



DIGITAL EARTH PARTNERSHIP

ACCELERATING DIGITAL EARTH OBSERVATION SERVICES FOR RESILIENT DEVELOPMENT



MAY 5th 2023

Edward Anderson | eanderson1@worldbank.org

Alex Chunet | achunet@worldbank.org





Accelerated Action
is needed to ensure
development an a
post-COVID world.

Attaining the
**Sustainable
Development Goals**
will prove incredibly
challenging given the
COVID-19 pandemic
and accelerated
Climate Change.





Shaping **resilient cities** requires accessible, detailed, up to date **data** used by **local communities**

Traditional Approach to Risk Data Collection

— TOP DOWN

— EXPERT CENTRIC

— COSTLY

— COMPLEX

— NOT DESIGNED TO SCALE



BLENDED APPROACH FOR MAXIMUM IMPACT

LOCAL PARTICIPATION

- context
- calibration
- training

EARTH OBSERVATION

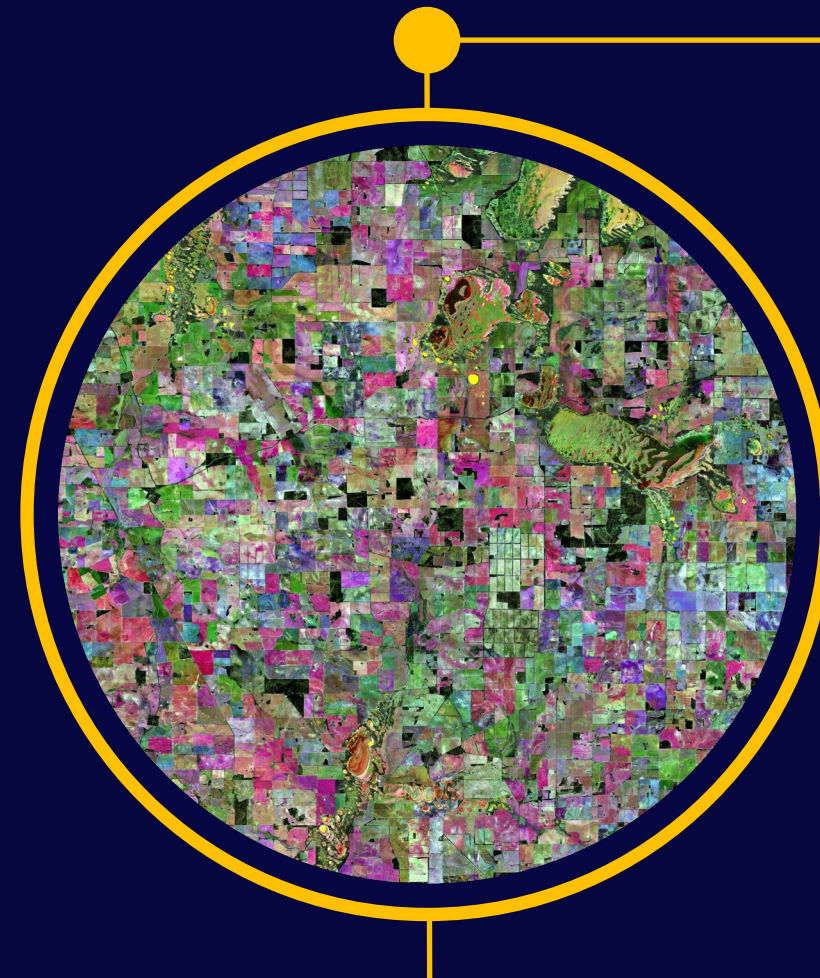
- independence
- trust
- cost effective at scale

ARTIFICIAL INTELLIGENCE

- customization
- cost reduction
- analysis potential



THE THREE PILLARS



GLOBAL KNOWLEDGE

- Digital Public Goods
- Communities
- Resilience Academy



PARTNERSHIPS

- Space Agencies
- Infomediaries
- Academia



OPERATIONS SUPPORT

- Digital and resilience skills
- Risk data and tools
- Public data services

Support World Bank Task Teams, Clients, and Beneficiaries to create, access and use localized Earth Observation data and services to enhance development outcomes

A RESPONSIBLE INCLUSIVE APPROACH



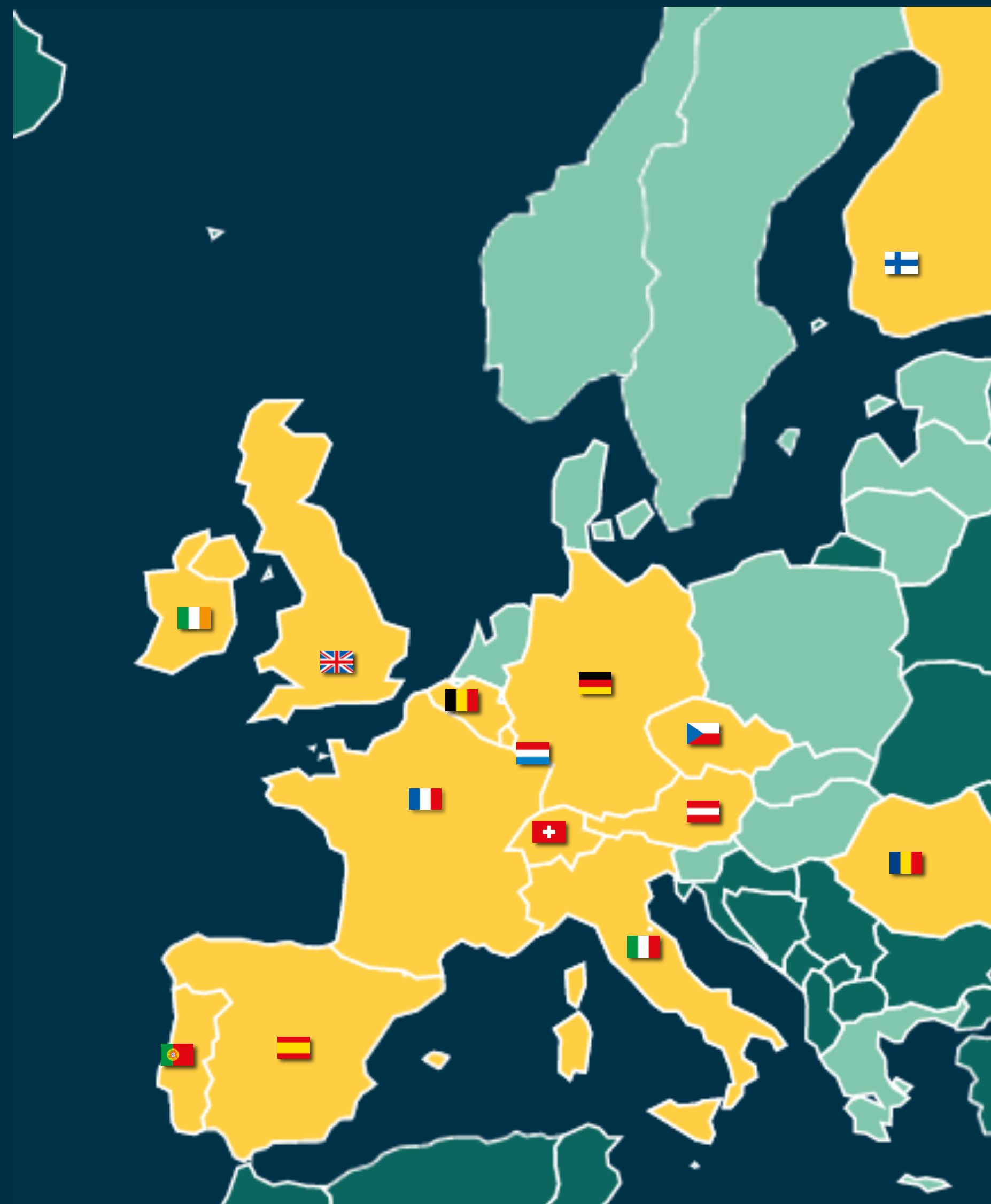
Co-creation of geospatial data
address locally articulated needs
pool expertise and resources

