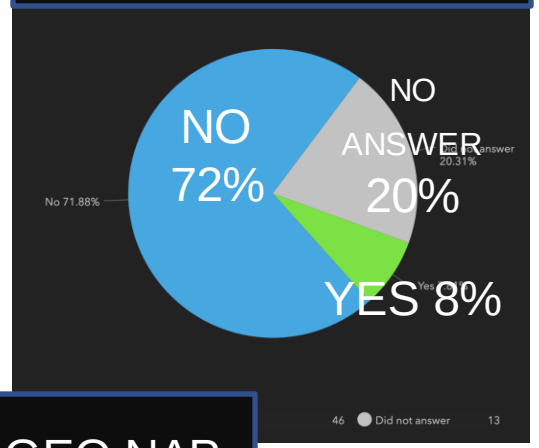
But...focus/support areas tell us something else

- **Adaptation**: 31 activities - of which
  - 20 are suitable for GEO technical guidance on National Adaptation Plans
  - 25 support monitoring of extreme weather events
- **Loss & Damage:** 26 activities
- **Means of implementation (finance, technology, capacity building):** 24 activities
- **Mitigation**: 18 activities
- **Climate Science**: 17 activities
- **REDD+**: 8 activities

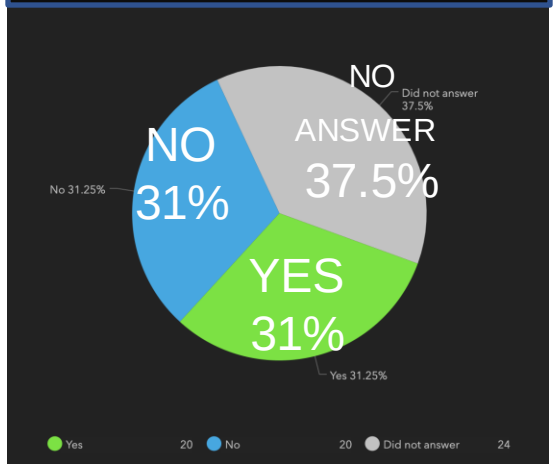
Provides input to UNFCCC and Paris Agreement



Collaborates with UNFCCC focal point



Suitable for GEO NAP guidance



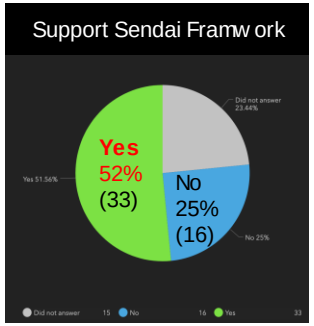
Some initial results…

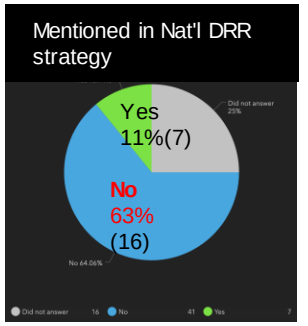
Disaster Risk Reduction (DRR)

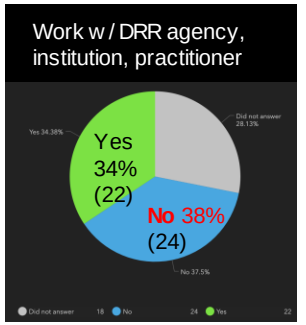
- Strength: alignment with SFDRR priorities for action
- Weakness: existing coordination/collaboration with DRR users →*need to ensure Toolkit helps match EO-tech "seeds" with user "needs"*

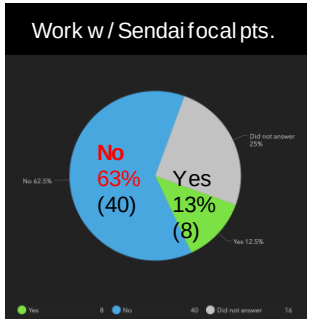
GWP Activities' Alignment with or Support for UNDRR Sendai Framework Priorities for Action

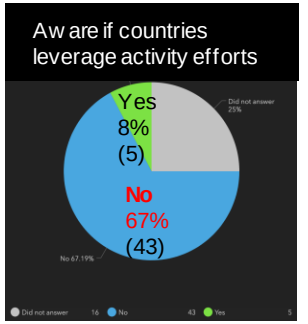
	Under-standing Disaster Risk	Strengthening governance & management of DR	Investing in DR for resilience	Enhancing disaster preparatedness for effective response, recovery, rehabilitation and reconstruction
Total	30	14	7	23
Flagship	0	0	1	1
Initiative	12	6	3	7
RegionalGEO	3	2	0	2
CA	15	6	3	13

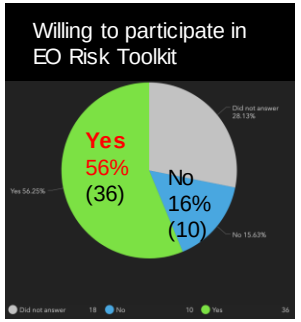












Capacity Development

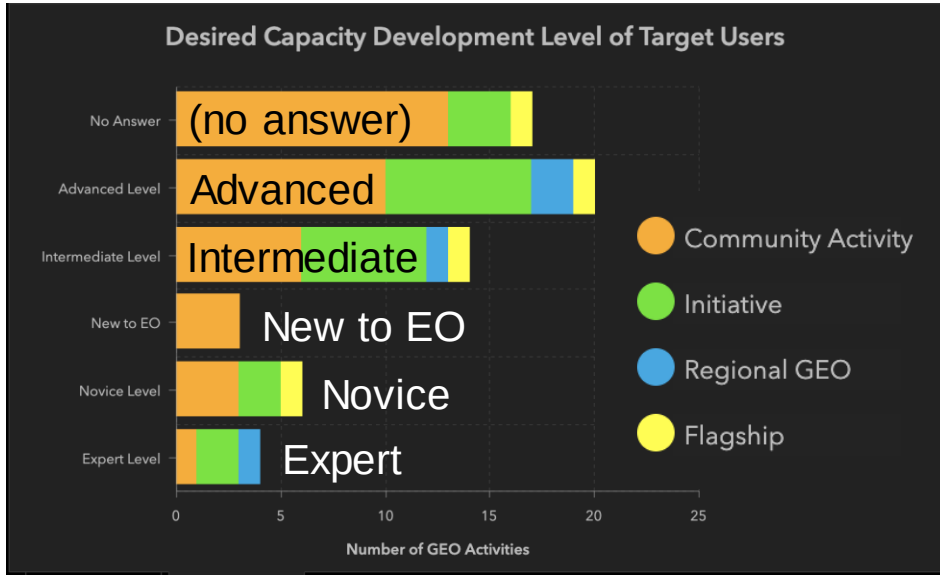
Capacity Development is an essential element for supporting both Climate and DRR activities – it is how we empower our community with the tools it needs to maximize the impact and utility of Earth Observations

Strengths – there is already a lot of interest in producing and sharing Capacity Development resources, across the GEO Work Programme

Weaknesses – collaborating across some Work Program flagships, initiatives, and community activities could be increased; there are CD resources that could be produced and shared by multiple WP components.

Opportunities – identify and curate CD resources that bridge the gap between current and desired levels, as indicated by WP components, and in collaboration with Regional GEOs

There are a lot of great CD resources already somewhere in the GEO community – how can we make sure we know what is already available, make it findable and accessible?



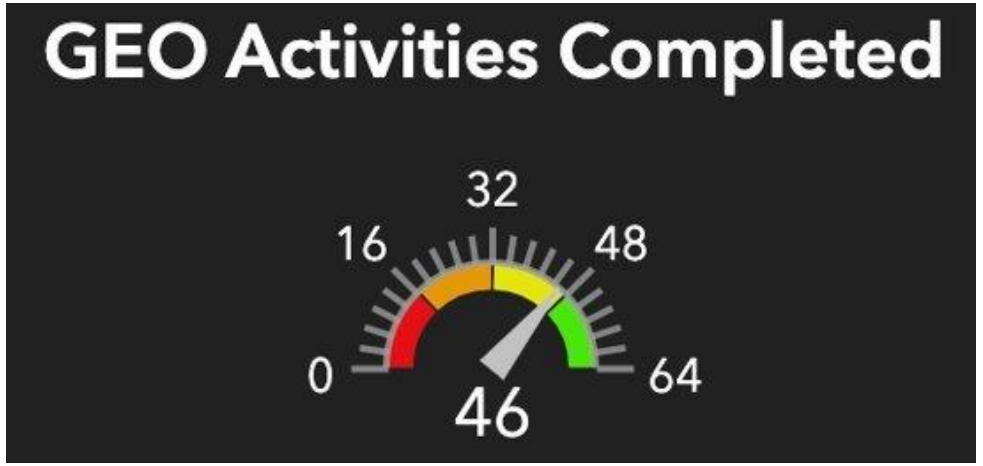
GEO Work Programme components: current CD level vs. *(desired CD level)*

	No answer	New to EO	Novice level	Intermediate level	Advanced level	Expert level	Total
Total	**15 *(17)***	**3 *(3)***	**9 *(6)***	**21 *(14)***	**11 *(20)***	**5 *(4)***	***64 (64)***
Flagship	1 *(1)*	0 *(0)*	0 *(1)*	2 *(1)*	1 *(1)*	0 *(0)*	*4 (4)*
Initiative	3 *(3)*	1 *(0)*	4 *(2)*	5 *(6)*	5 *(7)*	2 *(2)*	*20 (20)*
Regional GEO	0 *(0)*	0 *(3)*	1 *(0)*	3 *(1)*	0 *(2)*	0 *(1)*	*4 (7)*
CA	11 *(13)*	2 *(0)*	4 *(3)*	11 *(6)*	5 *(10)*	3 *(1)*	*36 (33)*

How can we effectively gather and build CD tools for GEO toolkits?

Initial observations

- # of completed responses: 46 out of 64 (good!)
- Establishment of baseline
- GEO Work Programme link to policy: needs improvement
- Survey results will help guide activities of Cross-GEO Working Groups (such as this workshop)



Next steps

- Continue mapping: open-ended process (second deadline for submissions/updates tbd)
- Gaps report to PB in 2022 to inform call for proposals for next GEO WP
- Dashboard to be hosted on GEO website

Feedback and suggestions are welcome
Thank you!

Sara Venturini
sventurini@geosec.org

#EO4Impact

Pat started her career with 14 years in state government, pioneering early GIS work in Minnesota and New Jersey. She joined Esri in 1998, supporting the state and national government teams, focusing on understanding emerging government policies and how to apply innovative applications of GIS technology to support them. Pat has developed skills to bridge the gap between policy and technology, working with executives in state and federal government, the White House, and US Congress to help them understand the value geospatial data and GIS technology bring to realizing efficient, smart government.

Esri is a GEO Associate with many years of contributions to GEO projects. Pat coordinates Esri's engagements across all of GEO's work program areas and serves on the GEO Climate Change work group and supports AmeriGEO activities.

Patricia Cummens

Government Strategist, Esri

GEO CLIMATE POLICY AND FINANCE WORKSHOP

Applying Modern Data Collection and Analysis Techniques

Patricia Cummens, Esri
21 September 2021

GROUP ON EARTH OBSERVATIONS

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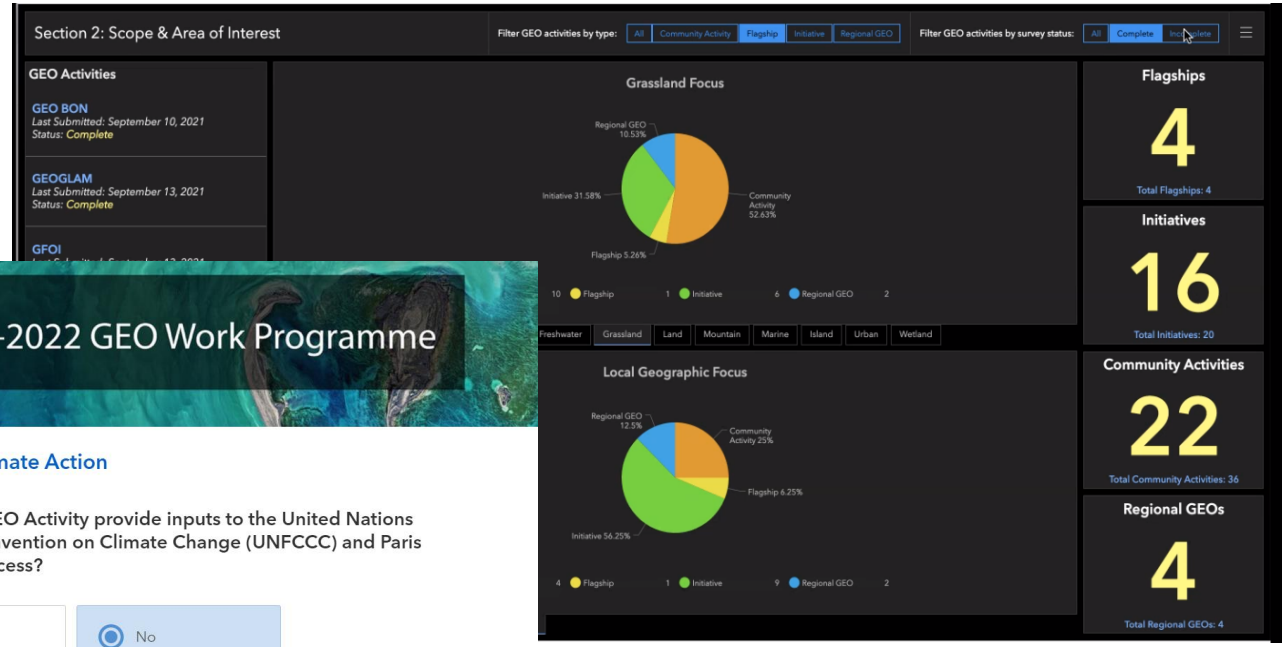
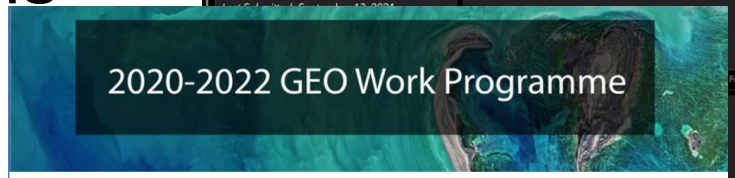
Modern Data Collection and Analysis Techniques

- User friendly survey
- Flexible dashboards
- Interactive visualizations
- Interrogate data
- Derive Insights

Streamlining the process…
…Make the most of data





Section 3: Climate Action

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Yes
No

2. Are you collaborating with the UNFCCC national focal points in the countries your GEO activity operates in?

Yes
No

Thank You!

Patricia Cummens / September 21, 2021
pcummens@esri.com

#EO4Impact

Ian is the Director of the GEO Global Agricultural Monitoring (GEOGLAM) flagship initiative.

He has been stationed within the GEO Secretariat in Geneva Switzerland since 2017. Previously Ian was the Director of Agro-Climate, Geomatics and Earth Observation at Agriculture and Agri-Food Canada in Ottawa.

