



# Digitalisation for the Green Deal

Webinar 4 – Digitalisation as an enabler for the Green Deal

*March 3, 2021*

# Key messages from webinar #3

- Duality of digitalisation: environmental risks and sustainability opportunities
- Digitalisation can support a transition to clean energy
- Digitalisation is promoting circular economy across 3 main axes
- Key components & technologies for Sustainable Digital Infrastructure

# Icebreaker

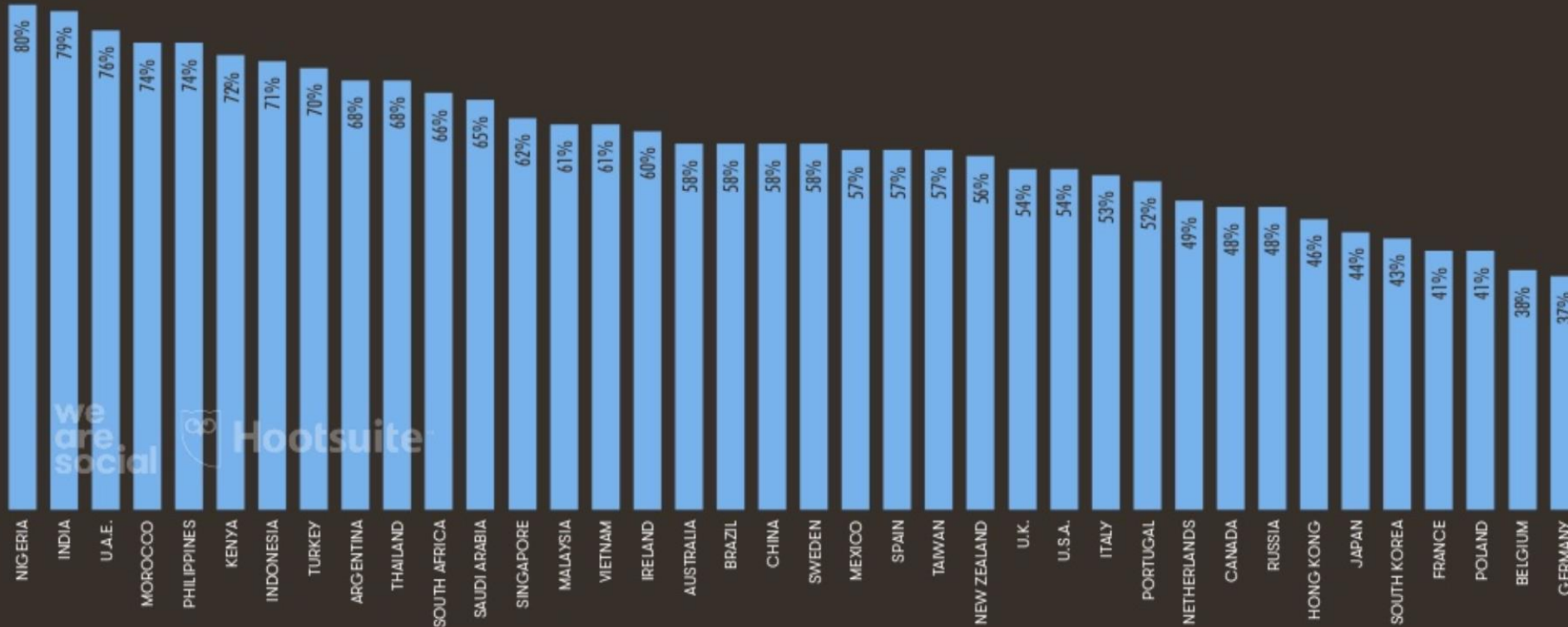
Digitalisation: are you an optimist or a pessimist?

# Optimism vs Pessimism

JAN  
2018

## DIGITAL OPTIMISM

PERCENTAGE OF THE POPULATION THAT BELIEVES NEW TECHNOLOGIES OFFER MORE OPPORTUNITIES THAN RISKS



# Agenda for webinar #4

- Tech for environmental monitoring
- Digital technologies to promote environmental transboundary cooperation, sustainable behaviours and practice
- Earth Observation / Copernicus
- Case study: application of Copernicus in the EC Delegation in the Philippines
- Case study: application of Copernicus in the EC Delegation in Costa Rica
- Group Discussion

# Environmental monitoring

# Environmental monitoring

- Digital technologies are a critical enabler for attaining the sustainability goals of the Green deal in many different sectors.

Digitalisation presents new opportunities for:

- Distance monitoring of **air and water pollution**
- Monitoring and optimising **how energy and natural resources are used**

# Different strategies to support environmental monitoring

- Different technologies
  - In-situ sensors
  - Remote sensing (e.g. satellite-based indexes)
  - Big Data techniques (byproduct of data as a proxy)
- Opportunities to engage citizens for active citizen science supporting Green Deal goals



# Air pollution monitoring

- Launched in 2017 in response to a lack of data on air quality in African cities, **sensors.AFRICA** uses locally assembled sensors to measure and record air pollutants.
- Data are provided to journalists who can back up their coverage of related health and environmental concerns.
- Data has been used by local news outlets to report on pollution levels, and community activists have used it to advocate for cleaner air.