Strong ethical frameworks
protect the vulnerable, and ensure
shared benefits of disruptive tech

Local Capacity Building critical
for adoption, sustainability and
continued tech development




Skill Development
introduce marketable digital
skills, and potential
employment opportunities

Global Development Assistance: Stakeholders



14 Participating States

- | | |
|--|---|
|  Austria |  Italy |
|  Belgium |  Luxembourg |
|  Czech Republic |  Portugal |
|  Finland |  Romania |
|  France |  Spain |
|  Germany |  Switzerland |
|  Ireland |  UK |

 ESA member and associate states  Non ESA member states  GDA participating states



Clean Energy
2022

Water – 2023

Transport – 2023 (upcoming)

Agriculture
2022

Forestry (upcoming)
2023

Marine Environment
2022

Health (upcoming)
2023

Urban Sustainability
2022

44 WB projects supported...

Fragility Conflict Security
2022

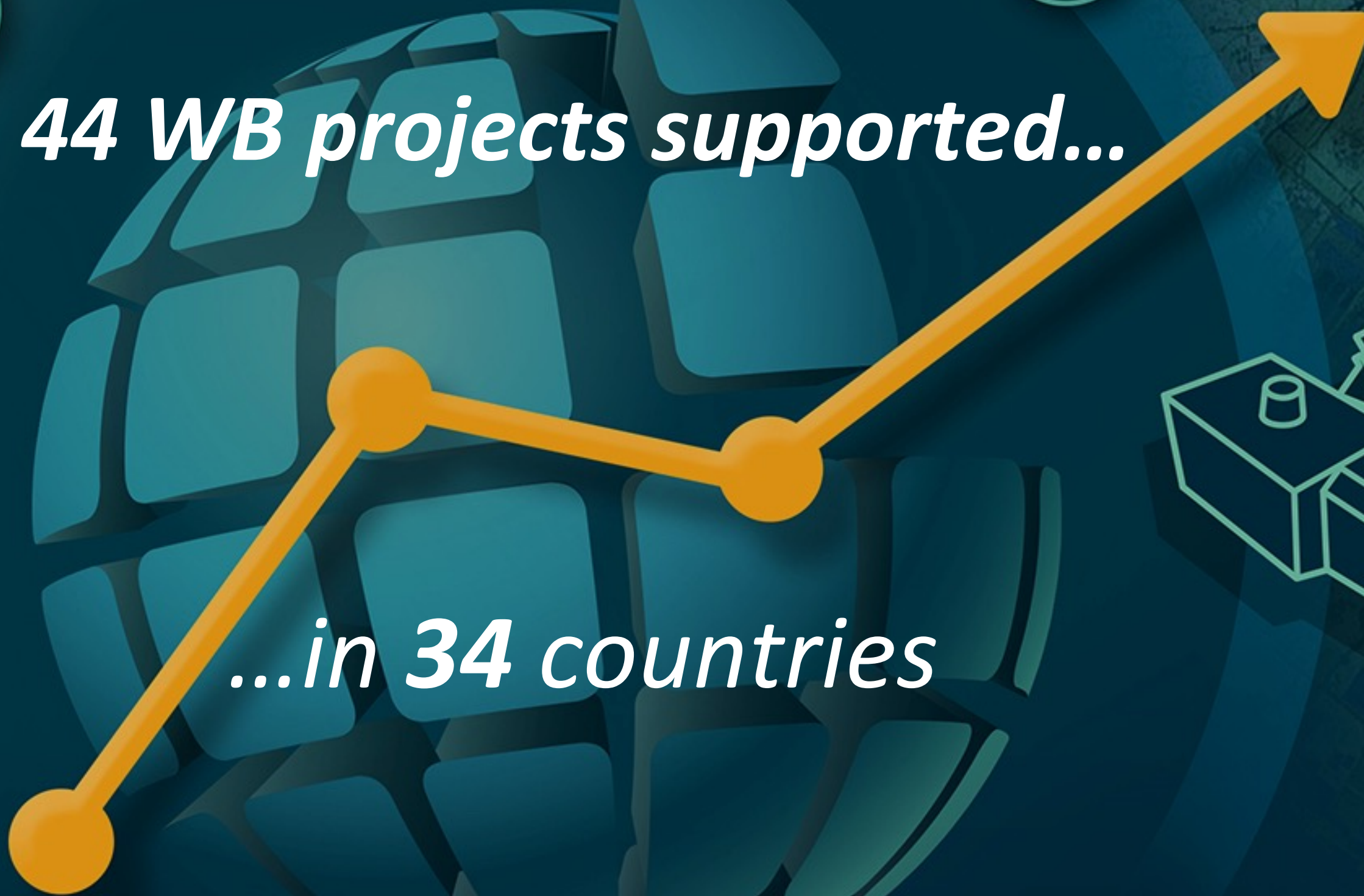
...in 34 countries

Climate Resilience
2021

Disaster Resilience
2021

GDA status

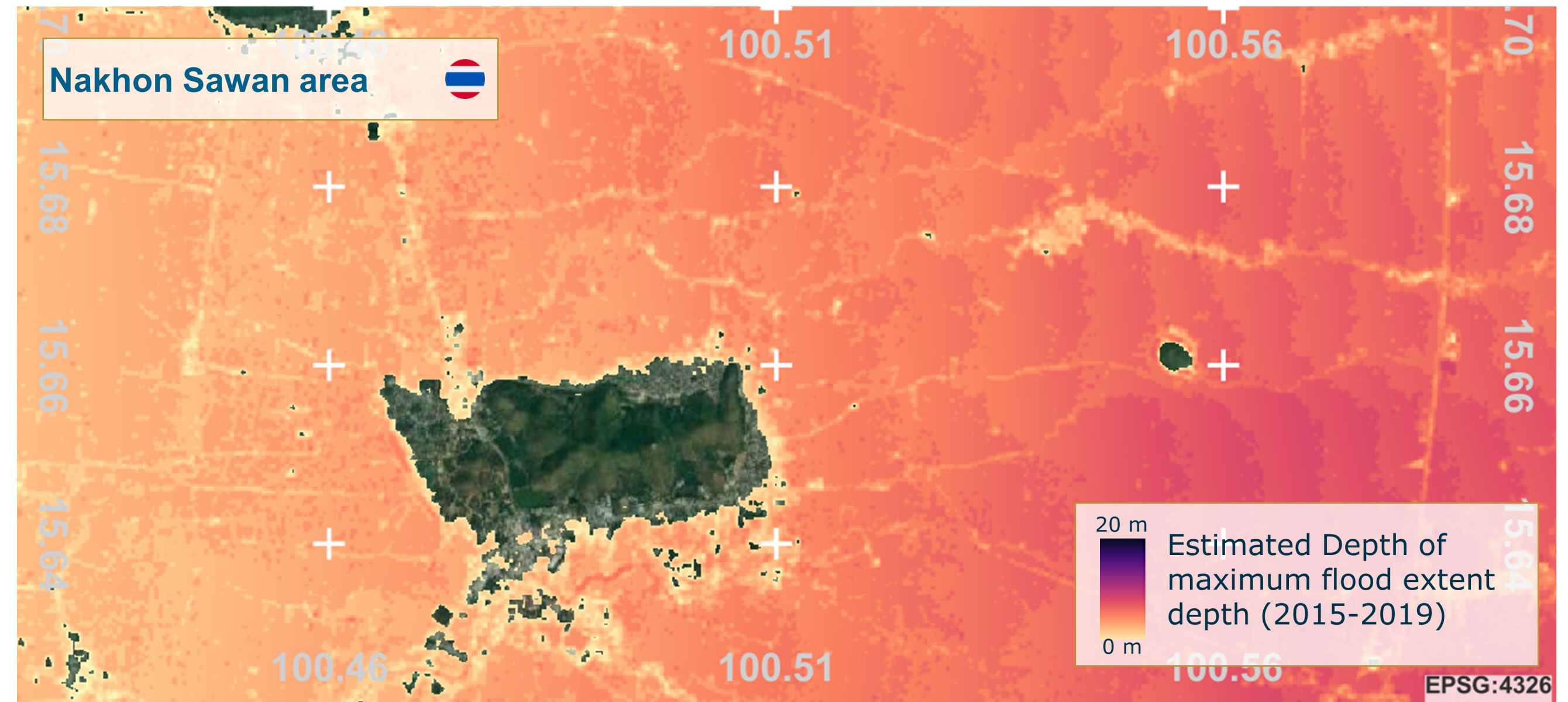
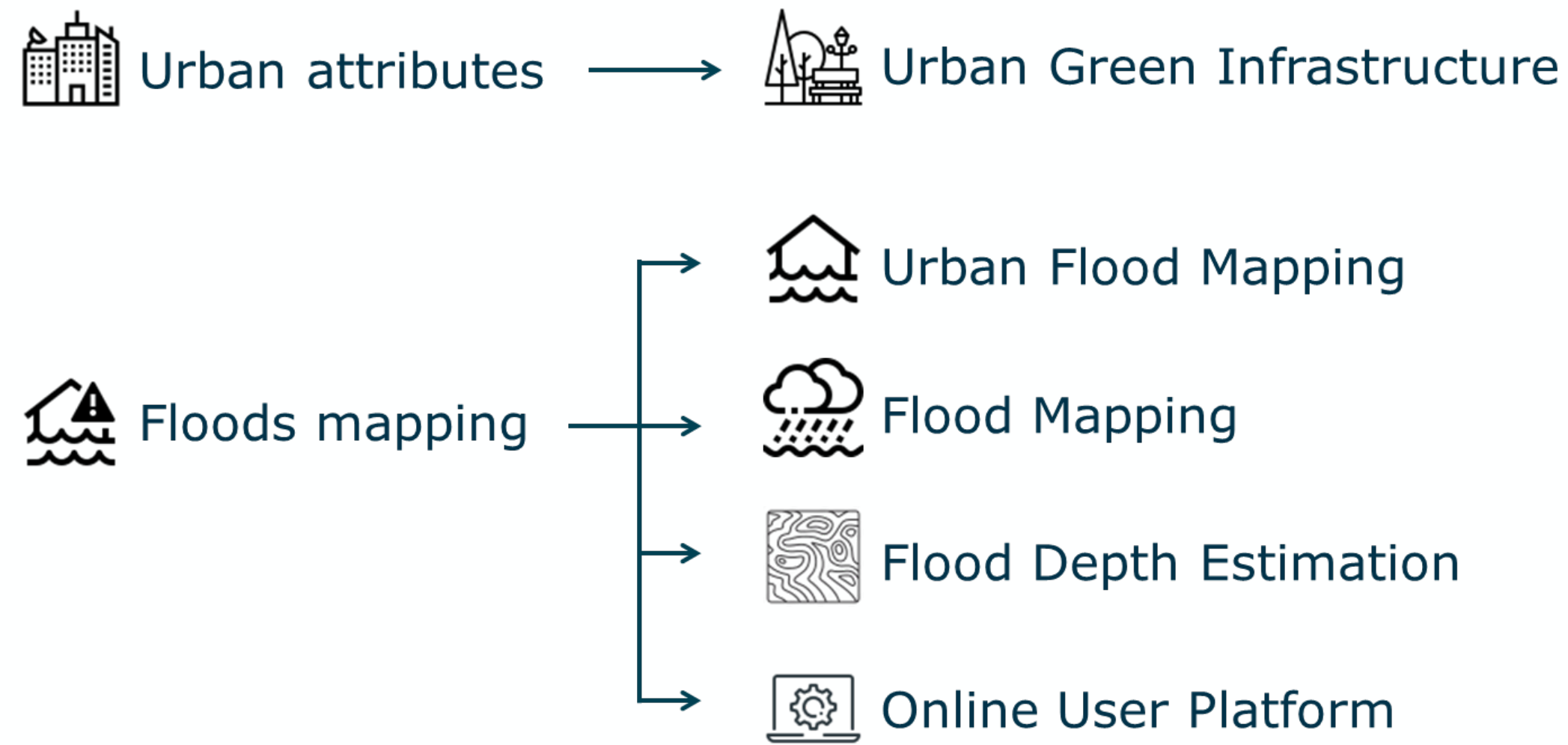
Global Development Assistance



Example: Nature-Based Solutions investments scanning tool



The **Global Program on Nature-Based Solutions (NBS)** has been working on a tool to **map opportunity areas for investment in specific NBS types**. This tool is aimed at informing early discussions on NBS investments and relies on the integration of **earth observation data** for the analysis of **flood mapping and urban green infrastructure** through the ESA-WB partnership.