Ian Jarvis
Director
GEOGLAM Secretariat

GEO CLIMATE POLICY AND FINANCE WORKSHOP

Monitoring Agriculture for Climate Response

Ian Jarvis, GEOGLAM
and
Catherine Nakalembe, NASA Harvest
21 September 2021

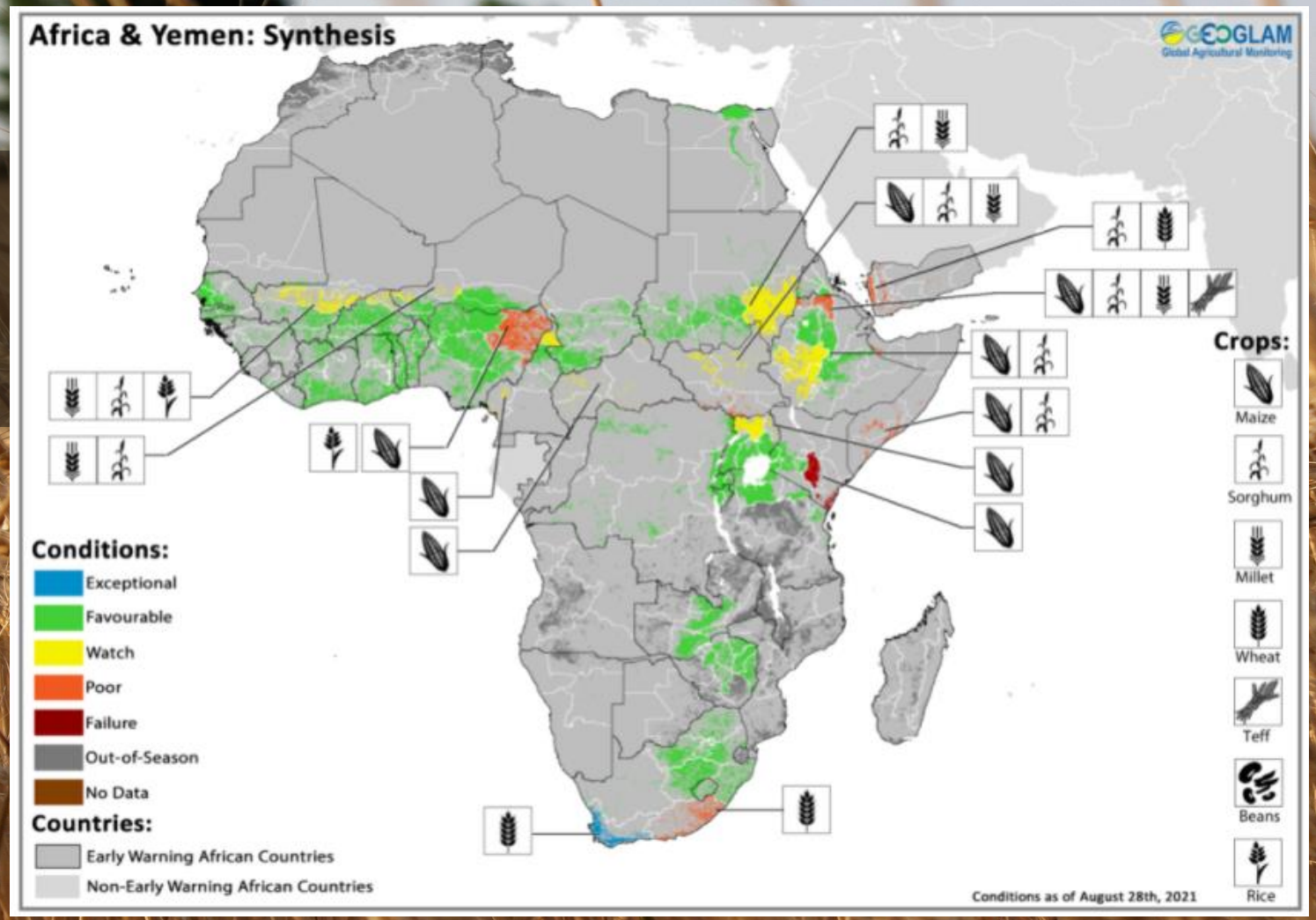
GEO GROUP ON EARTH OBSERVATIONS

GEOGLAM GLOBAL AGRICULTURAL MONITORING

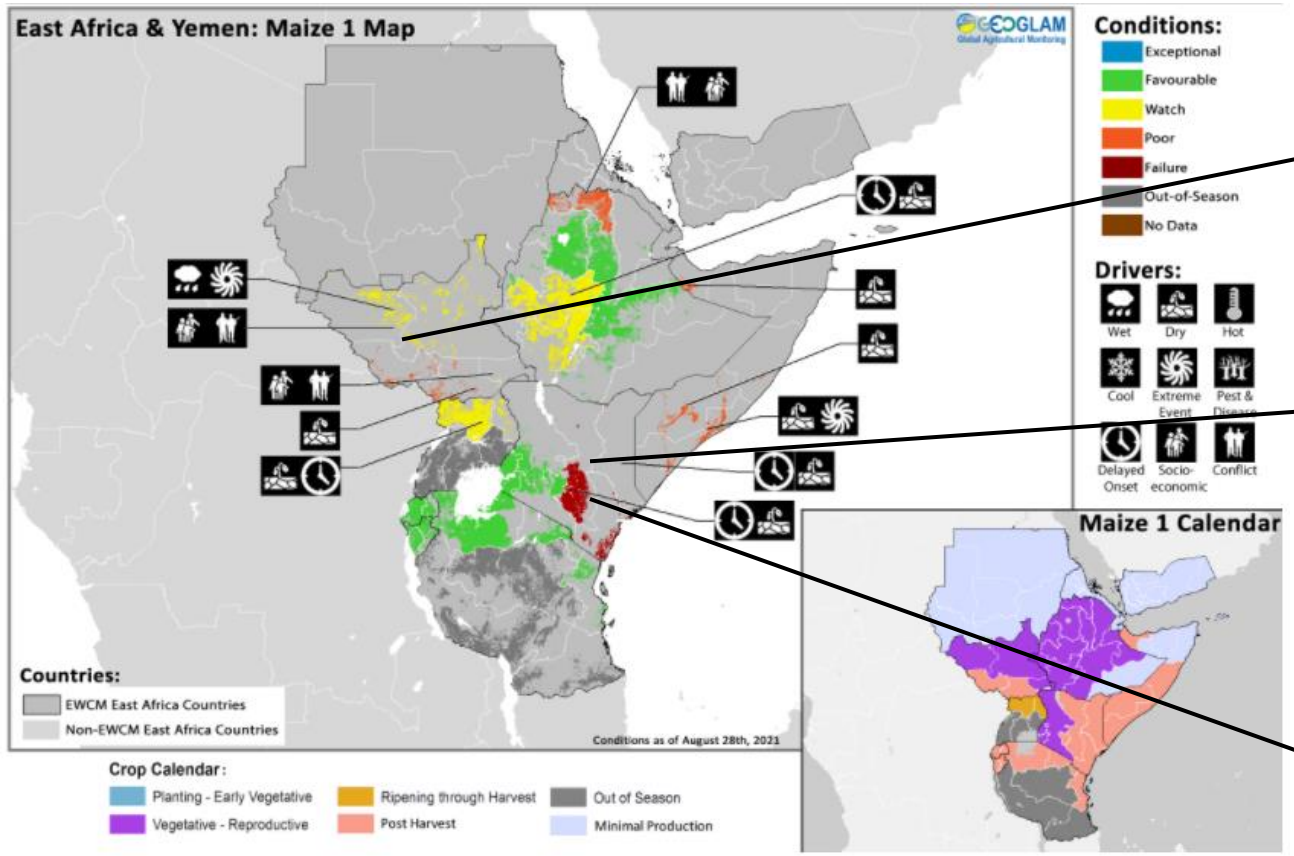
NASA UNIVERSITY OF MARYLAND HARVEST

#EO4IMPACT

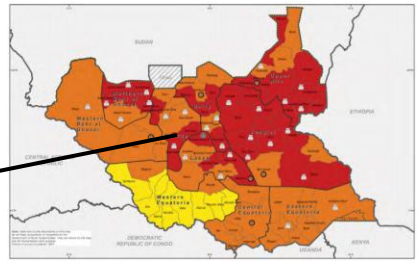
Operational Global Crop Assessments:



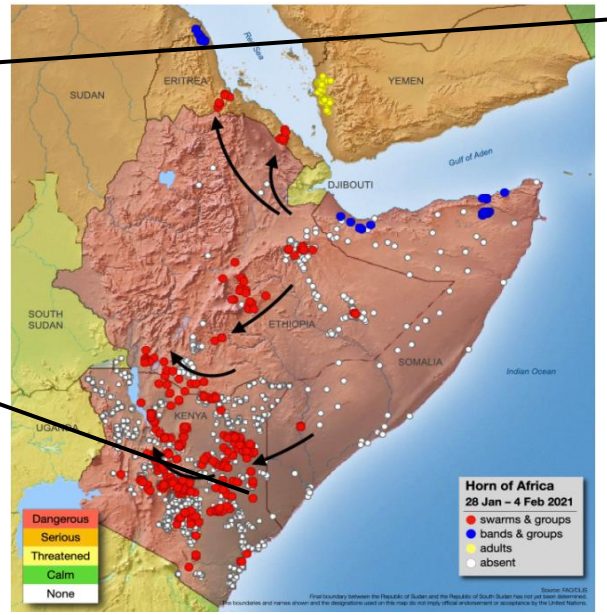
Report #64 September 2021



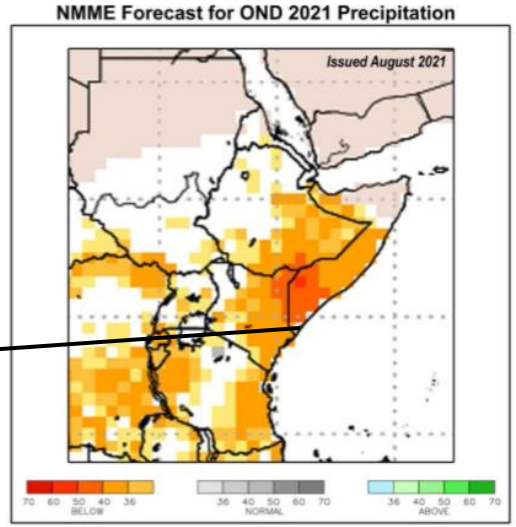
Conflict Report
Acute Food Insecurity



Locust Update



Seasonal Forecasts



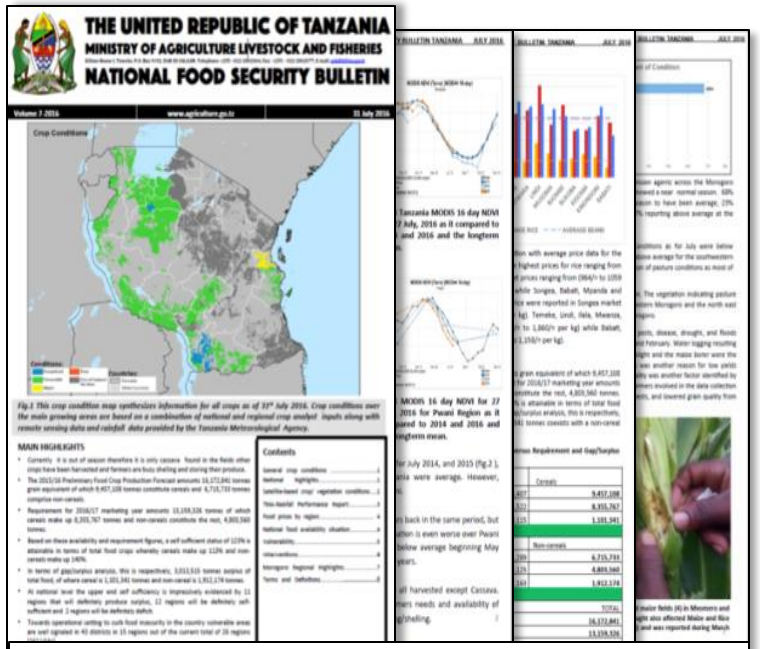
Working with partners to enhance the early warning reports (FAO, UCSB,ACLED)

Crop Monitor for Early Warning

Co-Development of National Monitoring Systems

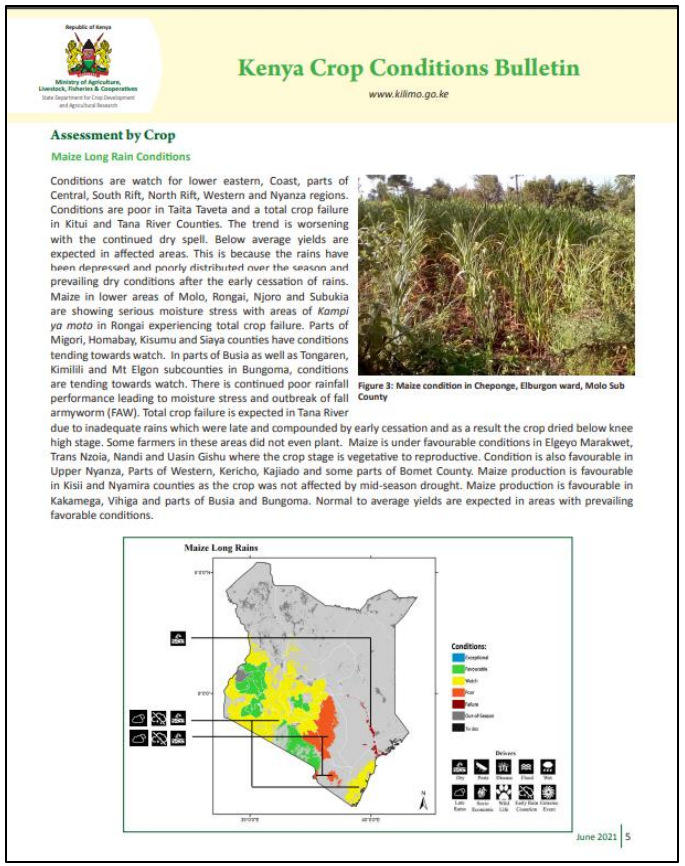
7 Countries and 1 Region

Tanzania


THE UNITED REPUBLIC OF TANZANIA
MINISTRY OF AGRICULTURE LIVESTOCK AND FISHERIES
NATIONAL FOOD SECURITY BULLETIN

National Food Security Bulletin, published by the Tanzania Ministry of Agriculture Food Security, National Food Security Division

Kenya


Kenya Crop Conditions Bulletin
www.kilimo.go.ke

Assessment by Crop

Maize Long Rain Conditions

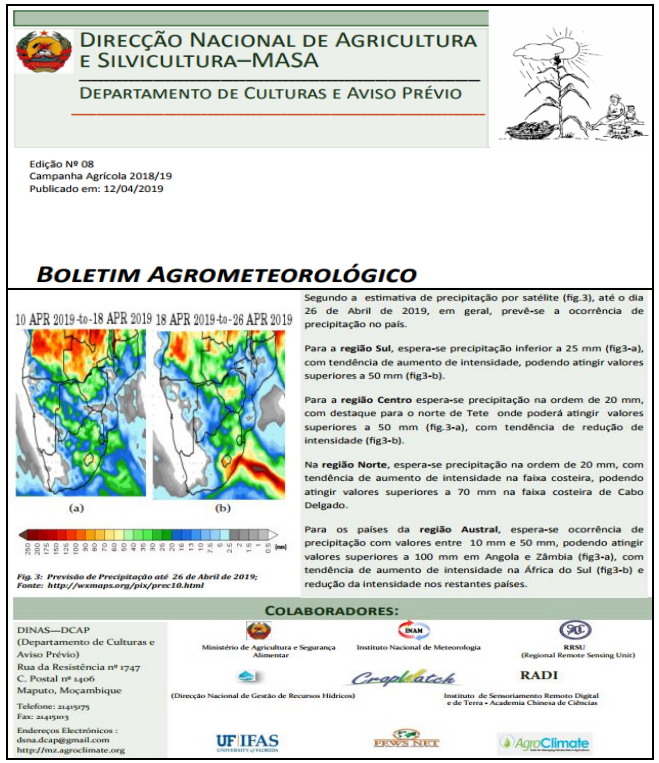
Conditions are watch for lower eastern, Coast, parts of Central, South Rift, North Rift, Western and Nyanza regions. Conditions are poor in Taita Taveta and a total crop failure in Kitui and Tana River Counties. The trend is worsening with the continued dry spell. Below average yields are expected in affected areas. This is because the rains have been depressed and poorly distributed over the season and prevailing dry conditions after the early cessation of rains. Maize in lower areas of Molo, Rongai, Njoro and Subukia are showing serious moisture stress with areas of *Kampi ya moto* in Rongai experiencing total crop failure. Parts of Migori, Homabay, Kisumu and Siaya counties have conditions tending towards watch. In parts of Busia as well as Tongaren, Kimilili and Mt Elgon subcounties in Bungoma, conditions are tending towards watch. There is continued poor rainfall performance leading to moisture stress and outbreak of fall armyworm (FAW). Total crop failure is expected in Tana River due to inadequate rains which were late and compounded by early cessation and as a result the crop dried below knee high stage. Some farmers in these areas did not even plant. Maize is under favourable conditions in Elgeyo Marakwet, Trans Nzoia, Nandi and Uasin Gishu where the crop stage is vegetative to reproductive. Condition is also favourable in Upper Nyanza, Parts of Western, Kericho, Kajiado and some parts of Bomet County. Maize production is favourable in Kisii and Nyamira counties as the crop was not affected by mid-season drought. Maize production is favourable in Kakamega, Vihiga and parts of Busia and Bungoma. Normal to average yields are expected in areas with prevailing favorable conditions.