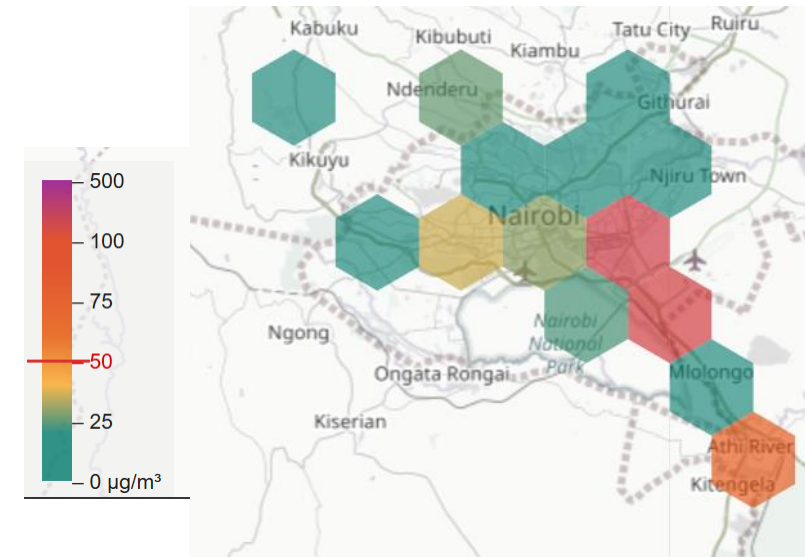
# Air pollution monitoring

- **sensors.AFRICA** is a project of **Code for Africa & International Center for Journalists (ICFJ)**.
- Code for Africa's team of technologists have assembled and deployed the sensors in various locations, Nairobi, Kisumu, Lagos, Kampala, Dar es Salaam, Durban and Johannesburg.



# Air pollution monitoring

- Sensors showed that pollution levels in the neighborhood were consistently higher than daily average levels recommended by the WHO
- Residents partnered with a popular local blogger to launch an intensive campaign on social media #StopEndmorPollution



Project's Air Quality Map

# Using Big Data as a proxy

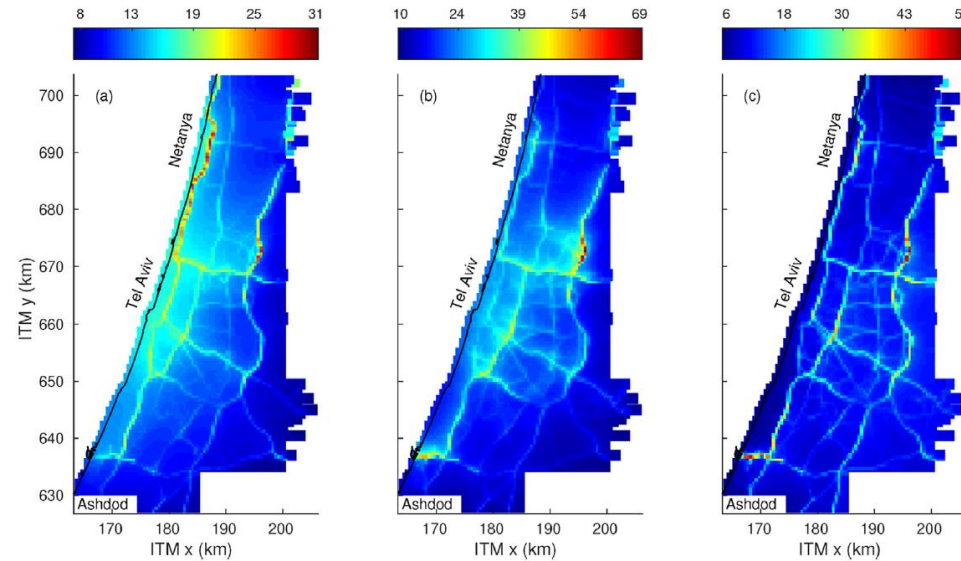
- In São Paulo, Brazil, **air pollution** levels can be predicted with 24 to 48 hours in advance
- What do you think the data source may be?

# Using Big Data as a proxy

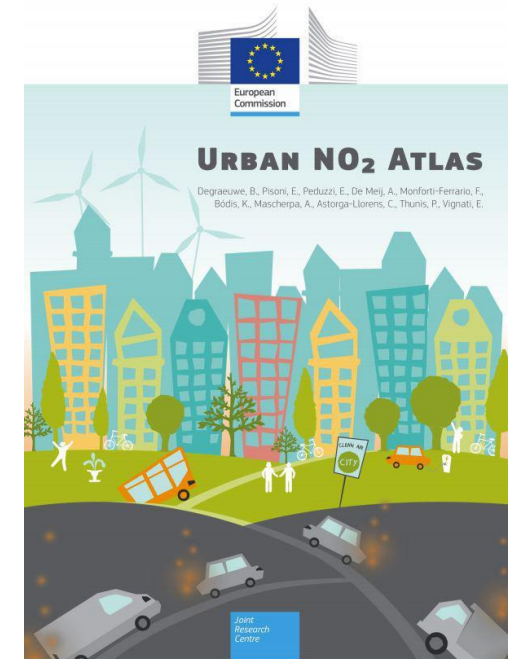
- In São Paulo, Brazil, **air pollution** levels can be predicted with 24 to 48 hours in advance
- Telefónica provides anonymised mobile data, algorithms and tools
- Data: weather, traffic and pollution sensors, to monitor and predict pollution levels over the entire city.
- Municipalities of São Paulo integrate them into their traffic and pollution management processes
  - Taking preventative steps if nitrogen dioxide (NO<sub>2</sub>) emissions could endanger human health

# Using Big Data as a proxy

- Aggregated GPS tracking of vehicles can be used as a proxy of traffic-related air pollution emissions
- Maps of NO<sub>2</sub> concentrations (ppb) for routine workdays