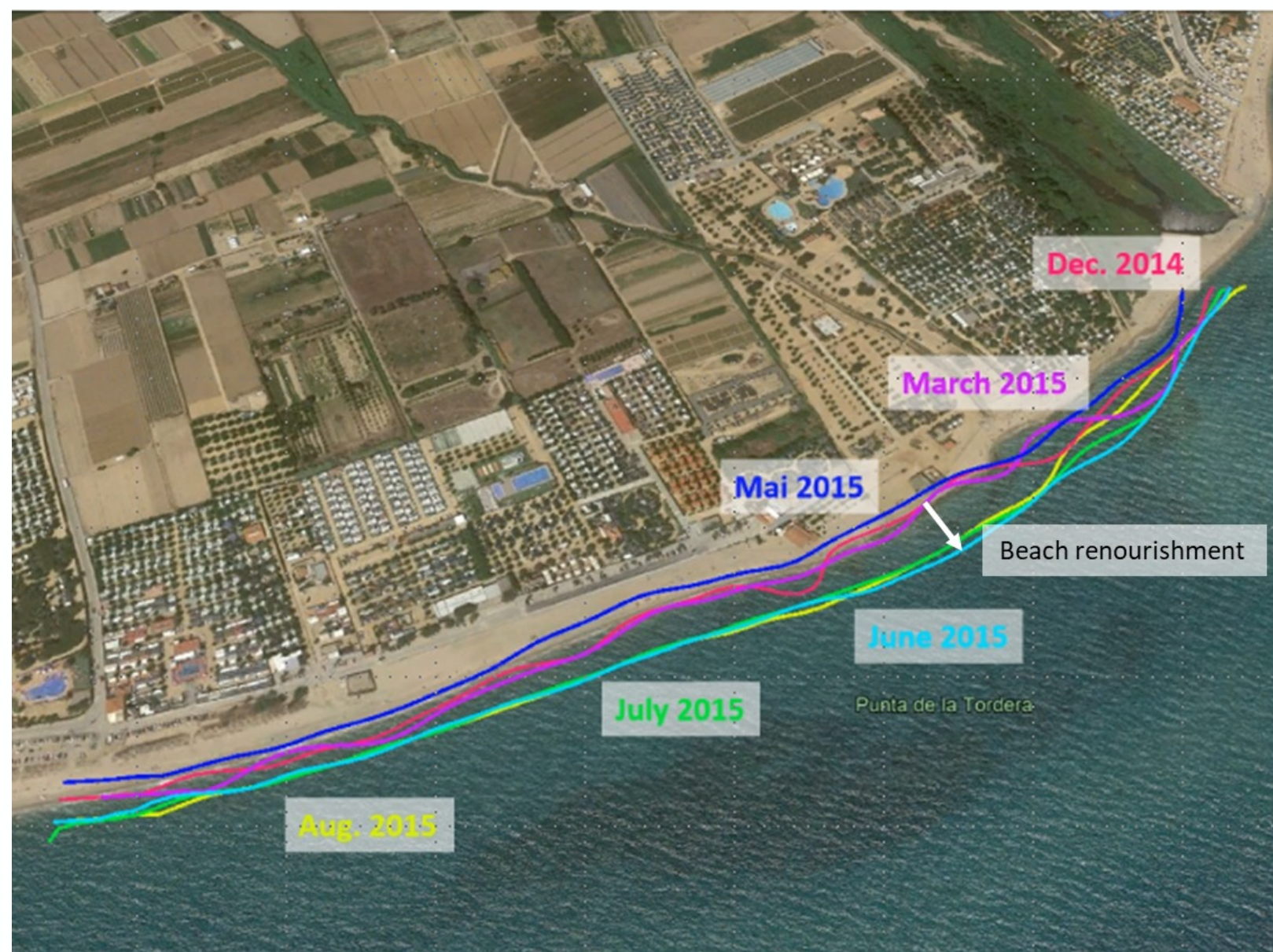
Example: West Africa coastal areas resilience analysis



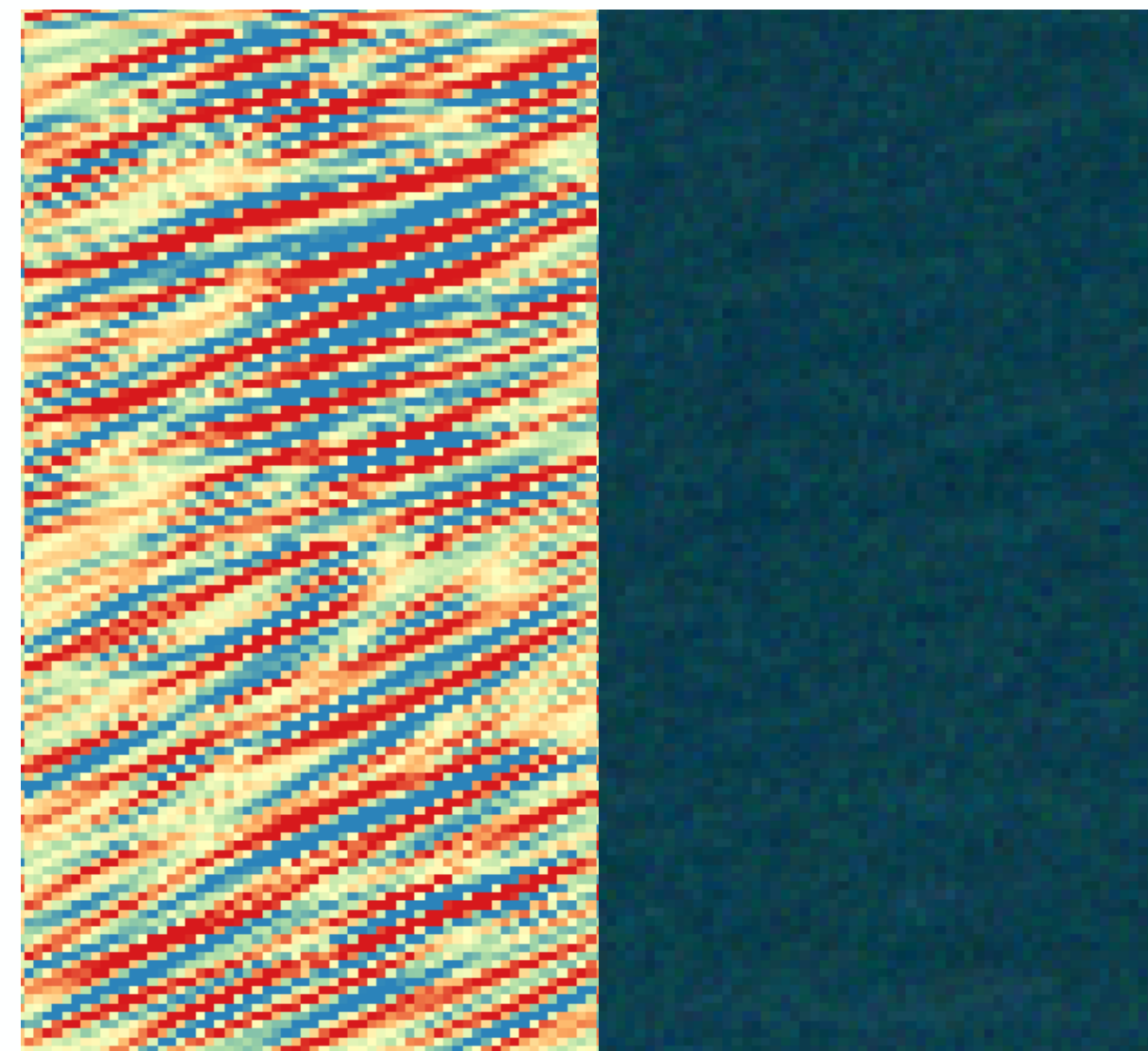
The **West Africa Coastal Areas Management Program** aims at boosting the transfer of knowledge, foster political dialogue among countries, and mobilize public and private finance to tackle **coastal erosion, flooding, pollution and climate change adaptation**. WACA has been receiving support from ESA in the use and adoption of **earth observation technologies to better understand and analyze coastal area resilience dynamics**.