Figure 3: Maize condition in Cheponge, Elburgon ward, Molo Sub County

Maize Long Rains

June 2021 | 5

Mozambique


DIRECÇÃO NACIONAL DE AGRICULTURA E SILVICULTURA–MASA

DEPARTAMENTO DE CULTURAS E AVISO PRÉVIO

Edição Nº 08
Campanha Agrícola 2018/19
Publicado em: 12/04/2019

BOLETIM AGROMETEOROLÓGICO

10 APR 2019 to 18 APR 2019 18 APR 2019 to 26 APR 2019

(a) (b)

Fig. 3: Previsão de Precipitação até 26 de Abril de 2019; Fonte: http://wxmaps.org/pix/prec10.html

Segundo a estimativa de precipitação por satélite (fig.3), até o dia 26 de Abril de 2019, em geral, prevê-se a ocorrência de precipitação no país.

Para a **região Sul**, espera-se precipitação inferior a 25 mm (fig3-a), com tendência de aumento de intensidade, podendo atingir valores superiores a 50 mm (fig3-b).

Para a **região Centro** espera-se precipitação na ordem de 20 mm, com destaque para o norte de Tete onde poderá atingir valores superiores a 50 mm (fig.3-a), com tendência de redução de intensidade (fig3-b).

Na **região Norte**, espera-se precipitação na ordem de 20 mm, com tendência de aumento de intensidade na faixa costeira, podendo atingir valores superiores a 70 mm na faixa costeira de Cabo Delgado.

Para os países da **região Austral**, espera-se ocorrência de precipitação com valores entre 10 mm e 50 mm, podendo atingir valores superiores a 100 mm em Angola e Zâmbia (fig3-a), com tendência de aumento de intensidade na África do Sul (fig3-b) e redução da intensidade nos restantes países.

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(Direcção Nacional de Gestão de Recursos Hídricos)
CropWatch
RADI
Instituto de Sensoriamento Remoto Digital e de Terra - Academia Chinesa de Ciências
UF IFAS
FEWS NET
AgroClimate

The Uganda Experience

- Uganda's population is predominantly rural with up to 80% of the households relying on rain-fed crops
- A disaster risk financing (DRF) project was launched in 2016 for the Karamoja region
- GEOGLAM worked with the Ugandan Government to develop quantitative triggering indicators using EO
- It was immediately put into action in 2016-17 to respond to severe drought, triggering labour-intensive public works funding to offset crop failures

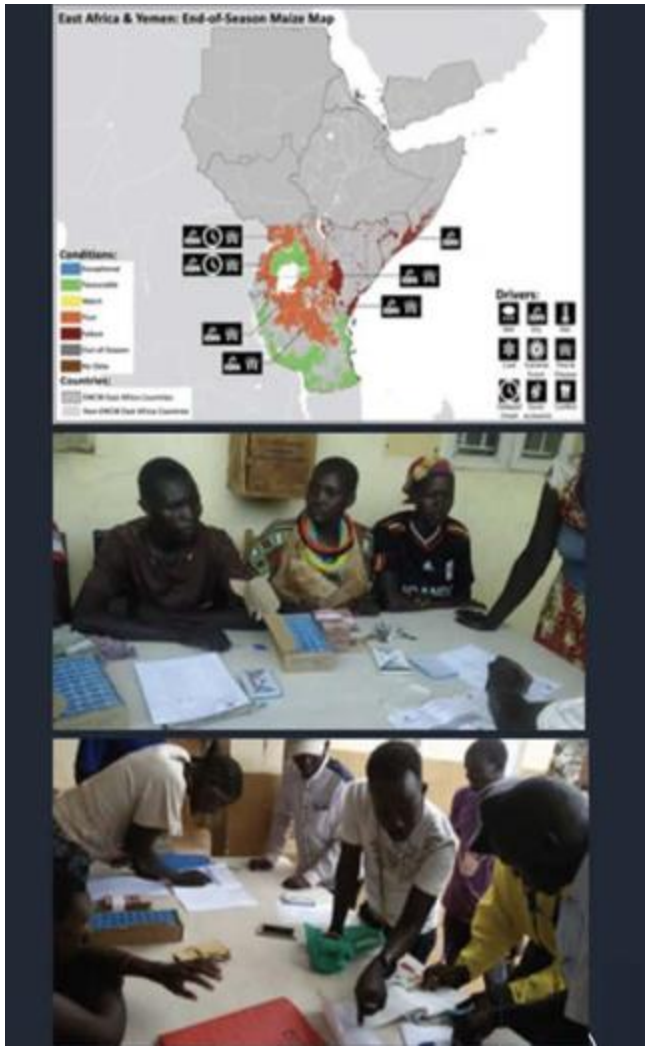
Impact 2016/17

"In the past we always reacted to crop failure, spending billions of shillings to provide food aid in the region. 2017 was the ***first time we acted proactively because we had clear evidence from satellite data very early in the season"***

Martin Owor, Commissioner Office of the Prime Minister (OPM)

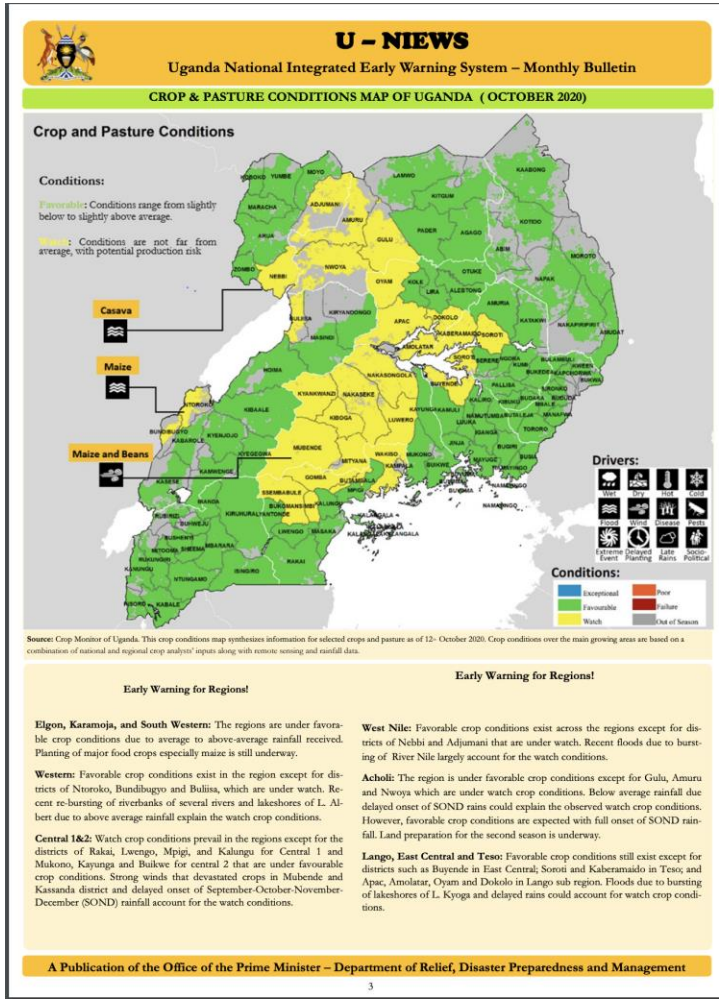
> Earth Observations provided warning 3 months sooner than previous years

> The government was able to quickly implement programs to address the climate emergency and reduce suffering



Evaluation and Lessons Learnt

- A 2019 review of DRF indicated that the Government of Uganda realized a saving of UGX 9.6bn (51%) against an overall emergency fund of UGX 19bn for FY ending 2016/17.
- The program has supported 66,075 households (~ 300,000 people)
- Uganda was able to run the EO-based assessment locally, which increased the credibility and ownership of the results (impact of co-development)
- Since 2016 Uganda has operationalized the crop monitoring system and it is now a part of the Uganda National Early Warning Bulletin


U – NIEWS

Uganda National Integrated Early Warning System – Monthly Bulletin

CROP & PASTURE CONDITIONS MAP OF UGANDA (OCTOBER 2020)

Crop and Pasture Conditions

Conditions:

Favorable: Conditions range from slightly below to slightly above average.

Watch: Conditions are not far from average, with potential production risk

Cassava

Maize

Maize and Beans

Drivers:

Conditions:

Exceptional

Favourable

Watch

Poor

Failure

Out of Season

Source: Crop Monitor of Uganda. This crop conditions map synthesizes information for selected crops and pasture as of 12- October 2020. Crop conditions over the main growing areas are based on a combination of national and regional crop analysts' inputs along with remote sensing and rainfall data.

Early Warning for Regions!

Elgon, Karamoja, and South Western: The regions are under favorable crop conditions due to average to above-average rainfall received. Planting of major food crops especially maize is still underway.

Western: Favorable crop conditions exist in the region except for districts of Ntoroko, Bundibugyo and Buliisa, which are under watch. Recent re-bursting of riverbanks of several rivers and lakeshores of L. Albert due to above average rainfall explain the watch crop conditions.

Central 1&2: Watch crop conditions prevail in the regions except for the districts of Rakai, Lwengo, Mpigi, and Kalungu for Central 1 and Mukono, Kayunga and Buikwe for central 2 that are under favourable crop conditions. Strong winds that devastated crops in Mubende and Kassanda district and delayed onset of September-October-November-December (SOND) rainfall account for the watch conditions.

Early Warning for Regions!

West Nile: Favorable crop conditions exist across the regions except for districts of Nebbi and Adjumani that are under watch. Recent floods due to bursting of River Nile largely account for the watch conditions.

Acholi: The region is under favorable crop conditions except for Gulu, Amuru and Nwoya which are under watch crop conditions. Below average rainfall due delayed onset of SOND rains could explain the observed watch crop conditions. However, favorable crop conditions are expected with full onset of SOND rainfall. Land preparation for the second season is underway.

Lango, East Central and Teso: Favorable crop conditions still exist except for districts such as Buyende in East Central; Soroti and Kaberamaido in Teso; and Apac, Amolatar, Oyam and Dokolo in Lango sub region. Floods due to bursting of lakeshores of L. Kyoga and delayed rains could account for watch crop conditions.

A Publication of the Office of the Prime Minister – Department of Relief, Disaster Preparedness and Management

3

Next Steps

- Developing National Adaptation Plan (NAP) Supplementary Technical Guidance on the use of EO for Agricultural Monitoring (based on Uganda case study)
- Knowledge packages for the GEO Knowledge Hub, to support NAP guidance
- Work with a new country to utilize/test/evaluate the NAP guidance (possibly Malawi)
  - Funding required to drive this
- Exploring avenues to scale up co-development

Thank You!

Ian Jarvis / 21 September 2021
@geoglam / ijarvis@geosec.org

#EO4Impact

Dr Gutierrez is a Lead scientist at NOAA, with over 25 years of experience in the fields of hydrology, water quality, and environmental policy. She is a member of the Ambassador's Water Experts Program (AWEP), where she serves as an expert hydrologist on behalf of the U.S. around the world, a Program in support of the U.S. President's Global Water Strategy.

Within the Group on Earth Observations (GEO), she is a Co-chair of the regional GEO in the Americas (AmeriGEO) and a co-chair of the Global Water Sustainability (GEOGloWS) Initiative. She is the recipient of the GEO Individual Excellence Award 2019 for her exceptional contributions to the work of GEO by improving water sustainability in multiple countries, and pioneering scientific and regional collaboration. She holds a Ph.D. in Civil and Environmental Engineering from the University of Maryland and an M.S. in Technology Management and Public Policy from the State University of New York at Stony Brook. ï»¿

Lead Scientist for Water Prediction, National Oceanic and Atmospheric Administration

Angélica Gutiérrez
Lead Scientist, NOAA
Co-chair of GEOGloWS

GEO CLIMATE POLICY AND FINANCE WORKSHOP

Real-time decisions during Hurricanes ETA and IOTA
GEOGloWS-ECMWF, Honduras

Angélica Gutiérrez, Co-Chair GEOGloWS Initiative
21 September 2021

GROUP ON EARTH OBSERVATIONS

#EO4IMPACT

GEOGLOWS

GLOBAL WATER SUSTAINABILITY

Since 2017 – organizations using GEOGloWS-ECMWF Streamflow forecast System in the following countries

Honduras

Dominican Republic

SICA /Central America

Brazil

Colombia

Peru

El Salvador

Guatemala

Afghanistan

Togo

Tajikistan

India

Israel

World Bank Projects - Ethiopia, Ivory Coast, Somalia, Nile Basin Initiative

RCMRD operates the NASA-SERVIR – Kenya, Tanzania

FEWSNET (USAID)