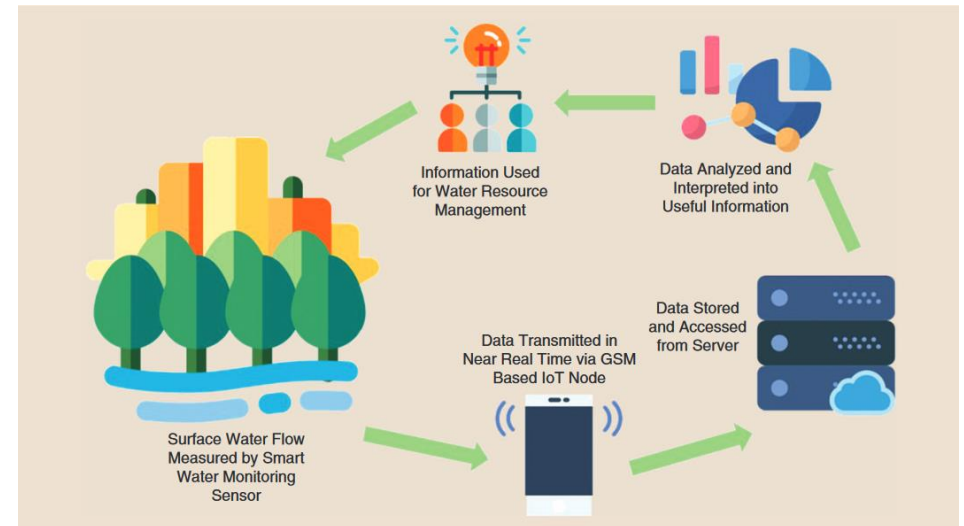


Chen et al. (2016)



# Water pollution monitoring

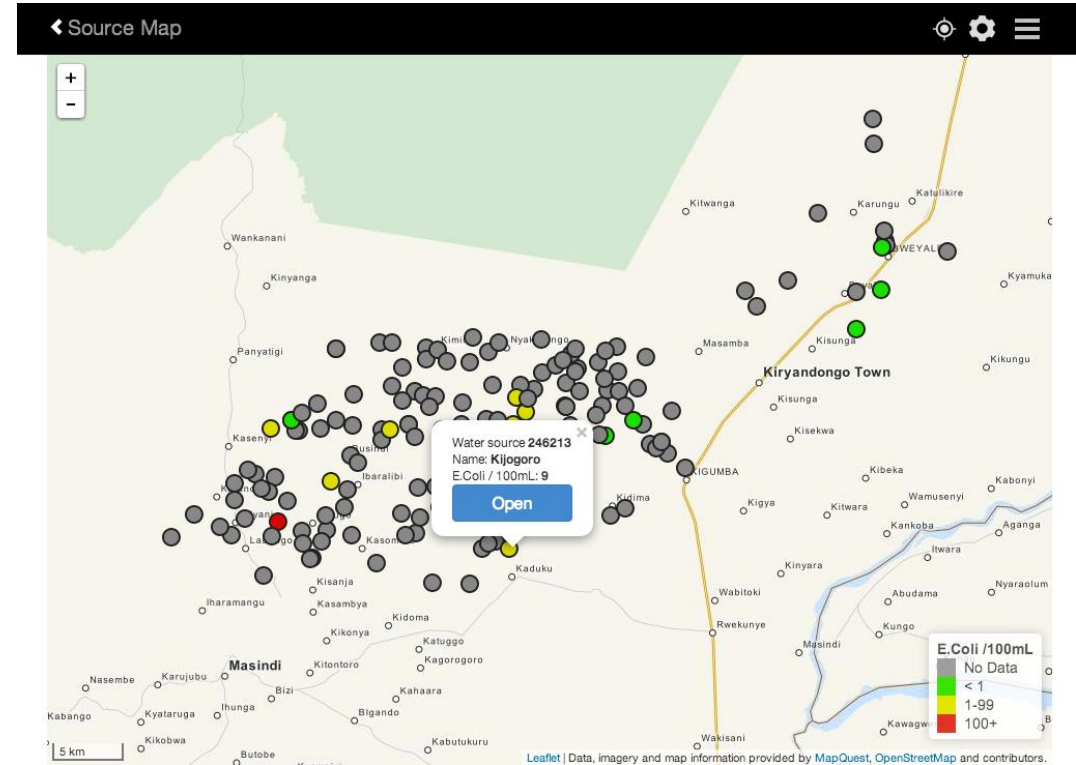
- High-resolution, smart water-monitoring equipment needed to measure the flow and quality of natural water sources is often expensive and prone to vandalism and theft
- Researchers from the University of Cape Town, South Africa, developed a **smart low-cost remote-monitoring flow sensor** to measure the flow of surface water.



System used to monitor the Stiebeuel River catchment

# Water pollution monitoring

- Applications like **mWater** allow integrating different datasets to validate data collection performed by different actors and multiply the benefits of local data collection campaigns



**mWater**

[www.mWater.Co](http://www.mWater.Co)

Twitter: @mWaterCo

Facebook: mWaterCo



# Digital technologies to promote environmental transboundary cooperation

# Environmental Cooperation

## Environment as a driver of conflict

- Cross-border water & grazing rights: Senegal vs Mauritania, Central African Republic vs Chad, Ethiopia vs Kenya vs Uganda
- Land distribution & soil erosion: Chiapas, Mexico
- Access to water (Near East)

## Environment as a source of cooperation

- 1950-2000: 1228 cooperative events vs 507 conflict episodes in water management.
- Technical cooperation on water: EXACT-ME (Jordan, Israel, Palestine)
- “Peace Parks”

# How can Digitalisation help?

1. Monitor the state of natural resources (e.g. water), including quality and use, for conflict prevention
2. Collaboration and networking for conflict resolution
3. Support to policy making towards a sustainable use of natural resources & post-conflict recovery