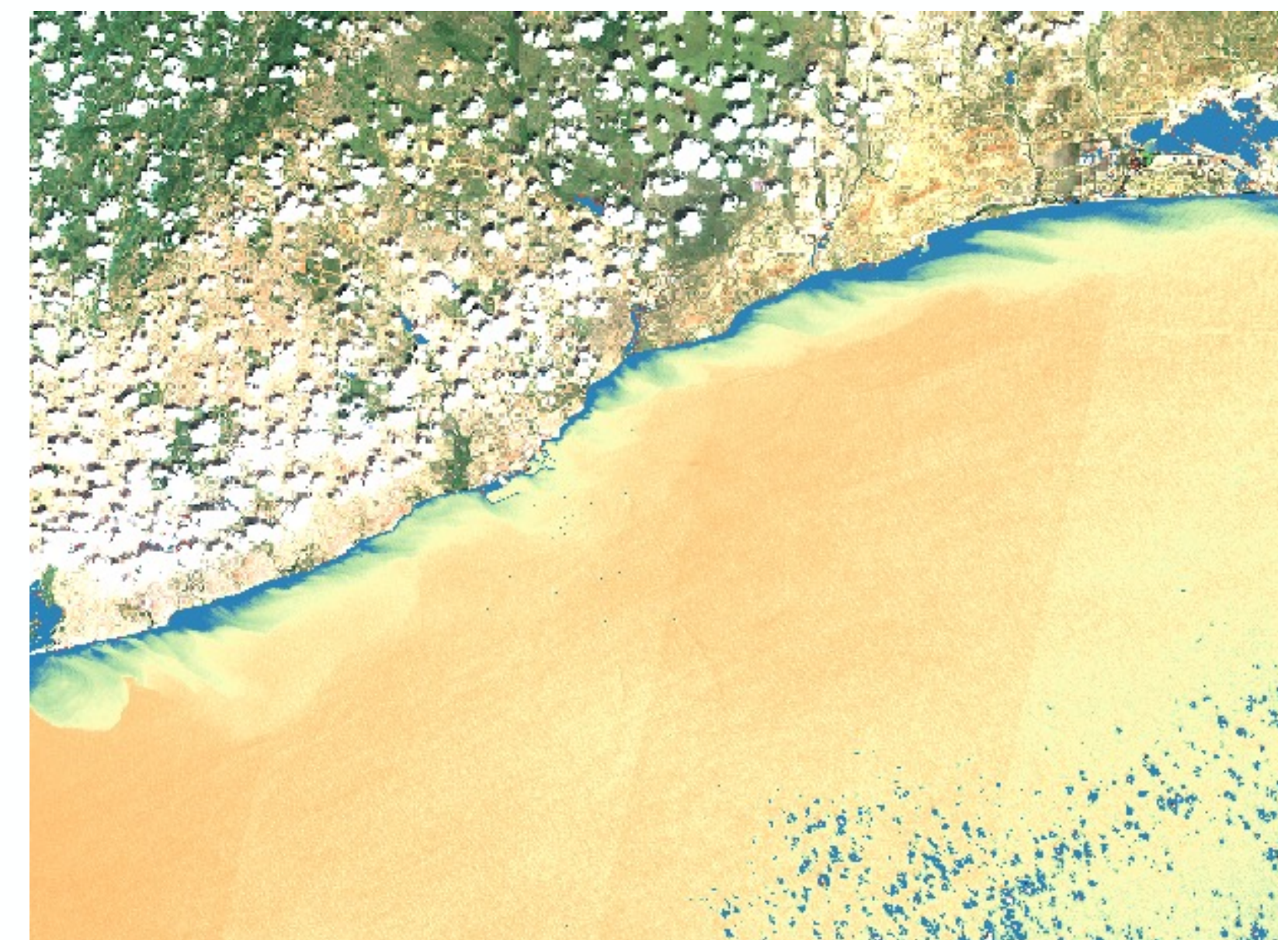
Shoreline change



Waves power patterns



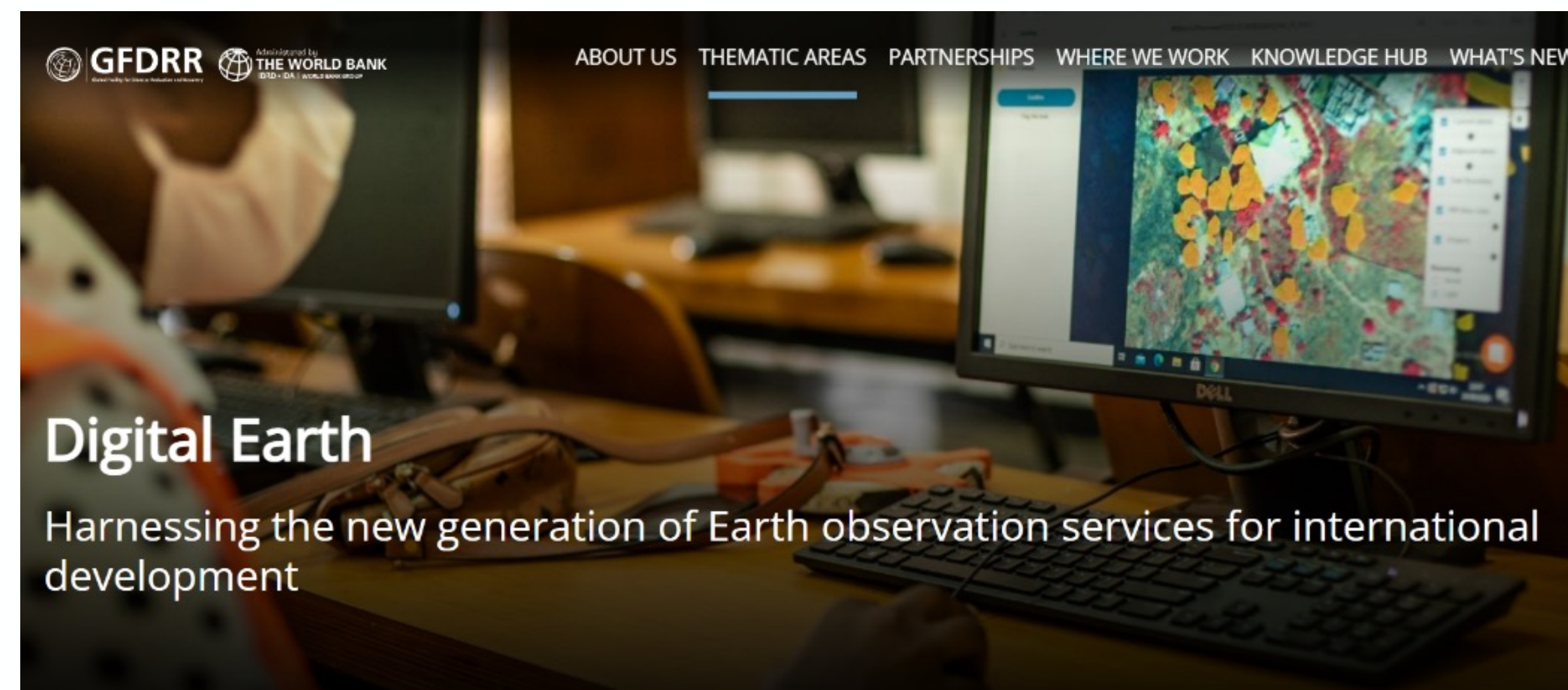
Sediment transport map



DEP as a dedicated programmatic structure



The Digital Earth Partnership is a dedicated programmatic structure that has been established by the WB to facilitate **coordination**, and ensure the **sustainable adoption of earth observation technologies** through **technical assistance** and the **mobilization of complementary resources for capacity building and skills transfer**