Nepal

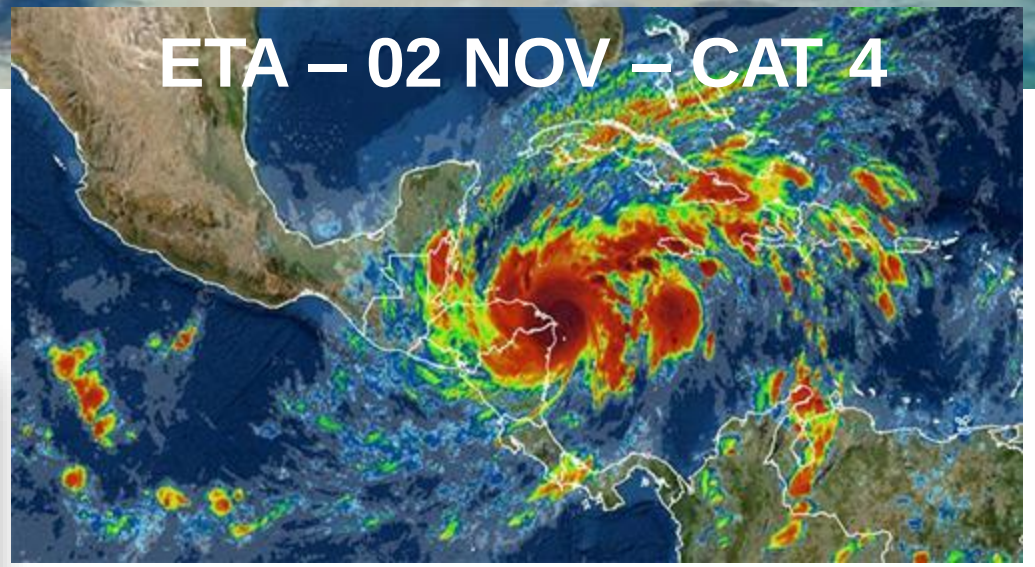
Bhutan

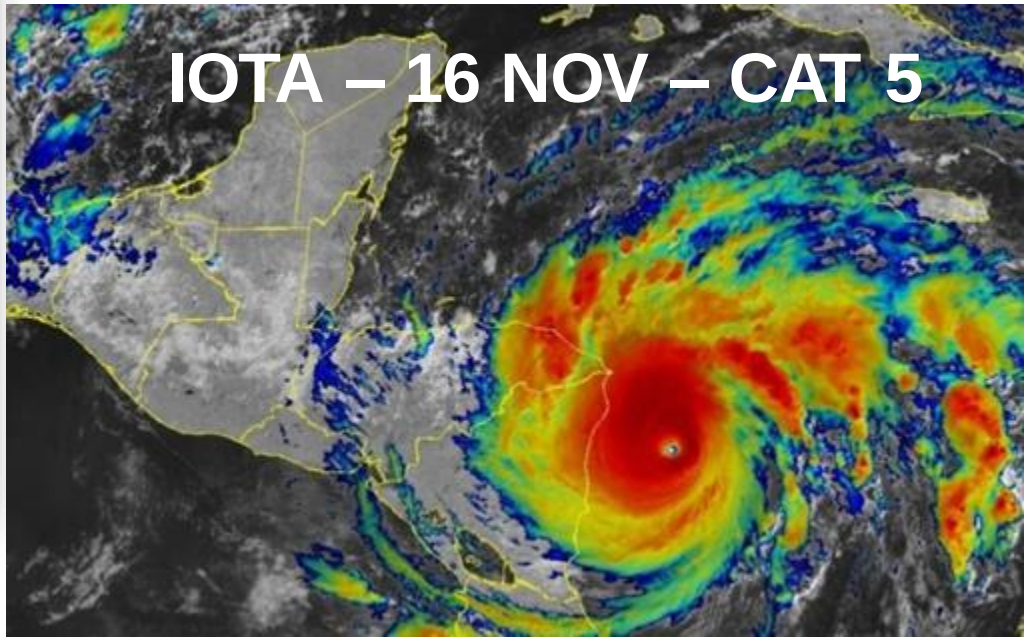
Bangladesh

Hurricanes ETA and IOTA November 2020

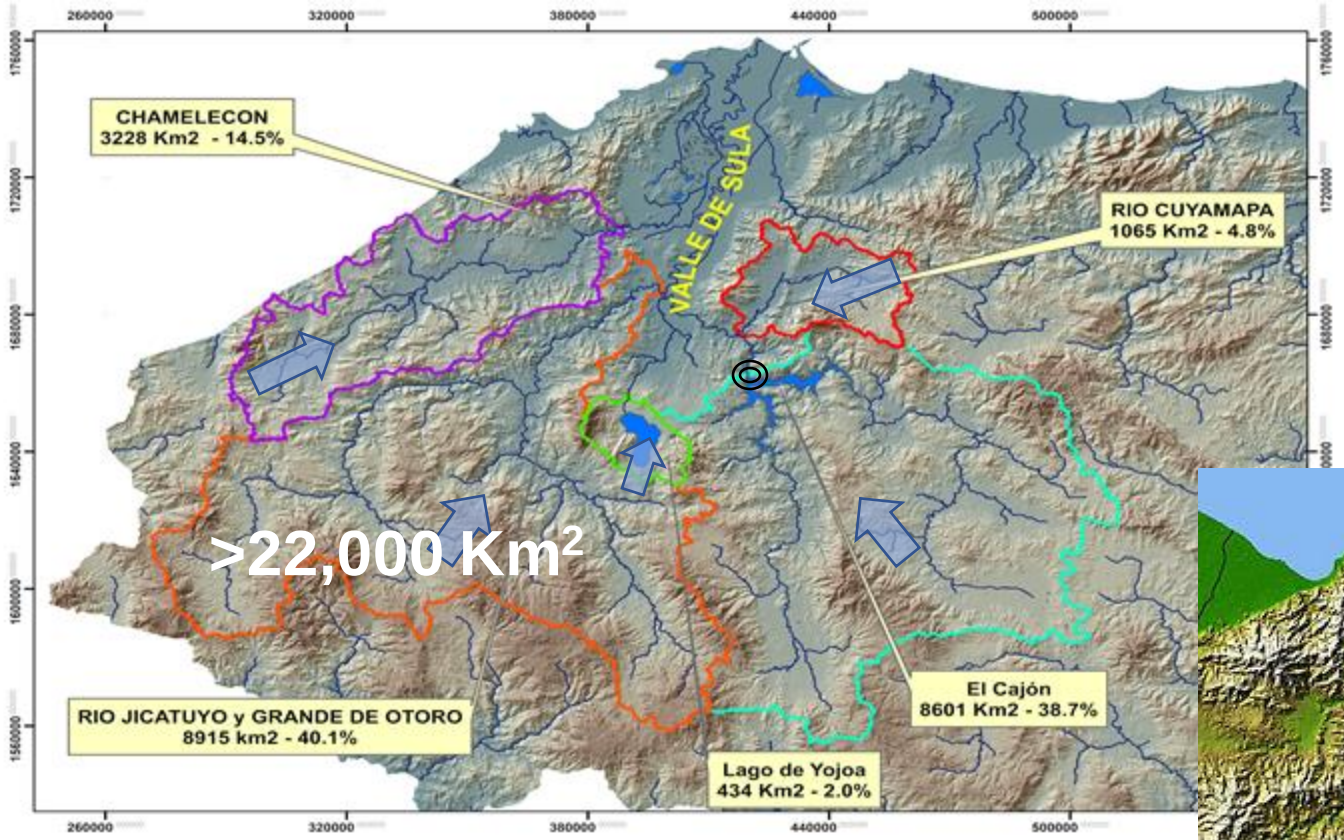
Lack of long-range forecast information.

Two hurricanes in one month





The Sula Valley, the most vulnerable area in Honduras



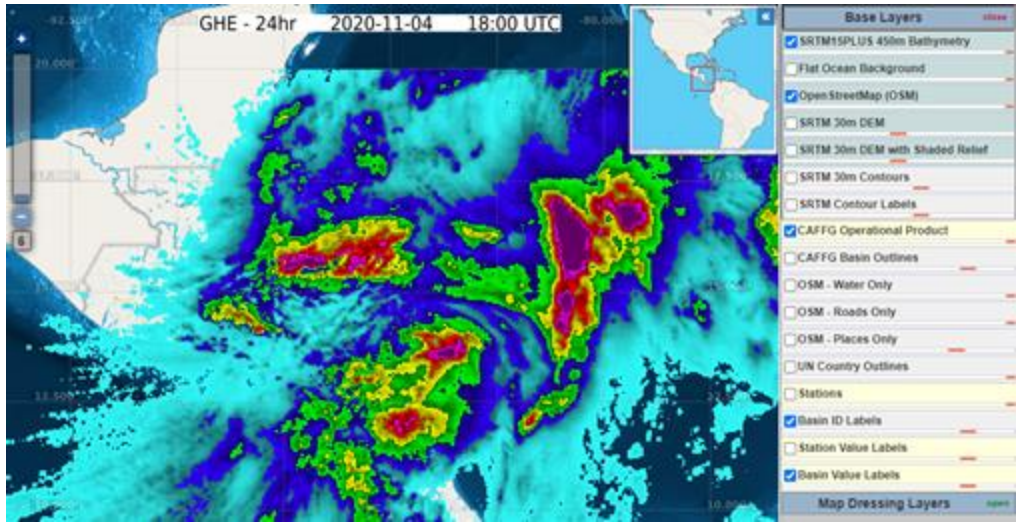
GOBIERNO DE LA REPÚBLICA DE HONDURAS

EMPRESA NACIONAL DE ENERGÍA ELÉCTRICA
ENEE

The only major river control structure in the upper basin is the Central Hidroeléctrica Francisco Morazán, with about 39% of the water contribution to the valley.

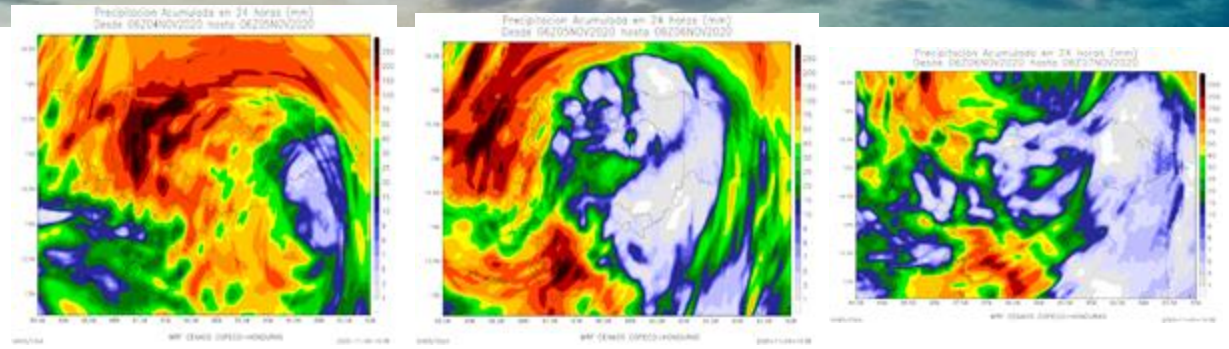
In preparation for ETA …..

CAFFGS



Resultados con datos del CAFFG- Modelo Centroamericano

		6 horas	24 horas
		6 pm de 04 de NOV	12 pm de 05 de NOV
Q m3/s		3165.71	4806.75
Vol MM3 (acumulado)		79.14	415.53
Nivel pronosticado (msnm)		277.80	281.49



Resultados con datos del Modelo WRF

	7:00 am de 05 de NOV	7:00 am de 06 de NOV	7:00 am de 07 de NOV
Lluvia promedia acumulada	102.45	189.76	209.85
Q m3/s	8548.12	8339.64	6137.89
Vol MM3 (acumulado)	825.15	1610.05	1777.47
Nivel pronosticado (msnm)	285.38	293.29	294.59

WRF

November 2 :What was done during ETA?

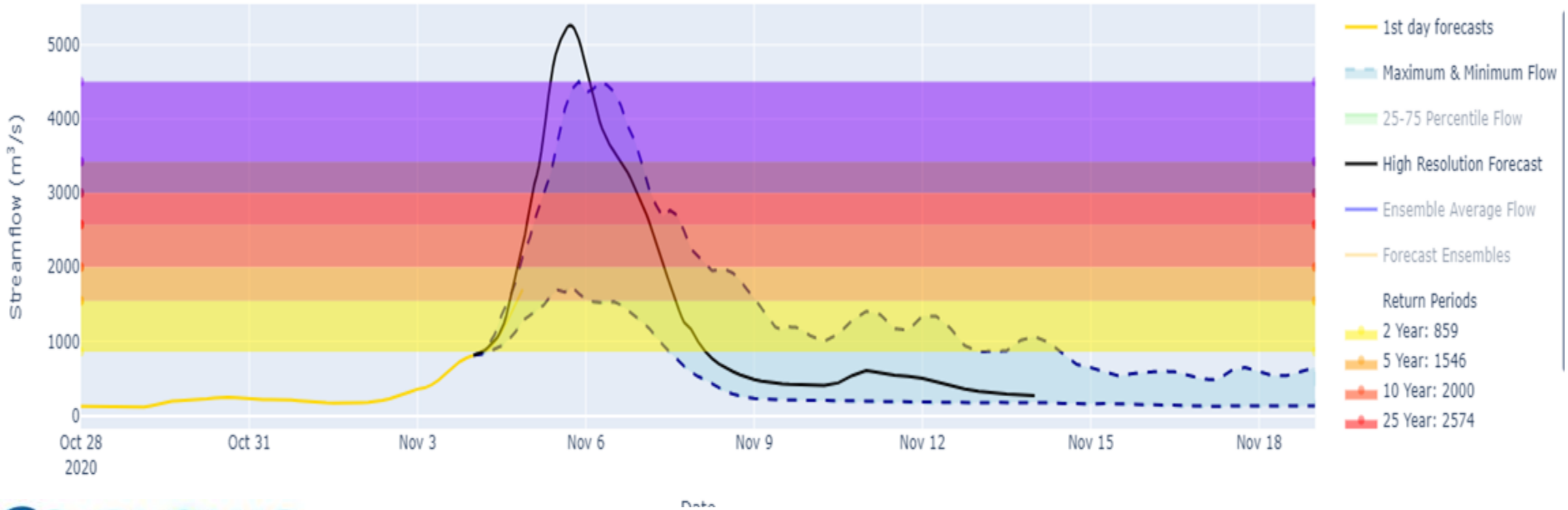
- With Eta's arrival, the water elevation increased, surpassing the 285 m maximum level of the reservoir.
- During the emergency and as part of the ENEE's management plan, energy production was maximized while retaining as much water as possible in the reservoir.

ETA - stored volume = 1068 MM3
maximum flow = 4,000 m^3/s
level: 13.35 m | 285.95 msnm (protocol start)

IOTA is announced for November 16

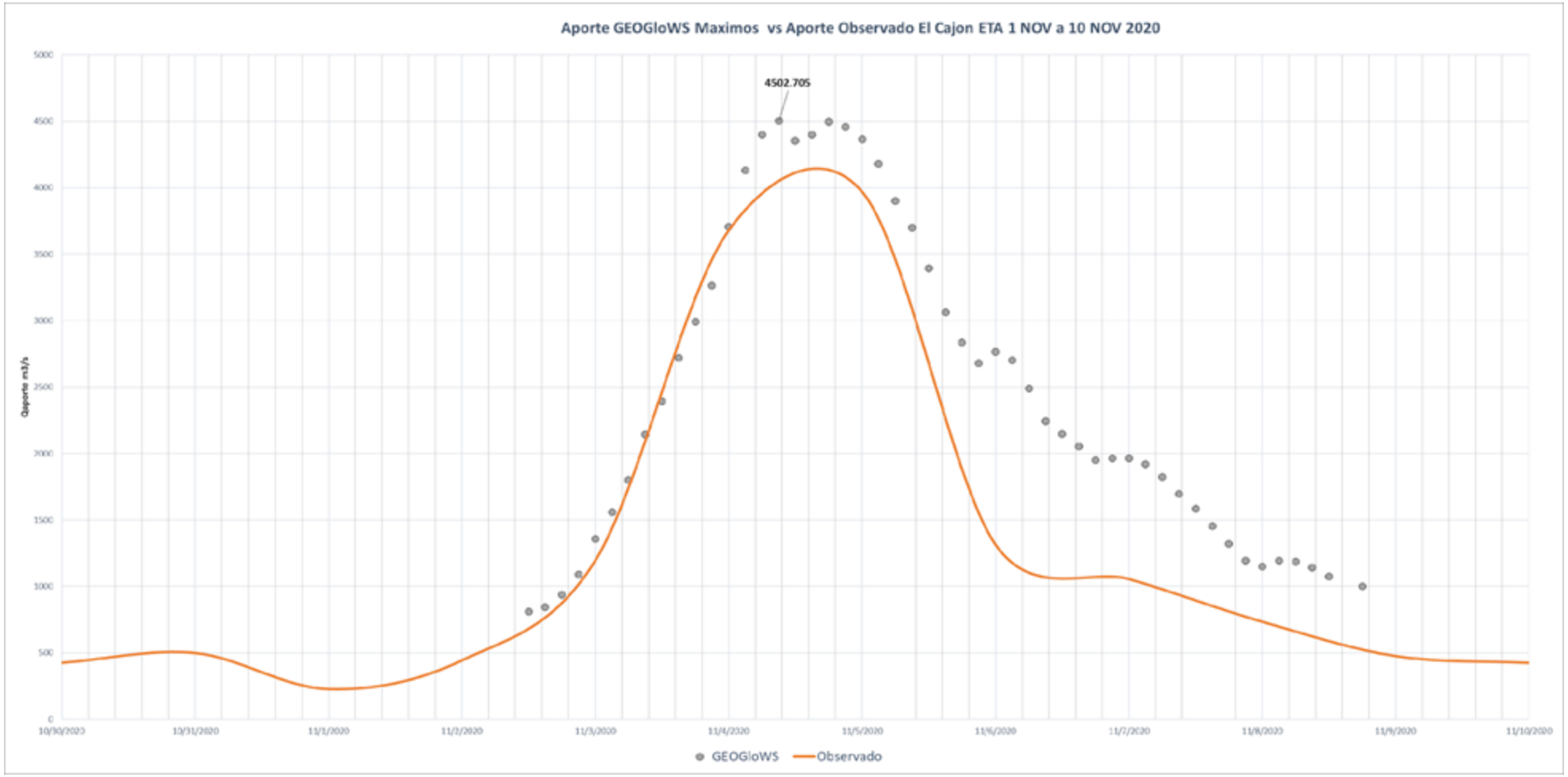
- The announcement of IOTA brought serious complications to our Decision process
- We needed long range forecast information