# How can Digitalisation help?


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# Case study #1

## EXACT-ME

- Low collaboration among Water Authorities of Israel, Palestine, and Jordan
- Pitch: climate change requires data to allow precise downscaling, hence cooperation is of mutual interest; digital technology is an enabler of better data
- Bilateral and Joint meetings identified pain points for each Water Authority, opportunities they were interested in
- Project proposal was agreed and signed by all parties

Feasibility study



Information and Communication Technologies to Support Climate Change Adaptation in the Water Sector in Countries Member Of EXACT

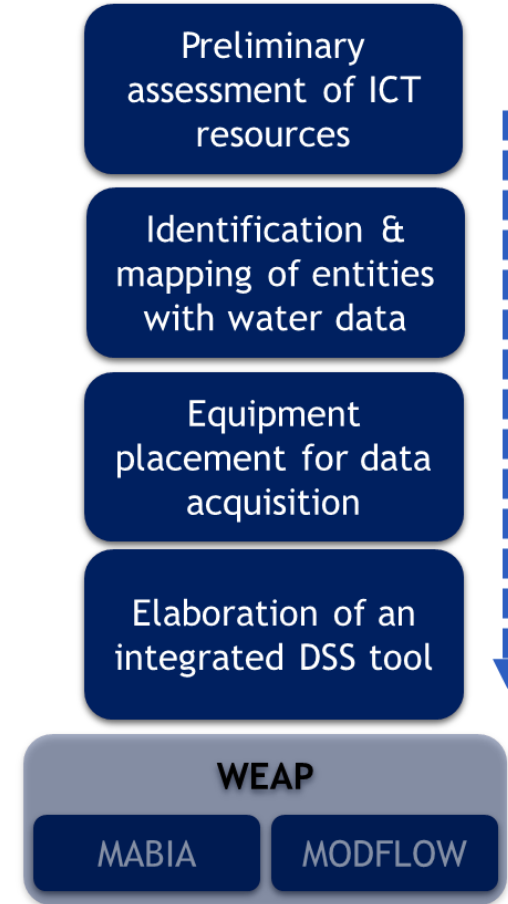
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# Case study #2

## Al Assi river basin, Lebanon

- Climate Change makes traditional schemes to allocate access to water obsolete (both at domestic and international level)
  - Need to re-assess resources available
  - Make agreements climate-proof

→ Digital tools are essential



*Strengthen the sustainable  
management of water resources  
in the Orontes river basin*

# Mobilizing communities for a greener planet through digitalisation

## Key functions

- Educate and influence people
- Increase citizens' awareness about environmental issues
- Enable citizens' sustainable consumption choices
  - Sharing information about the products' environmental footprint
- Engage citizens to become co-creators of knowledge and evidence that decision-makers, businesses, investors and other citizens can use.
- Put pressure on the market to demand green(er) solutions

# Mobilizing communities for a greener planet through digitalisation

## Caveat

- Citizens need to have **access** to digital tools
- Citizens need to have access to the needed **skills** to make use of digital tools

... Otherwise, they become invisible.



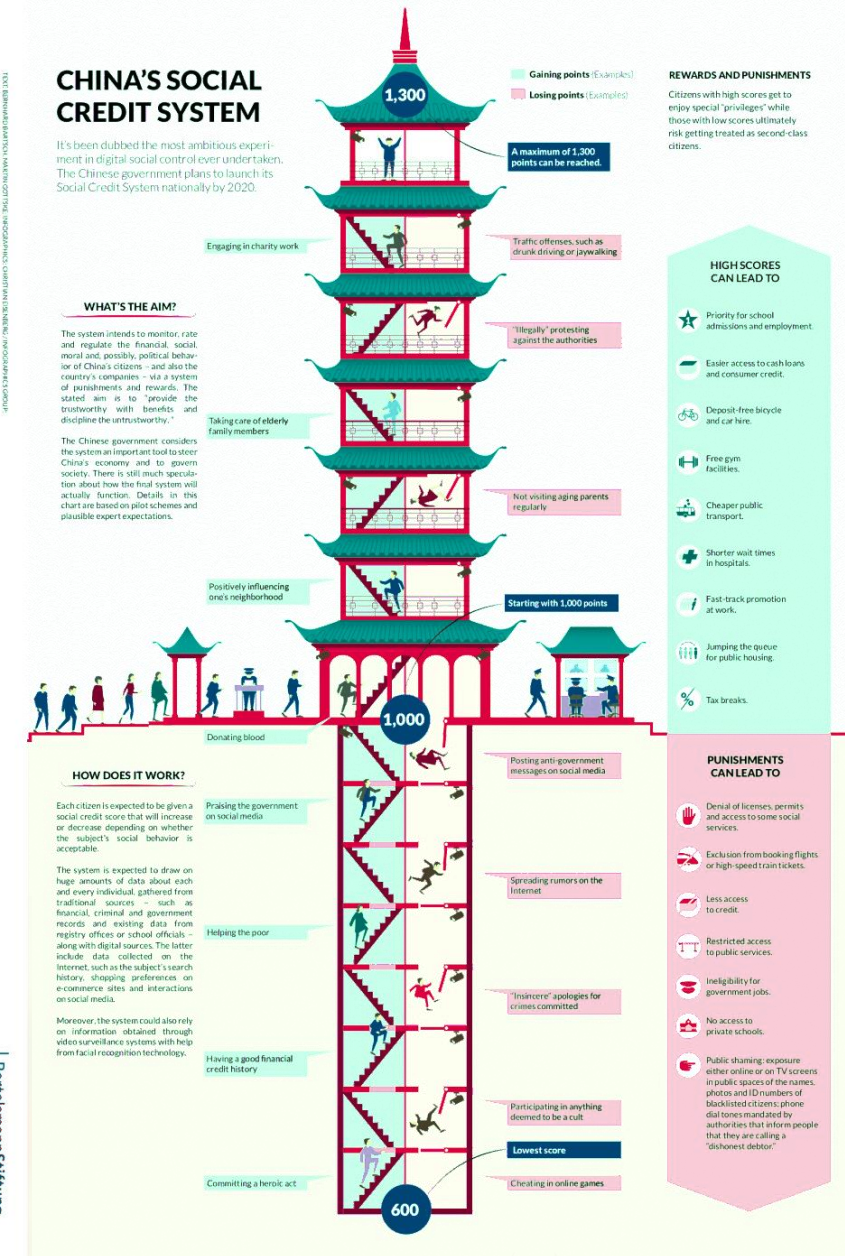
# Mobilizing communities for a greener planet