MONITORING URBAN FOREST CANOPY

AI supporting Nature based solutions

Cities require comprehensive forest inventory to support the regular monitoring of the growth and health of planted trees

In addition to field based inventory, baseline canopy detection using RS allows for scaled approach

APPROACH:

- Digitization of training **datasets** of locally representative urban tree canopy using **satellite & drone data** and local mappers
- Train an AI** to classify historic imagery and establish a “greening” baseline.
- Tree canopy map is produced for the whole urban expanse
- Repeat with new satellite imagery as needed for change detection



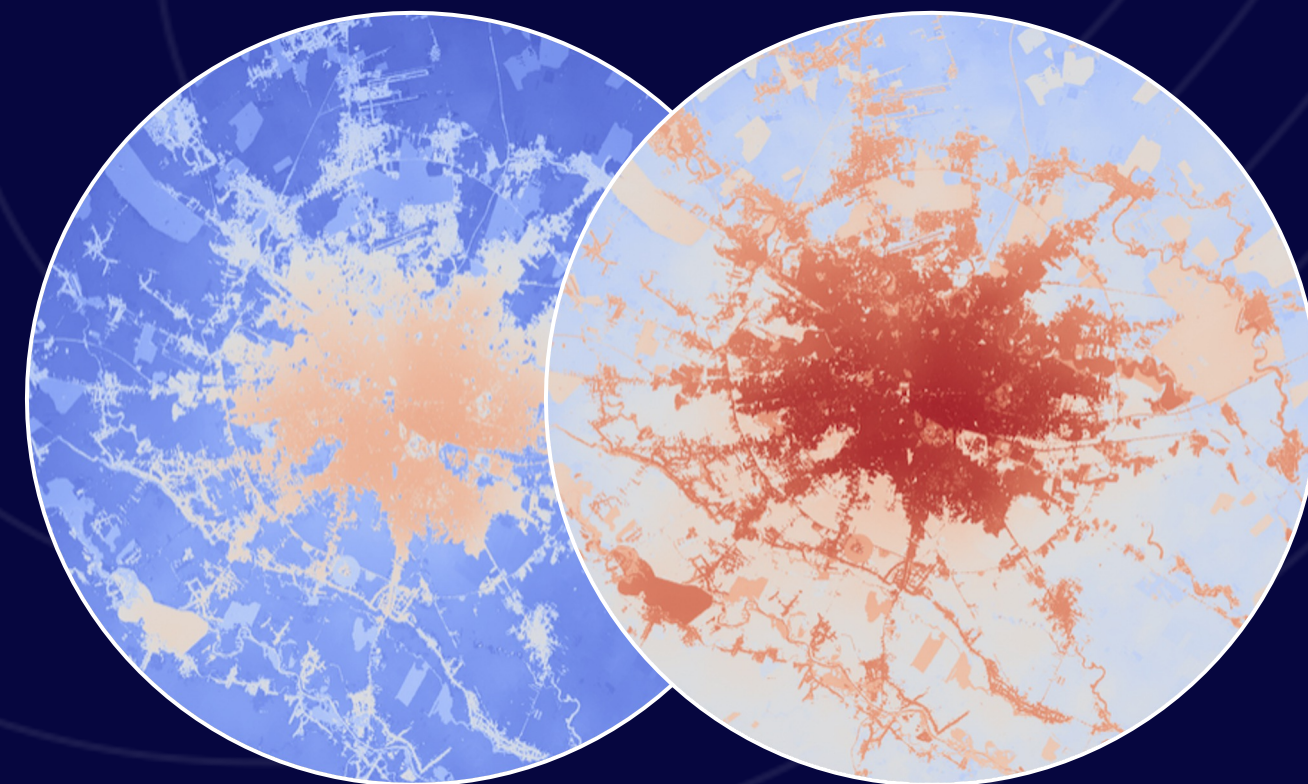


EXTREME HEAT IN ECA CITIES: FROM ASSESSMENT TO ACTION

1. BUILD EVIDENCE BASE

GFDRR has worked with climate modeling partners to deliver forward-looking heat stress projections, at urban or national scale, in Romania and other countries.

Bucharest: projected number of hot nights per year



Present

2041-2060

TOOLS: Climate modeling; impacts assessment of health, labor & infrastructure channels; assess change in person-hours exposure.

2. ENGAGE STAKEHOLDERS

For a regional flagship study on extreme heat, GFDRR mobilized citizen science volunteers to conduct heat mapping using sensors fitted to motorbikes. Participants also identified localized options to mitigate heat exposure through a survey methodology using thermal cameras.



TOOLS: Citizen science assessment using vehicle-based, handheld and smartphone-based heat cameras.

3. PRIORITIZE RESPONSES

Building on climate modeling and citizen engagement, GFDRR has facilitated workshops to define governmental priorities on heat mitigation – working across heatwave emergency management, public health responses and ‘cool cities’ actions.



TOOLS: Multi-stakeholder planning workshops, defining investment options.