Collaboration Regional AmeriGEO /GEOGloWS

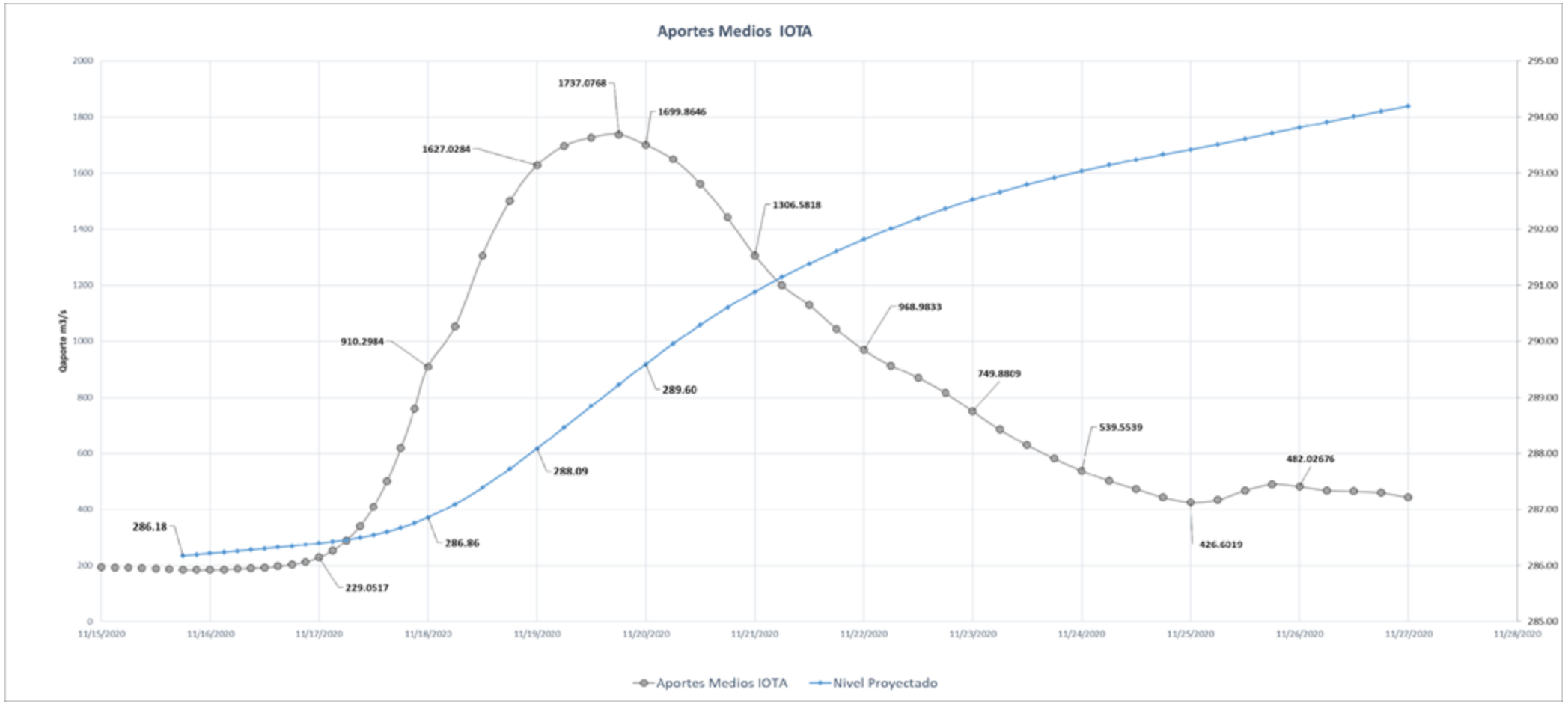


GEOGLOWS
GLOBAL WATER SUSTAINABILITY

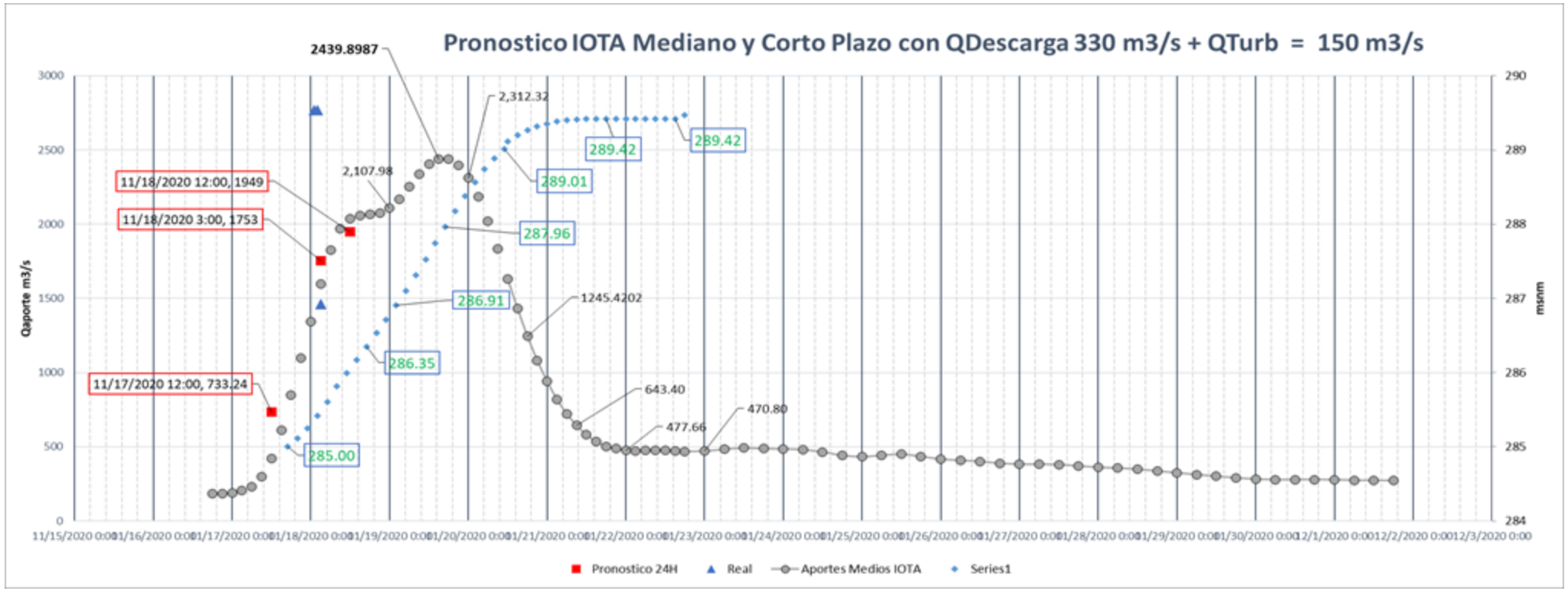
November 11: **Validation** of GEOGloWS forecast against In-situ data to determine
1. the accuracy of the prediction and
2. whether or not ENEE's decisions could be based on GEOGloWS forecast.



November 12 – Analysis and Projections based on GEOGloWS forecast for IOTA indicate that reservoir capacity is not enough.



November 17 – Decisions in the middle of the storm



In real time, we validate the forecast and we are able to make additional decisions such as closing the gates to detain El Cajón's inflow so as not to add to the extreme flows of the uncontrolled Ulua and Cuyamapa Rivers and provide the best opportunity for the flood wave to pass through the valley.

Results and Benefits

- The use of the GEOGLoWS-ECMWF Streamflow Forecast service avoided severe socio-economic losses and damages in the Sula Valley.

- Decisions on Community evacuations conducted by the National System of Disaster Risk Reduction (SINAGER) and the Committee of Contingencies (COPECO) were guided by ENEE's information based on GEOGloWS.

- The president of the ENEE's audit commission acknowledges that : "El Cajón Dam was the Sula Valley's silent hero, retaining more than one billion cubic meters of water that were not discharged into the valley".

Inter Institutional Collaboration

CEPREDENAC

CENTRO DE COORDINACIÓN PARA LA PREVENCIÓN DE LOS DESASTRES EN AMÉRICA CENTRAL Y REPÚBLICA DOMINICANA

COPECO HONDURAS

GOBIERNO DE LA REPÚBLICA DE HONDURAS

SISTEMA NACIONAL DE GESTIÓN DE RIESGO (SINAGER)

GOBIERNO DE LA REPÚBLICA DE HONDURAS

EMPRESA NACIONAL DE ENERGÍA ELÉCTRICA ENEE

Thank You!

Thank You!

Angélica Gutiérrez
angelica.gutierrez@noaa.gov

#EO4Impact

@j_m_fitton

Senior Postdoctoral Researcher at MaREI, UCC, working on climate change adaptation and development of climate services and often collaborates with local/national government on climate change adaptation

Research Areas:

- Climate Risk and Adaptation
- Coastal Management
- Remote Sensing/GIS

James has background in Earth Sciences and Coastal Management and has worked at universities in the UK, Denmark, and Ireland.

Dr James Fitton

Senior Postdoctoral Researcher

MaREI, UCC

GEO CLIMATE POLICY AND FINANCE WORKSHOP

GEO Blue Planet -

Dynamic Coast: supporting climate change adaptation of the coast

Dr. James Fitton, MaREI, UCC

21 September 2021

GROUP ON EARTH OBSERVATIONS

#EO4IMPACT

- Increasing extents and rates of **coastal erosion** will result due to sea level rise and climate change, causing the **loss of valuable ecosystem services within the intertidal zone**
- To support climate adaptation we need to **map the environment and monitor this change**
- Coastline data/maps are often out of date/incorrect **due to high cost and logistical complexities** involved in regularly survey and map at national scales
- The intertidal zone is a **difficult environment to map** using traditional approaches: Earth Observation
- Dynamic Coast has developed Coast X-Ray, a new approach to map the intertidal zone by measuring **water occurrence frequencies using tidally calibrated satellite imagery** (Sentinel-2), processed within Google Earth Engine (GEE), for the UK and Ireland.

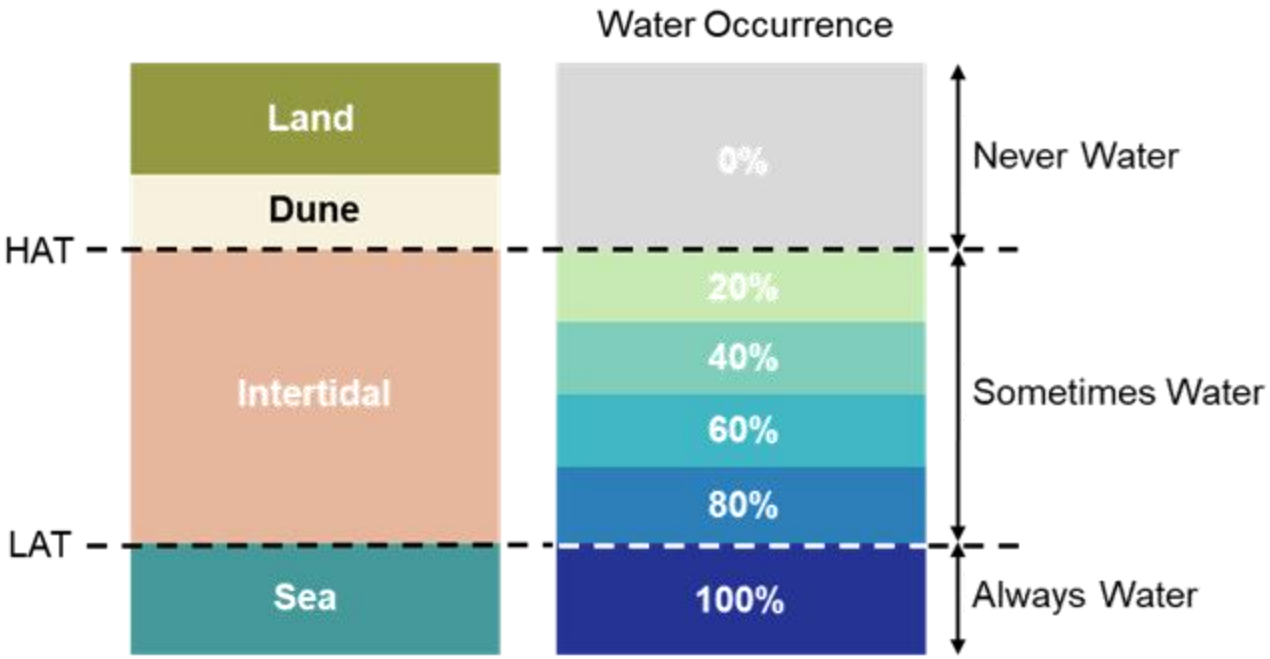
Water Frequency

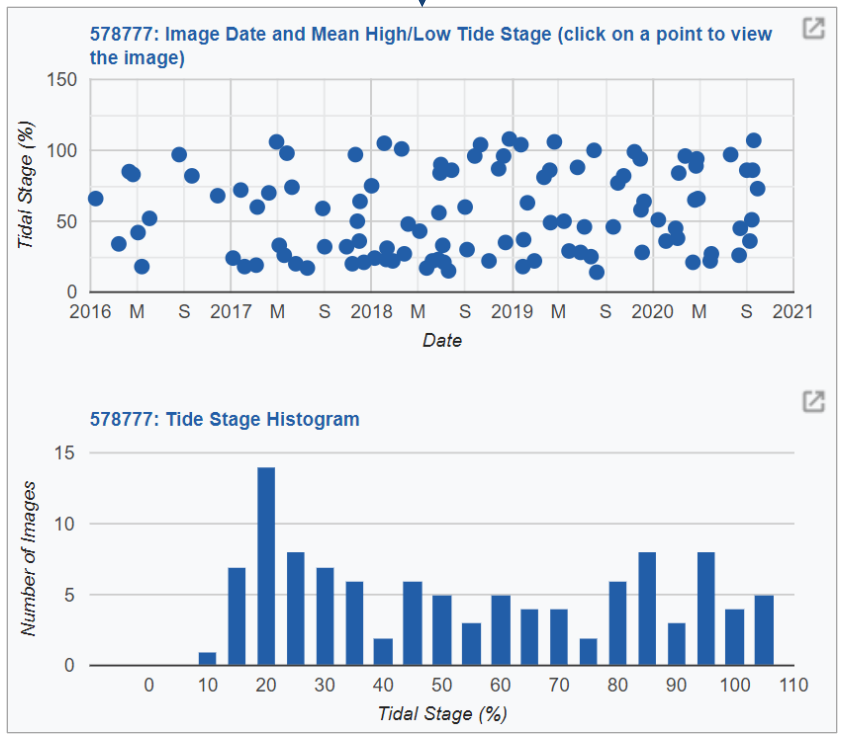
Grid Cell Image Collection

Tidal Calibration

POLPRED Offshore Tidal Model

- Converted to % of MHWS/MLWS Tide Range



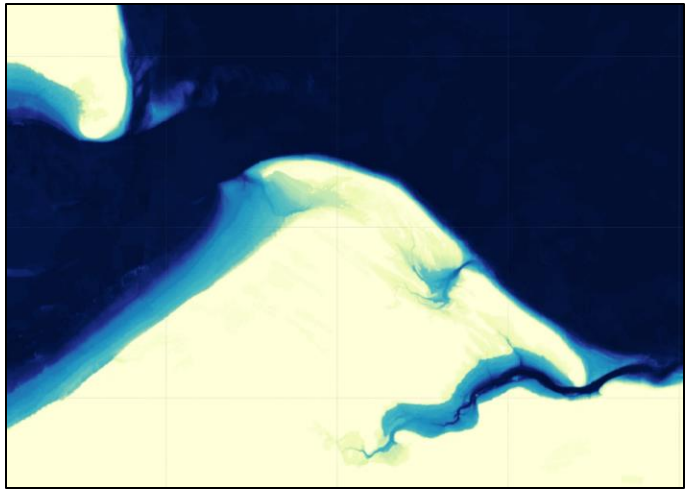


- a Water Occurrence output;
- an Intertidal Elevation (metres relative to mean sea level) output;
- an Intertidal Tide Stage (% of MHWS/MLWS tide range) output;
- a RGB image representing the highest tidal stage observed;
- a RGB image representing the lowest tidal stage observed;
- an estimate of the MHWS contour (the -10 to 0% tide stage interval), if available;
- an estimate of the MLWS contour (the 90 to 100% tide stage interval), if available.