## Risks

- Not all digital tools are in line with the EU's approach to digitalisation.
- China's social credit-score is an example of how people could be monitored, rewarded and punished based on their behaviour

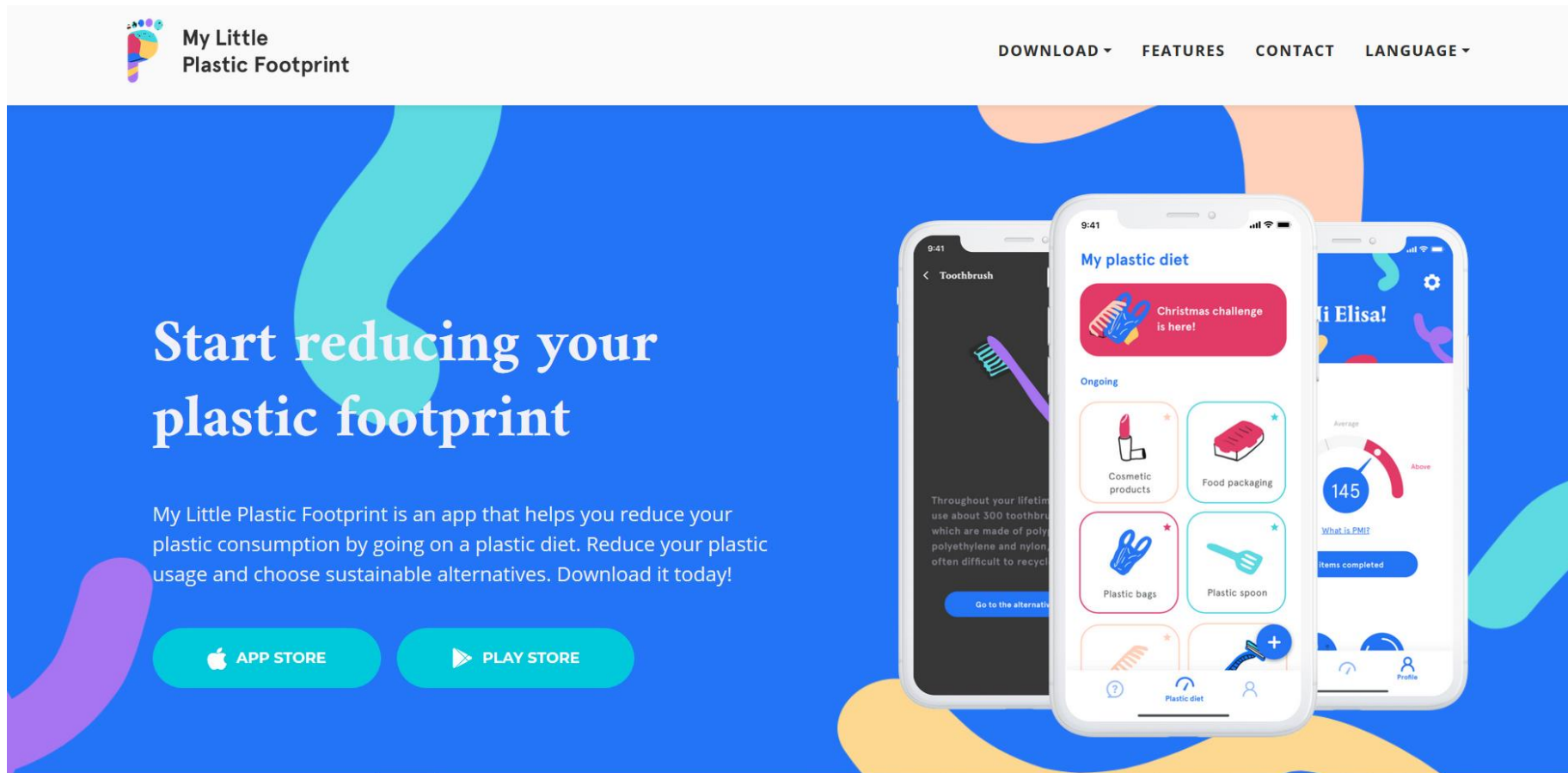


BertelsmannStiftung



# Enable sustainable choices

## My Little Plastic Footprint



Link: <https://mylittleplasticfootprint.org/>

# Earth Observation Copernicus

# Copernicus Space Component (ESA)



- Procurement
- Launch and operation of the Sentinel satellites
- Operation of the ground segment
- Distribution of Sentinels and contributing missions' data