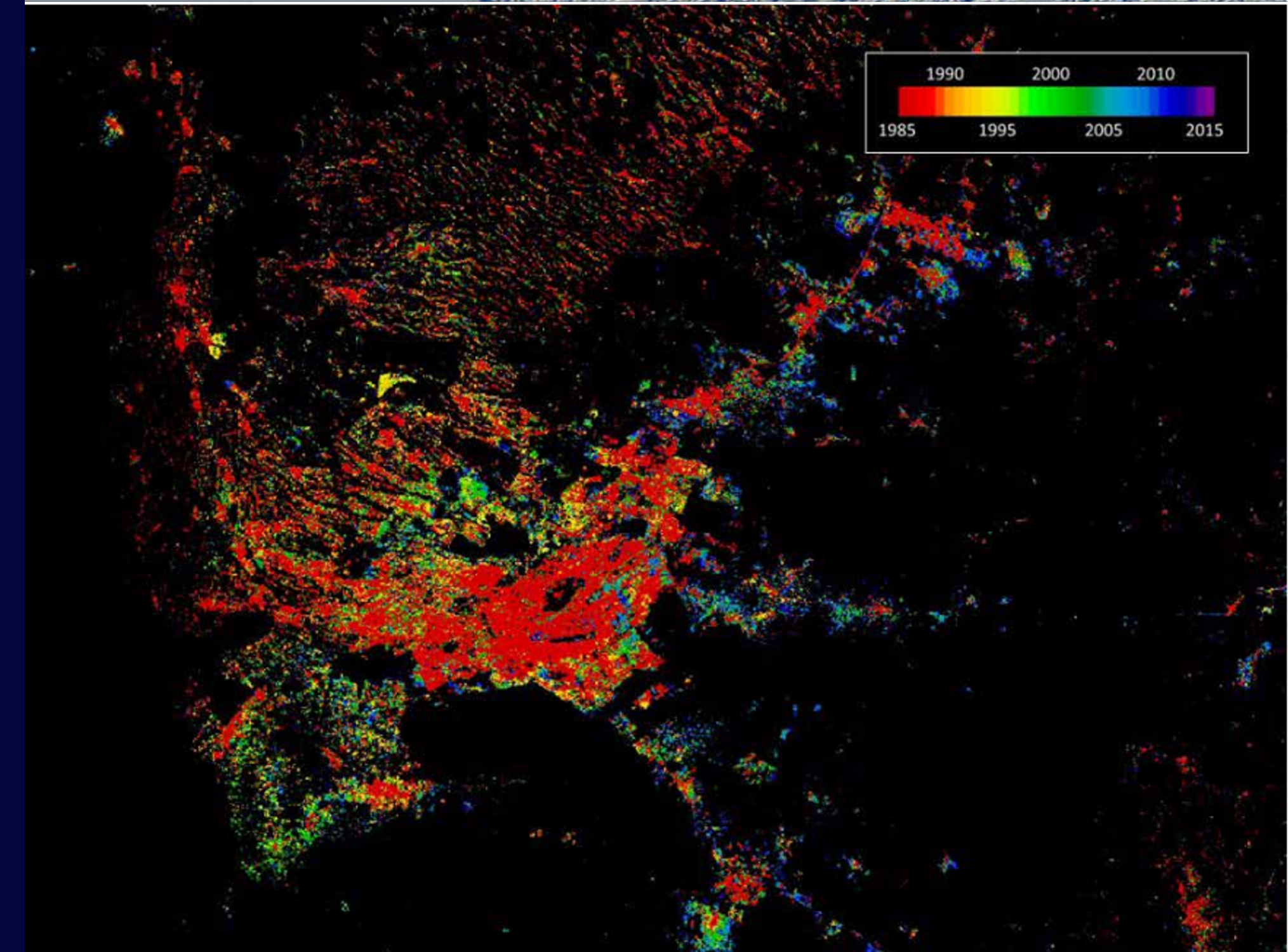
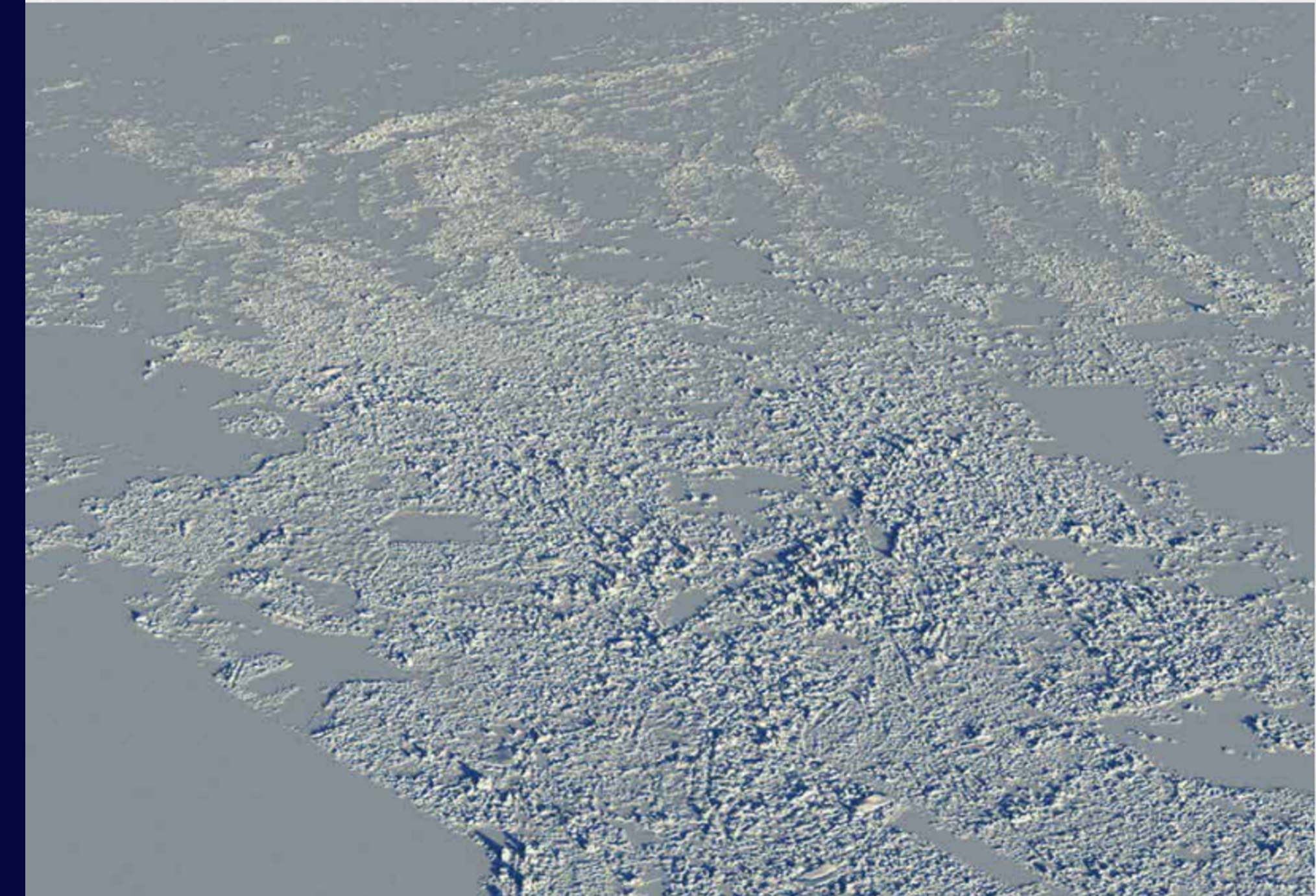


INSIGHTS AND OPPORTUNITIES FROM THE WORLD SETTLEMENT FOOTPRINT

Open Data for Disaster Risk Reduction

This report focuses on the use of EO to identify built-up areas exposed to natural hazards. It describes the World Settlement Footprint (WSF) suite of EO-derived datasets which was developed by the German Aerospace Center (DLR) in collaboration with the European Space Agency (ESA), the Google Earth Engine team, and the World Bank.

These gridded datasets capture: the extent of built-up areas from 1985-2015 and again for 2019, estimated building heights, impervious surfaces, and estimated population.



DIGITAL EARTH FOR A **RESILIENT CARIBBEAN**

GFDRR DIGITAL EARTH PARTNERSHIP

● Dominica

● St. Lucia

● Grenada

To **raise awareness** and **enhance local capacity** to use Earth Observation (EO) data & services in support of World Bank **resilient infrastructure and housing** operations

OPEN CITIES AFRICA

2018-2020

OPEN DRI Open Data for Resilience Initiative

specs.