www.DynamicCoast.com

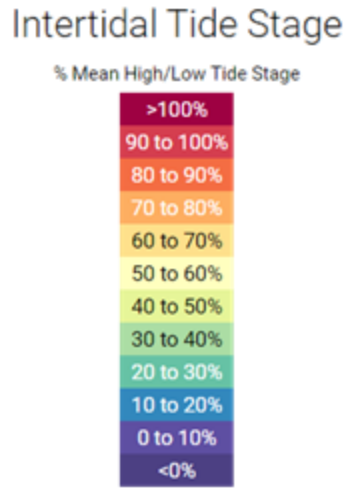
Highest Tide

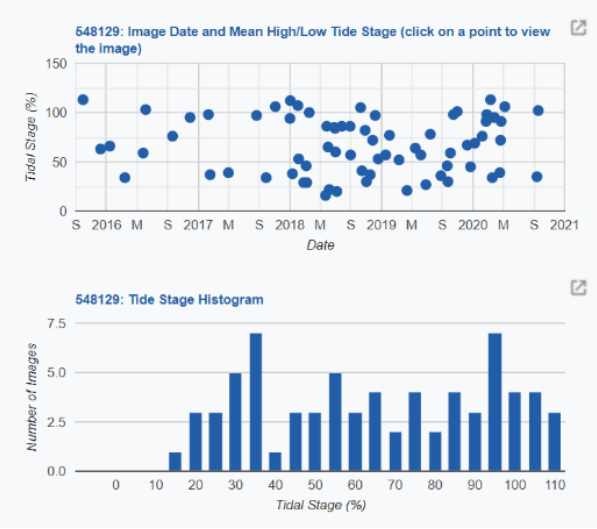
Lowest Tide



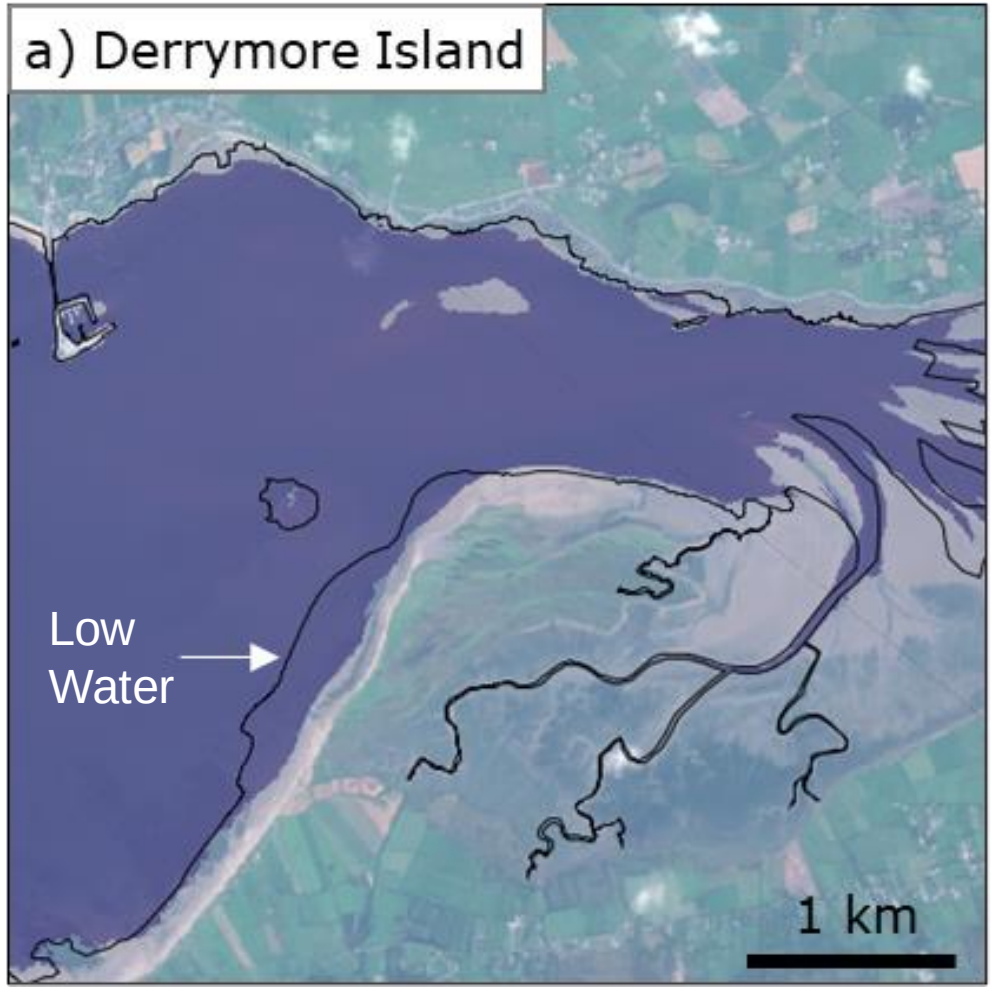
Water Occurrence

Elevation

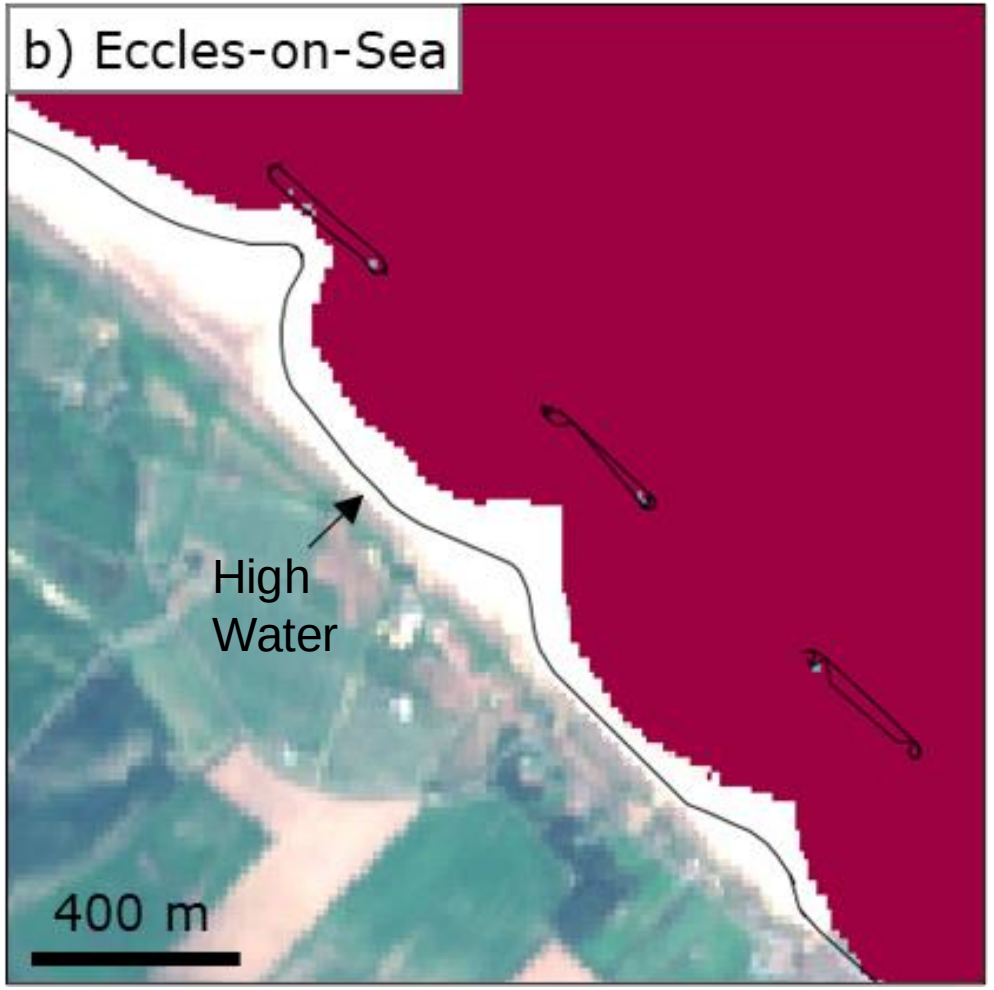




- Open Access Article
  - https://doi.org/10.1016/j.rsase.2021.100499
- Portal
  - www.DynamicCoast.com/coastxray
- Github
  - https://github.com/jamesfitton/cxr/



Erosion



Accretion

- EO has allowed us to develop a useful tool that is supplying **change intelligence of intertidal extent and coastal change**
- These outputs **supports the OS and others** to accurately map coastal environments
- Scottish Government provided **£12m** (€14m, $16.5m) **for coastal adaptation**
- Knowing where the coastline is and how it is changing is crucial for **coastal adaptation planning and implementation**

Thank You!

James Fitton
@J_M_Fitton / james.fitton@ucc.ie

#EO4Impact

MaREI Energy · Climate · Marine

UCC University College Cork, Ireland Coláiste na hOllscoile Corcaigh

Dr. Frédéric Bretar is a French Engineer and a scientist. He was a researcher on Lidar, image processing and photogrammetry at the French National Survey (IGN) before heading a laboratory in Earth Sciences. He served as a diplomat for some years in China (Shanghai and Hong Kong). He joined the Centre National d'Etudes Spatiales (CNES) in 2019 to develop and manage the Space Climate Observatory.

Frédéric BRETAR
SCO program Manager
Centre National d'Etudes Spatiales (CNES)

GEO CLIMATE POLICY AND FINANCE WORKSHOP

Supporting Climate action at national level: Hints from the SCO

Frédéric BRETAR/CNES
21 September 2021

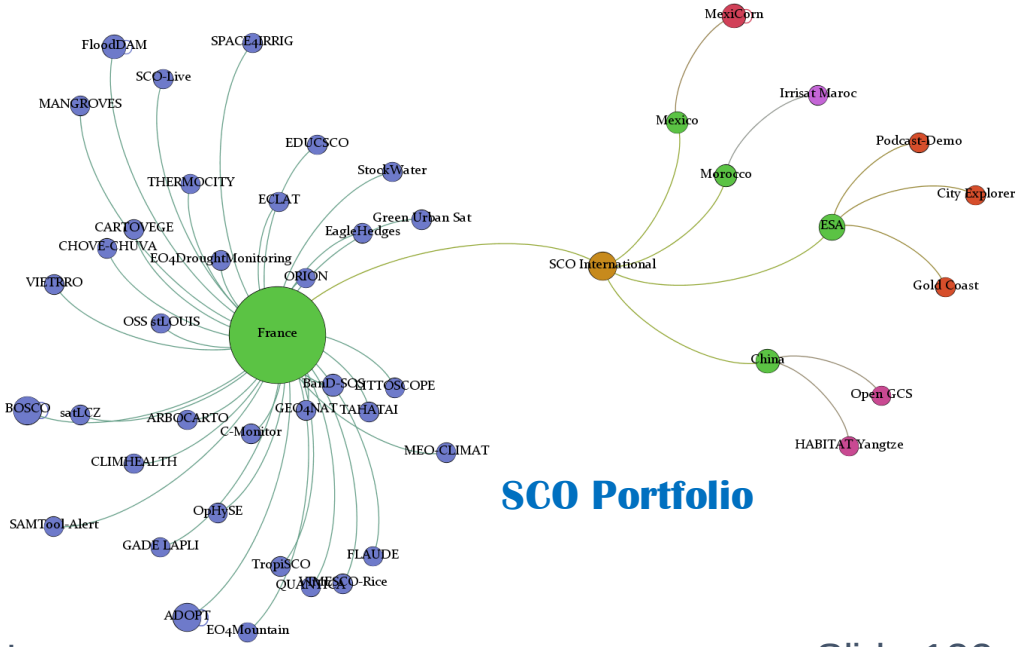
GROUP ON EARTH OBSERVATIONS

#EO4IMPACT

SCO is…

- ✓ An international Alliance of space agencies and UN bodies with local implementations
- ✓ It aims to provide operational tools and studies to help decision makers to adapt to climate change, especially at local scales, using satellite earth-based observation tools in combination with field data and models.
- ✓ A strong accreditation process able to generate a rich portfolio of projects
- ✓ **43 accredited projects** on 64 experimental areas (~20 countries)
- ✓ **10 Topics** : Land Use, Biodiversity, Carbon, Extreme Meteo, Energy, Natural Disaster Response, Agriculture, Health, Water management, education

SCO SPACE CLIMATE OBSERVATORY



SCO Portfolio

Urban areas: Thermocity

THERMOCITY

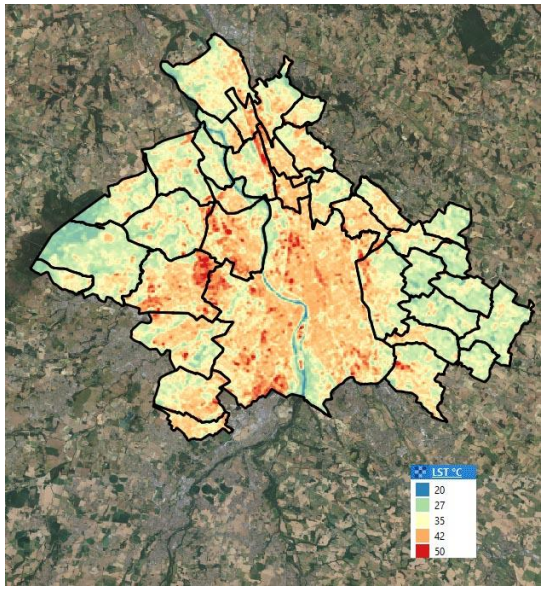
Studying urban heat islands and heat losses through the development of a thermography analysis tool based on satellite imagery.