# Copernicus Services



Atmosphere



Marine



Land



Climate Change

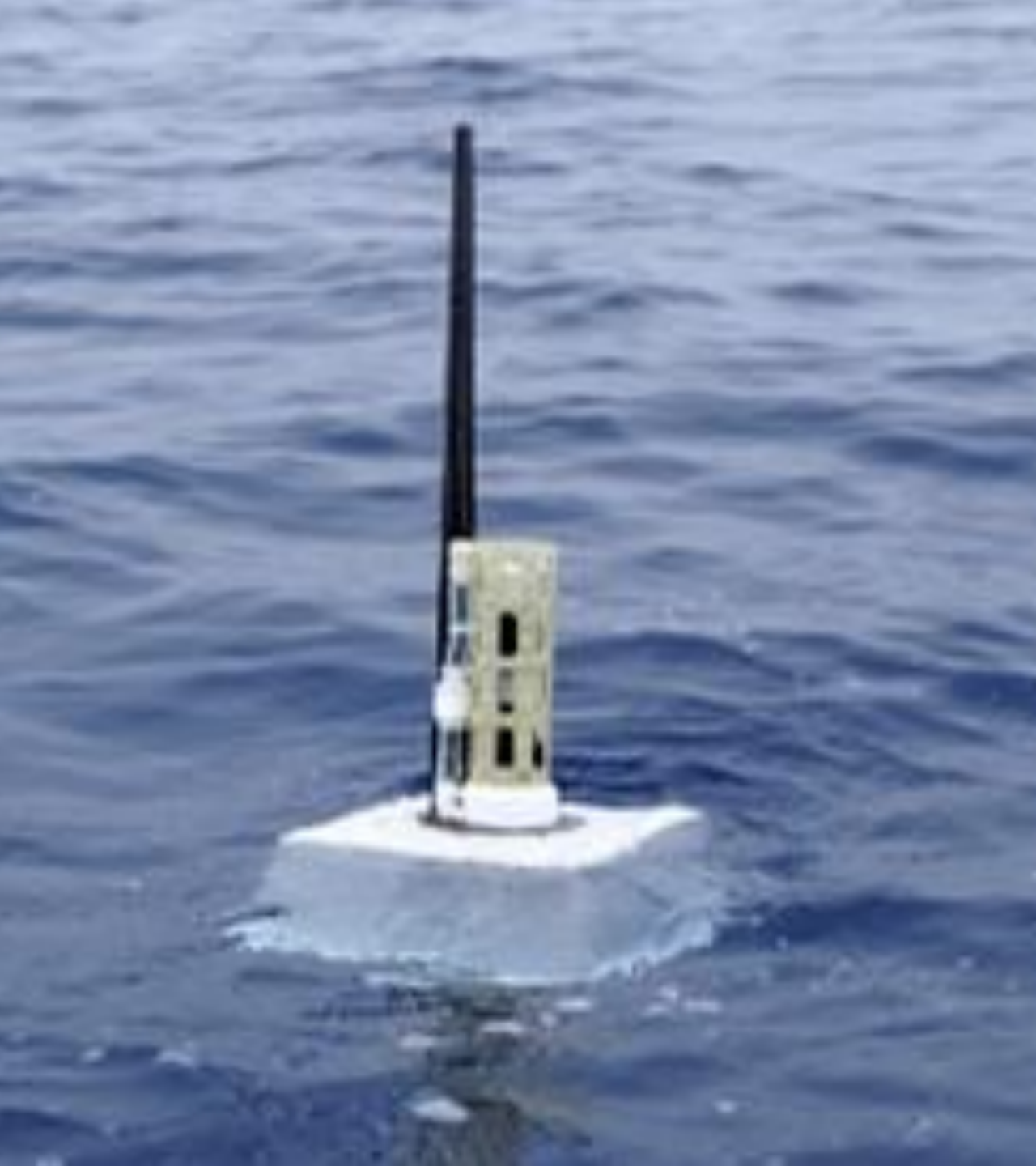


Security



Emergency

- Process and analyse the data
- Integrate it with other sources
- Offer Geo Information Systems

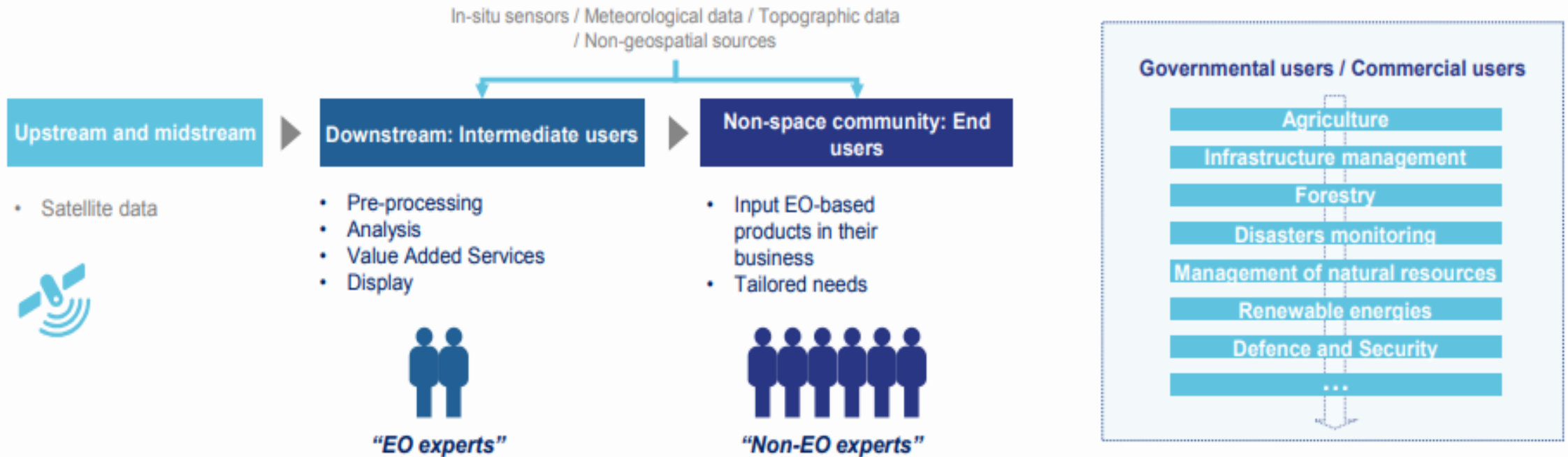


## In situ component (EEA)

- Provision and calibration of data from ground sensors
- Support the production of Copernicus products