1,500,000

Features Mapped

16

Participating Cities

1,600

Mappers

1,000's

Citizens Engaged

3

Regional Knowledge Exchanges

40%

Female Participation in trainings in mapping

Digital & Paper Tools Inform Policy & Investment Decisions

● St. Louis, Senegal

● Bamako, Mali

● Niamey, Niger

● Monrovia, Liberia

● Accra, Ghana

● Ngaoundere, Cameroon

● Yaounde, Cameroon

● Abidjan, Côte d'Ivoire

● Kampala, Uganda

● Brazzaville, Congo

● Kinshasa, DRC

● Pointe Noire, Congo

● Dar es Salaam, Tanzania

● Zanzibar, Tanzania

● Seychelles

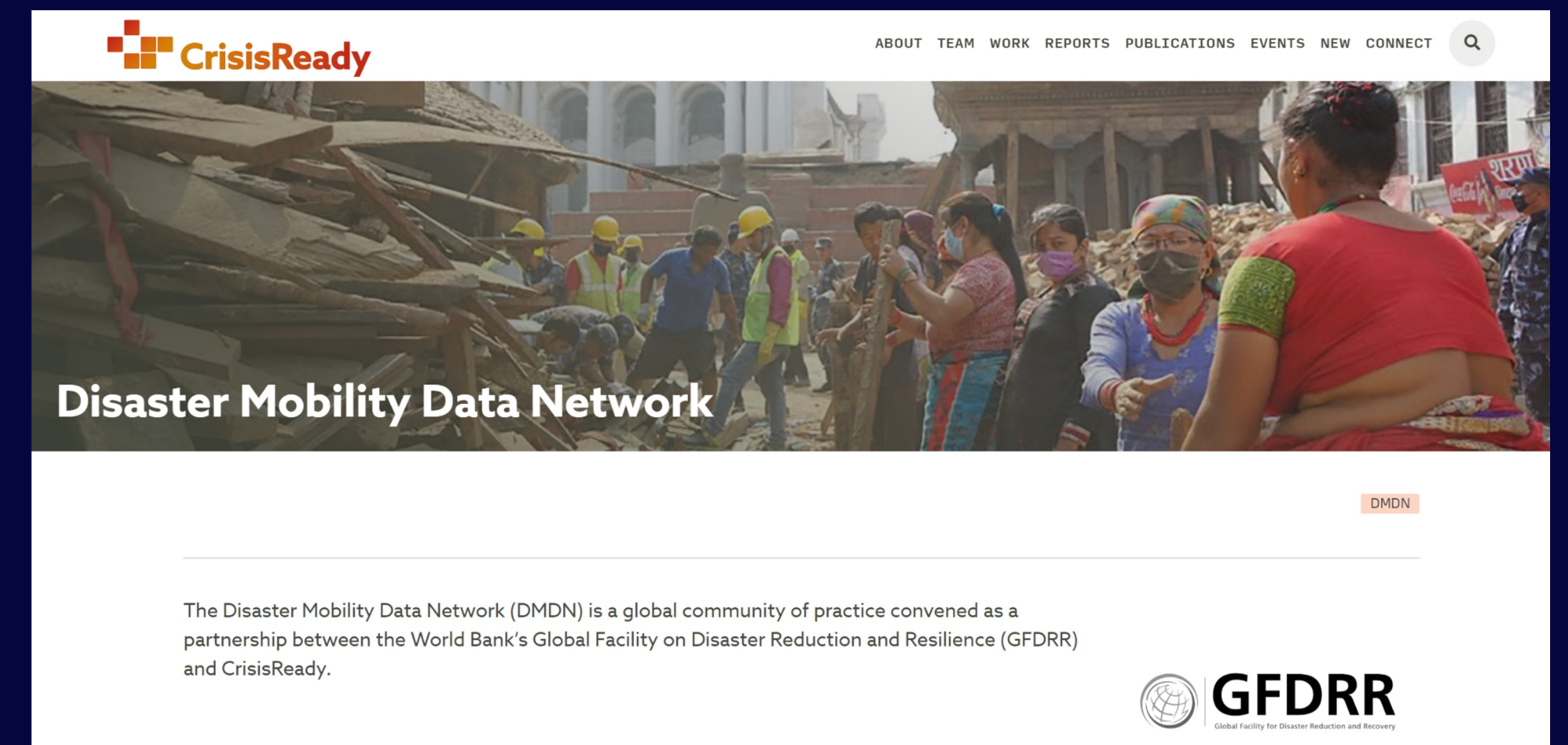
● Antananarivo, Madagascar



EXPLORING THE ETHICS OF FRONTIER TECHNOLOGIES

The **Responsible AI for DRM working group** summary, a product of collaborative and ongoing dialogue by the Global Facility for Disaster Reduction and Recovery (GFDRR) together with Deltares and the University of Toronto, highlights the ethics and responsibility concerns in AI- and ML-supported projects, such as algorithmic bias, transparency and privacy issues, and reduced roles for local participation and expert judgment.

The **Disaster Mobility Data Network (DMDN)** is a global community of practice convened as a partnership between the World Bank's Global Facility on Disaster Reduction and Resilience (GFDRR) and CrisisReady.



THE CLIMATE & RISK DATA FELLOWS



Zia Uddin Foisal



Paolo R. Magnata



Isabelle Tingzon



Hwaba Mambo



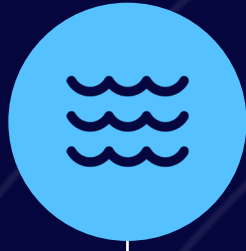
Mohammad Fadli



Ankita Sood



Bradley Riley



RESILIENCE ACADEMY

Soil Mapping & Erosion Modeling



Resilience
Academy

Resilience Academy trains young people with tools, knowledge, and skills to address the world's most pressing urban challenges and to discover solutions for resilient urban development

Soil erosion heightens flood impacts in Dar es Salaam, and soil data is lacking, hindering the accuracy of flood modelling

APPROACH:

- A team of young professionals & students used open source apps & measurement tools for collection of soil samples
- The subsequent profiles showed:
 - which areas are most susceptible to erosion,
 - which are experiencing the most erosion,
 - how this influences flooding and river dynamics

COST:

<25% of typical cost

AREA MAPPED:

643 sites
2,752 sq km



How to get involved?

European governments and ministries

Engage directly with the Digital Earth Partnership team or ESA representative to the World Bank to discuss avenues of collaboration

Industry service providers

Monitor potential tenders of interest related to the ESA GDA program and the activities of the World Bank DEP on the ESA star platform (esastar-publication-ext.sso.esa.int) and the World Bank eProcure platform (wbgeprocure.worldbank.org)

Public institutes and knowledge providers

Connect with the ministries in charge of Official Development Assistance in your country to notify them about your interest in connecting and collaborating with the World Bank Digital Earth Partnership

User institutions and developing countries stakeholders

Connect with the national government in your country or the representation of your country at the World Bank to notify them about your interest in receiving support through the World Bank Digital Earth Partnership

JOIN THE PARTNERSHIP

Edward Anderson | eanderson1@worldbank.org

Alex Chunet | achunet@worldbank.org

World Bank / GFDRR - www.gfdr.org/en/digitalearthpartnership

ESA GDA - <https://gda.esa.int/>