EARTHDATA OPEN ACCESS FOR OPEN SCIENCE
Theia
Copernicus Land Monitoring Service
DINAMIS

- ASTER (TIR, 60km/90m)
- ECOSTRESS (TIR, 70m)
- Copernicus Sentinel-2 (Visible, 300km/10m)
- Pléiades (Visible, 20km/70cm)

cnes CSTB le futur en construction ONERA THE FRENCH AEROSPACE LAB METEO FRANCE

- Thermography and related products (heat islands, hot spots, etc.)
- emissivity/temperature separation



Open source, open data

Co designed with

Montpellier méditerranée Métropole
toulouse métropole
Strasbourg.eu eurometropole

[Full description]

Monitoring deforestation: TropiSCO

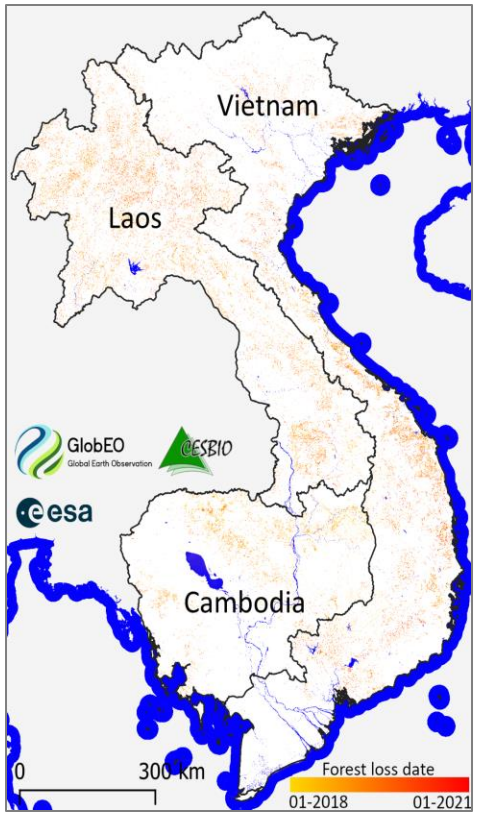
- Daily processing of Sentinel-1 (RADAR) data
- Deforestation map updated weekly: public data

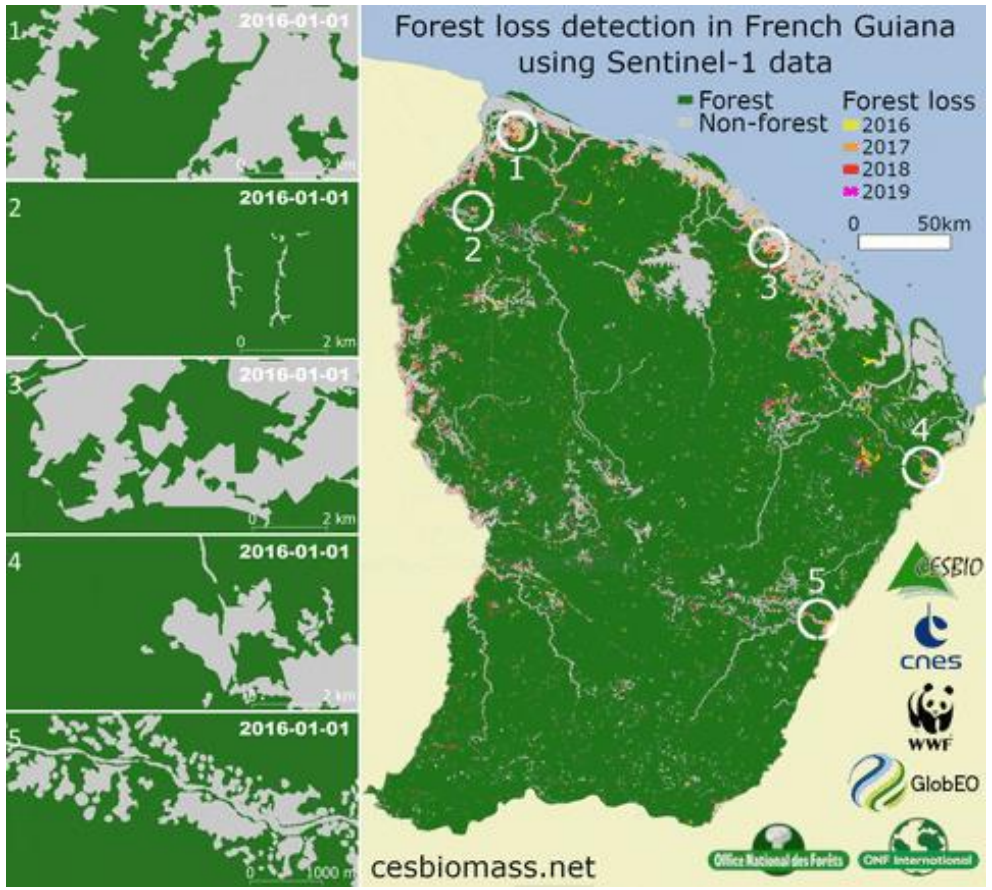
Product description:

- Weekly quick detection maps: minimum detection size = 0.1 ha
- Monthly and yearly deforested areas reports
- Specific products for partner users

[Full description]

Output of TropiSCO on the French Guiana





Open source, open data

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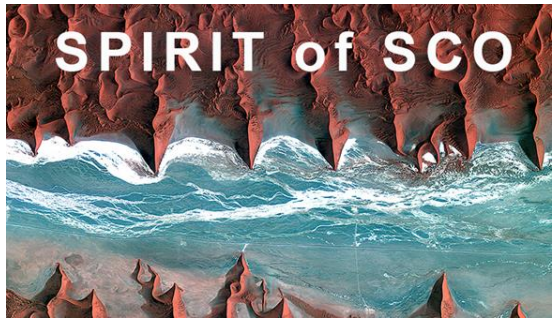


Thank You!

https://www.spaceclimateobservatory.org/

Frédéric BRETAR / 21 September 2021
Frederic.bretar@cnes.fr

#EO4Impact

Shanti Reddy has more than 30 years of experience in applying Earth observation and geospatial technologies to deliver policy outcomes at national and international level.

Over the past 12 years, he has been leading the geospatial and carbon modelling team at the Department of Industry, Science, Energy & Resources (DISER), Australian Government, contributing to the national GHG inventory and also domestic mitigation projects in Australia.

He is currently on deputation to Geoscience Australia where, as a senior manager, he is assisting with the Digital Earth Africa partnerships and strategic planning.

Shanti is one of the lead authors of *2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories*. He has extensive experience in assisting countries in SE Asia and Africa in implementing EO data to support environmental and climate action.

Shanti Reddy
Senior Manager, DE Africa
Geoscience Australia

GEO CLIMATE POLICY AND FINANCE WORKSHOP

Digital Earth Africa: A Platform to Support Climate Action in Africa

Shanti Reddy, Senior Manager
21 September 2021

GROUP ON EARTH OBSERVATIONS

#EO4IMPACT

DE Africa Vision & Mission

Digital Earth Africa (DE Africa) is a not-for-profit initiative funded by The Helmsley Charitable Trust, USA and the Australian Government.

Our vision

DE Africa will provide a routine, reliable and operational service, using Earth observations to deliver decision-ready products enabling policy makers, scientists, the private sector and civil society to address social, environmental and economic changes on the continent and develop an ecosystem for innovation across sectors.

Our mission

DE Africa will process openly accessible and freely available data to produce decision-ready products. Working closely with the AfriGEO community, DE Africa will be responsive to the information needs, challenges and priorities of the African continent. DE Africa will leverage and build on existing capacity to enable the use of Earth observations to address key challenges across the continent.

The governance of DE Africa is guided by several key principles

Digital Earth Africa Partners

Partnerships and collaborations underpin Digital Earth Africa's operational model

DE Africa – Unique Value Proposition 1

Continental decision-ready products and services

ARD products and services

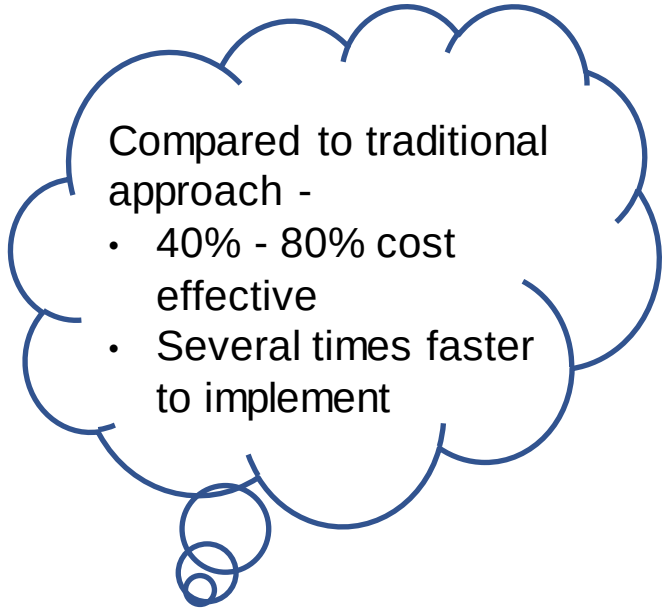
Analysis Sandbox

DE Africa Training Courses

DE Africa Map

Web Services for GIS

Africa Geoportal



DE Africa – Unique Value Proposition 2

African based governance and ownership

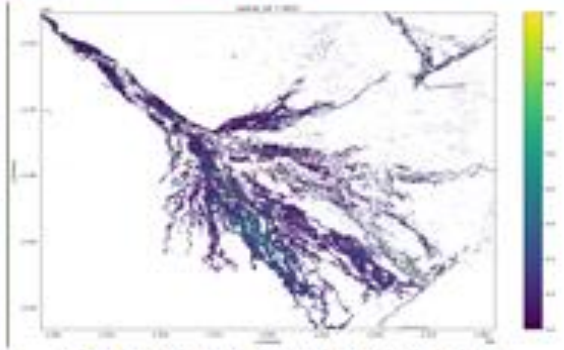
Expanding and Engaged User Community

Collaboration & established partnerships

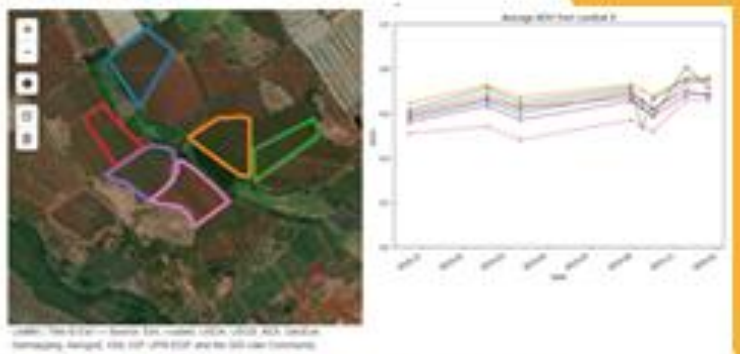
Ready to roll!

DE Africa Engagement with users to co-develop user cases

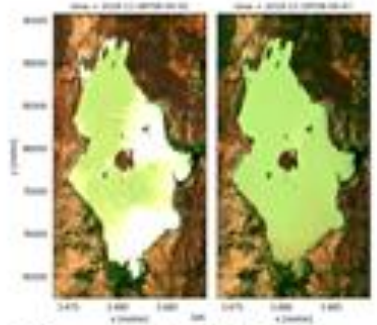
Vegetation changes, NBS Tanzania, co-development, Published ***with measurable impact***



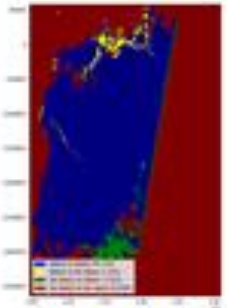
Using WOFS in monitoring Okavango Delta



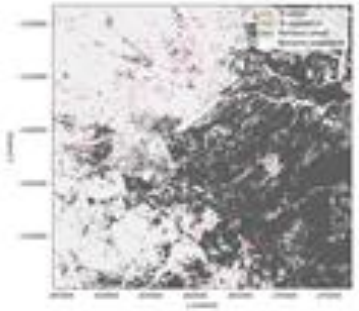
Assessment of coffee farming in Muranga, Kenya



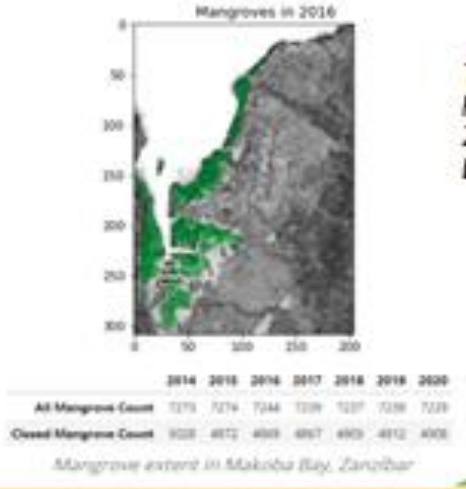
Water quality, Lake Baringo



Water extent Lake Victoria



Urbanisation, Nairobi



Time series for nature: Preserving mangroves in Zanzibar ***published on DE Africa website***

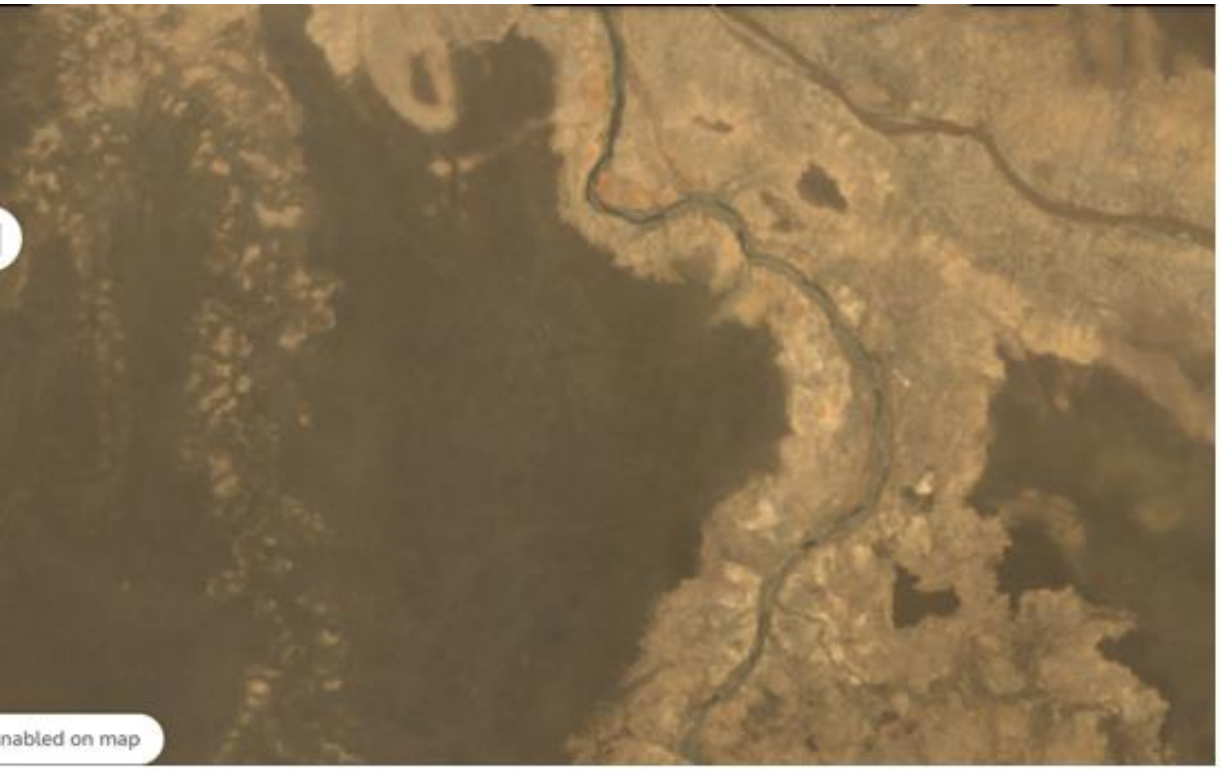
DE Africa in action to support the Paris Agreement

1. National GHG Inventories, Inventory Systems & Reporting
   - Activity data for land remaining and land converted categories (consistent with the 2006 Guidelines), which can be combined with emission factors or a T2/T3 model to generate IPCC compliant carbon accounts

2. Mitigation Projects
   - Reduced / avoided deforestation
   - Afforestation & Reforestation
   - Reduced emissions from savanna fires
   - Restoration of mangroves

3. Adaptation plans
   - Climate impacts such as coastal erosion, water availability, climate resilient cropping, infrastructure protection, DRR, urban planning, etc.