# Overview of Earth Observation

## Terminology and roles for Earth Observation intermediate users and end users



# Data access

## **Satellite data**

- Satellite distribution hubs
- Sentinels
- Contributing missions
- Access to archives

## **Services: data and information**

- Added value products
- Models
- Archives, Near Real Time and Forecast products



# Earth Observation Browser

The screenshot displays the Earth Observation Browser interface. The main map area shows a false-color satellite image of Rome, Italy, with the Tiber River and surrounding urban areas. The interface includes a sidebar on the left with a list of visualization options, a top navigation bar with search and language settings, and a bottom status bar with coordinates and scale.

**EO Browser** ENGLISH [Login](#)

[Discover](#) [Visualize](#) [Compare](#) [Pins](#)

[True color](#)  
Based on bands 4,3,2

[False color](#)  
Based on bands 8,4,3

[NDVI](#)  
Based on combination of bands  $(B8 - B4)/(B8 + B4)$

[False color \(urban\)](#)  
Based on bands 12,11,4

[Moisture index](#)  
Based on combination of bands  $(B8A - B11)/(B8A + B11)$

[SWIR](#)  
Based on bands 12,8A,4

[NDWI](#)  
Based on combination of bands  $(B3 - B8)/(B3 + B8)$

[Free sign up](#) for all features

Powered by [Sentinel Hub](#) with contributions by [ESA](#)  
v3.0.82

[About EO Browser](#) [Contact us](#) [Get data](#)

Lat: 41.8662, Lng: 12.5124 | 2 km



# Learn everything about the Copernicus Programme

## Welcome to the Copernicus MOOC

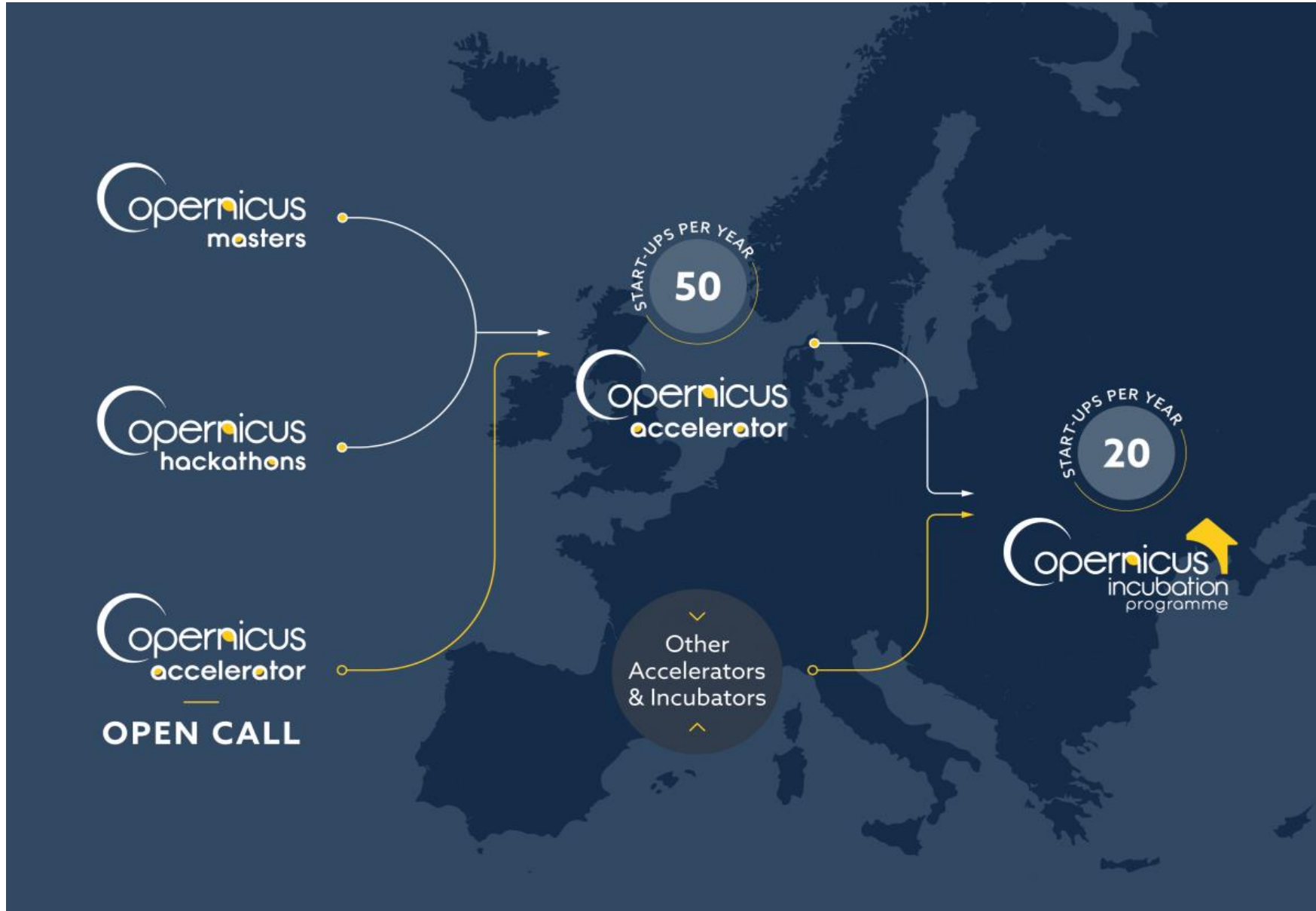
### What is the Copernicus MOOC?