Forest Land converted to settlements & wetlands



Sudan - Landsat, May 1984

Sudan - Sentinel-2 GeoMAD, Jan 2017

Grasslands converted to settlements & wetlands

Nigeria – Landsat, Nov 1998

Nigeria - Sentinel-2 GeoMAD, Jan 2017

Forest land conversion - deforestation

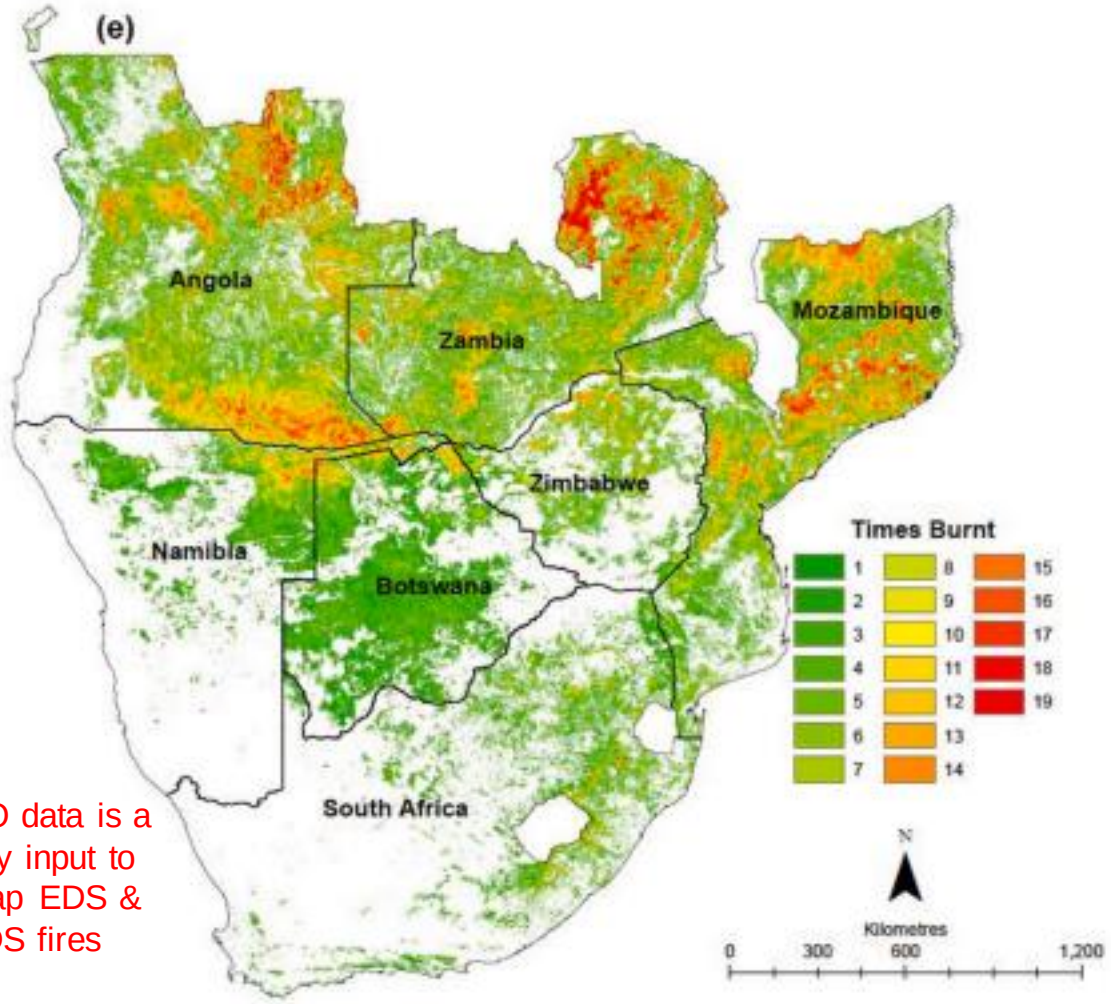
Ghana - Sentinel-2 GeoMAD, Jan 2017

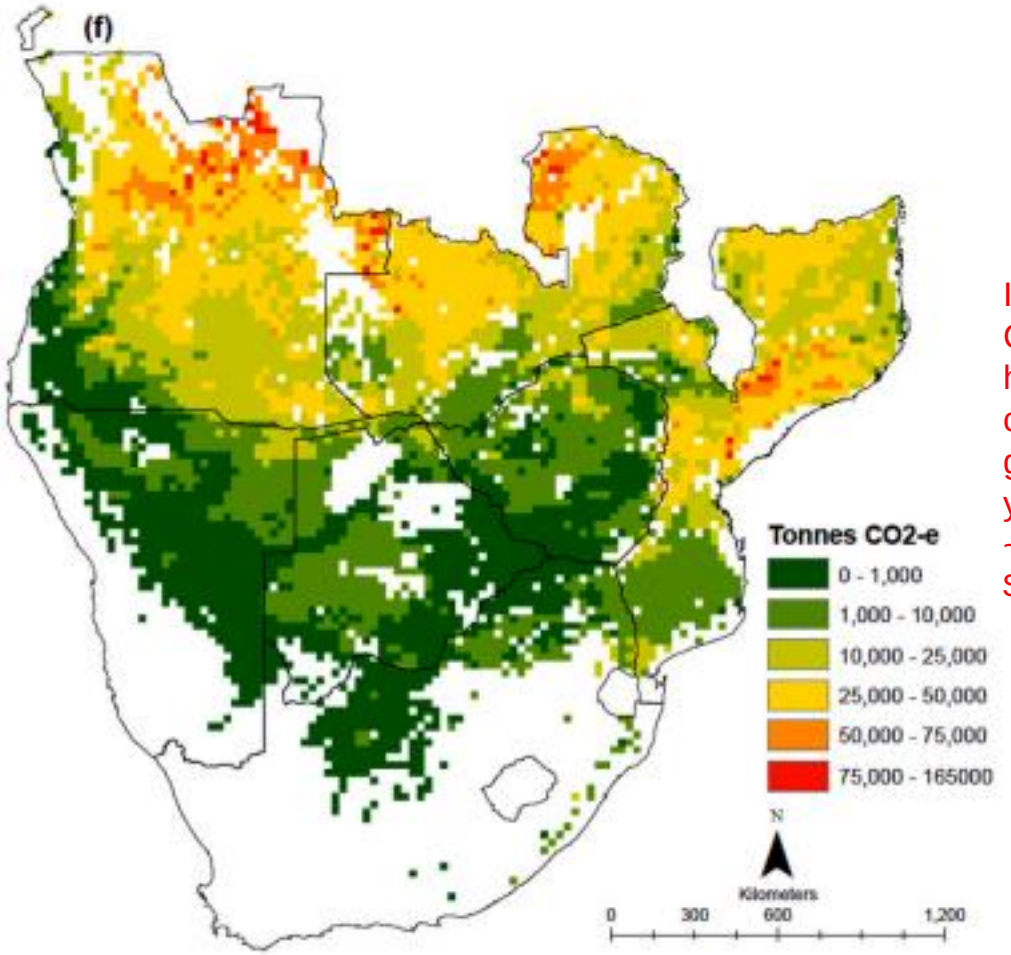
Ghana - Sentinel-2 GeoMAD, Jan 2020

Reduced / avoided deforestation

- Africa has highest rate of annual loss of forest
- During 2010-20, annual rate of net loss of forest in Africa was about 3.9 mha (FAO 2020 report)
- Since 1990, 106 mha of forest loss is reported
- If we can reduce/avoid annual net forest loss by even 10% it would result in significant emissions savings (~222 Mt CO_2-e y^{-1})

Savanna burning emissions abatement in southern Africa



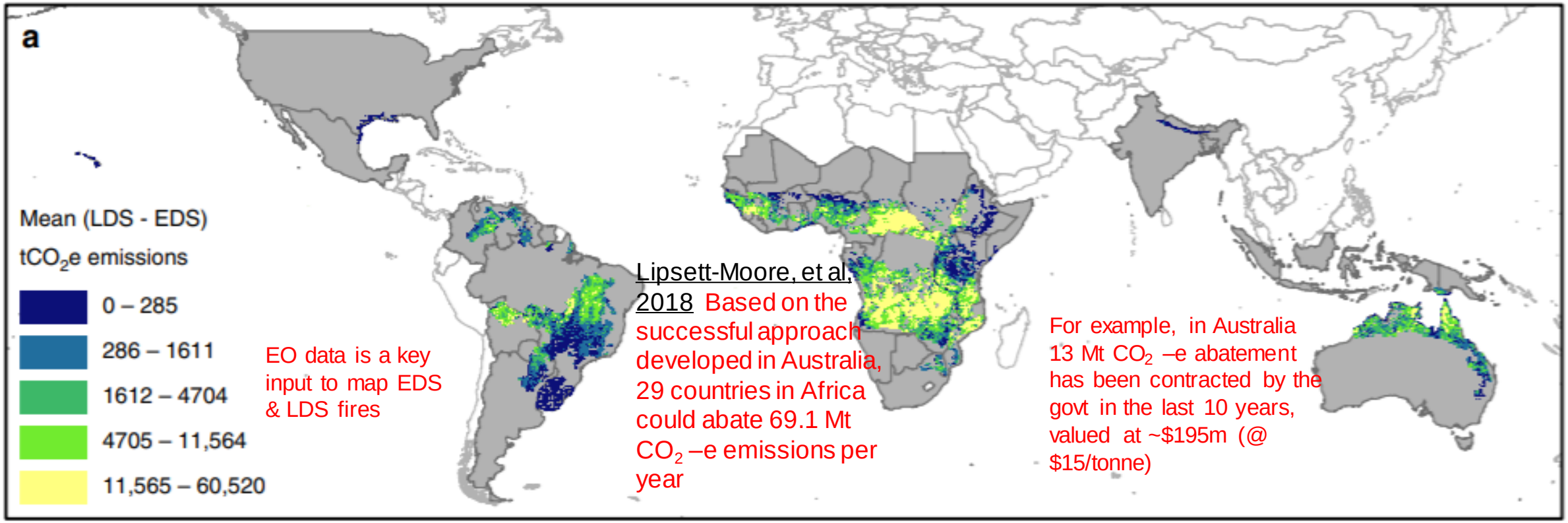


EO data is a key input to map EDS & LDS fires

In Australia 13 Mt CO_2 –e abatement has been contracted by the govt in the last 10 years, valued at ~$195m (@ $15/tonne)

Russell-Smith et al, 2021

Mean annual emissions abatement potential from reduced savanna fires

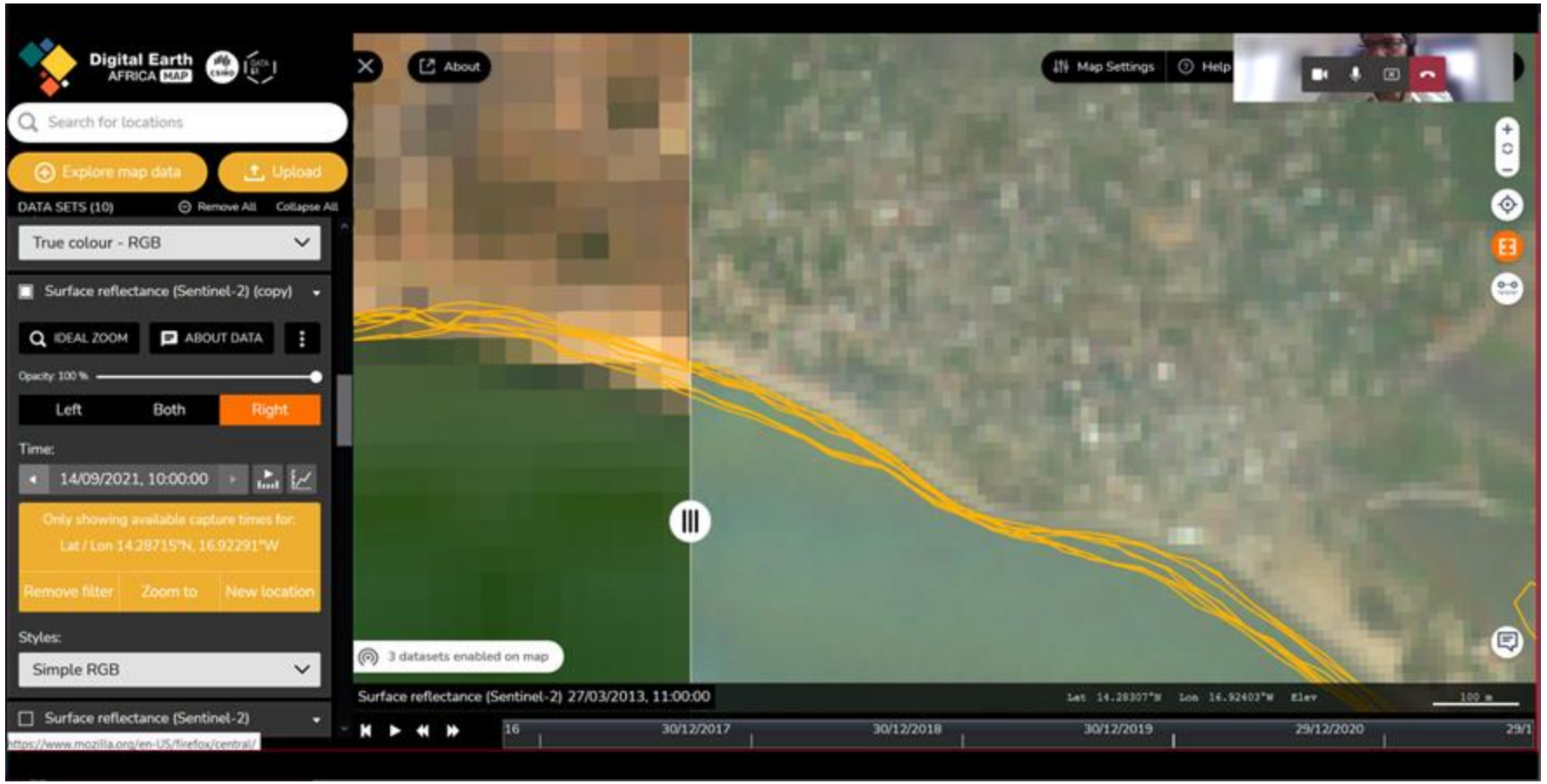


EO data is a key input to map EDS & LDS fires

Lipsett-Moore, et al, 2018 Based on the successful approach developed in Australia, 29 countries in Africa could abate 69.1 Mt CO_2 –e emissions per year

For example, in Australia 13 Mt CO_2 –e abatement has been contracted by the govt in the last 10 years, valued at ~$195m (@ $15/tonne)

Mapping coastline changes, critical for adaptation planning



Coastal erosion between 2013 to 2020 West Africa

Study led by CSE, Senegal, using DE Africa products, services, and technical assistance

Take away message!

DE Africa is operational and ready to support climate action in Africa. It is a unique capability for Africa.

DE Africa is African owned and led - delivered by 6 regional partners, coordinated by a Program Management Office in Pretoria, with oversight by an African Board.

This is a good time for new investors and collaborators to take advantage of the existing investment & infrastructure to build additional tools and services.

Thank You!

Shanti Reddy, 21 September 2021
shanti.reddy@ga.gov.au

@DEarthAfrica #DigitalEarthAfrica

#EO4Impact

Virginia Burkett is co-chair of GEO's Climate Change Working Group. She is the Chief Scientist for Climate and Land Use Change at the U.S. Geological Survey. She served as Chief Scientist for Global Change Research at the USGS (2006-2014), USGS Associate Director for Climate and Land Use Change (2015-2017) and Chair of the U.S. Global Change Research Program (2017-2019). Dr. Burkett has published extensively on the topics of global change and low-lying coastal zones. She was as a Lead Author of the United Nation's Intergovernmental Panel on Climate Change (IPCC) Third, Fourth and Fifth Assessment Reports and the IPCC Technical Paper on Water. She was a Lead Author of the First, Second, and Third U.S. National Climate Assessments and served on the Federal Steering Committee for NCA4 (2018).

Virginia Burkett
Chief Scientist for Climate and Land Use Change,
United States Geological Survey
CC-WG Co-chair

Open discussion

Guiding questions:

1. How can GEO most effectively support national climate action with EO-based products?
2. What should be the “GEO niche” or the unique contribution of GEO in supporting the implementation of the Paris Agreement?
3. Are there any perceived gaps or synergies in the GEO WP to address national climate action? If so, how should these be addressed or exploited?

Wrap-up

End of Day 1