The Copernicus MOOC (Massive Open Online Course) is an online training aimed at enabling anyone to understand how to use Earth Observation data in order to address societal challenges and generate business opportunities.

Participants will learn how Copernicus data can be used for evidence-based public policy, as well as to develop new products and services, open up new markets, improve quality of life, and make the most of limited resources in a sustainable way.

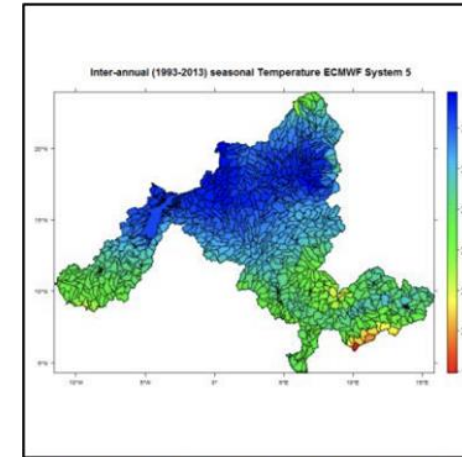


# Copernicus for startups

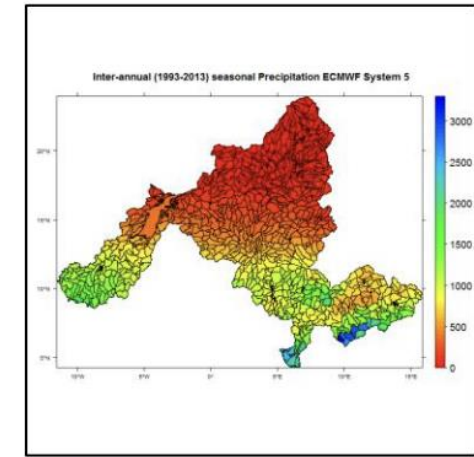


# Food Security in West-Africa

- **Where:** Niger River basin
  - **Institutions:** National Hydrology Department
  - **Seasonal forecast data (CDS)** and River discharge station data
  - Hydrological model
  - **Final product:** forecast river discharge for the rainy season
- 
- Support the decision of dam managers to better plan dam operations), farmers (to better plan their activities during the rainy season), and society (on the potential risks of floods).



**Figure 6: Seasonal average (1993-2013) temperature (°C) from ECMWF system 5 data**



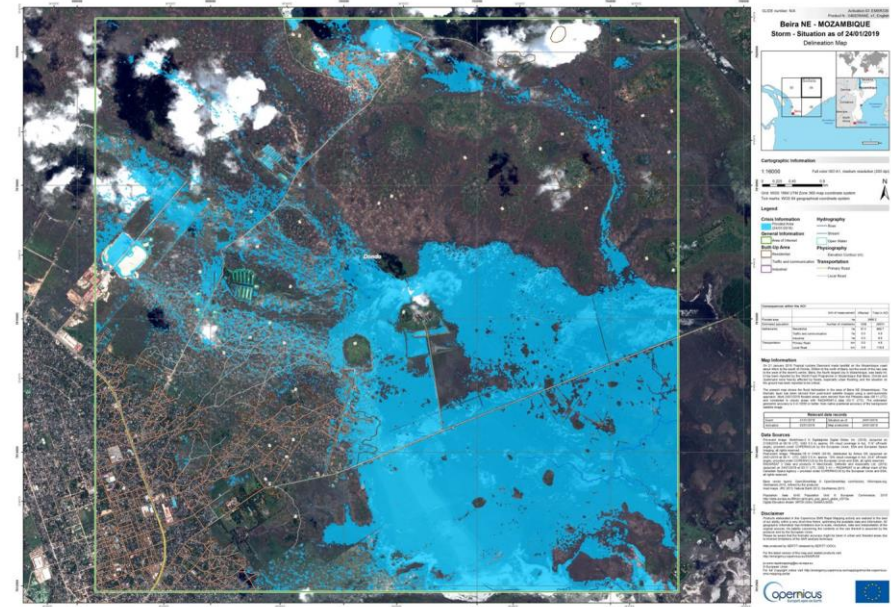
**Figure 3: Seasonal average (1993-2013) precipitation (mm) from ECMWF system 5 data (mm)**

Source: <https://climate.copernicus.eu/food-security-west-africa>

Minoungou et al. Using seasonal forecast information to strengthen resilience and improve food security in West Africa

# Flooding monitoring

- **Where:** Zambezia, Mozambique
- **Tropical storm** made landfall causing heavy flooding. Reports indicate that 277 mm of rain in 24 hours while large waves crashed over the sea defences.
- Approximately 120,000 people have been **displaced**, **2 deaths** and 90 houses were **damaged**.
- EMS Rapid Mapping - **Delineation monitoring maps** showing the extent of the flooding



The flood delineation map of Beira NE shows 2,496.2 ha (24.96 km<sup>2</sup>) of the area were affected at the time of satellite imagery acquisition

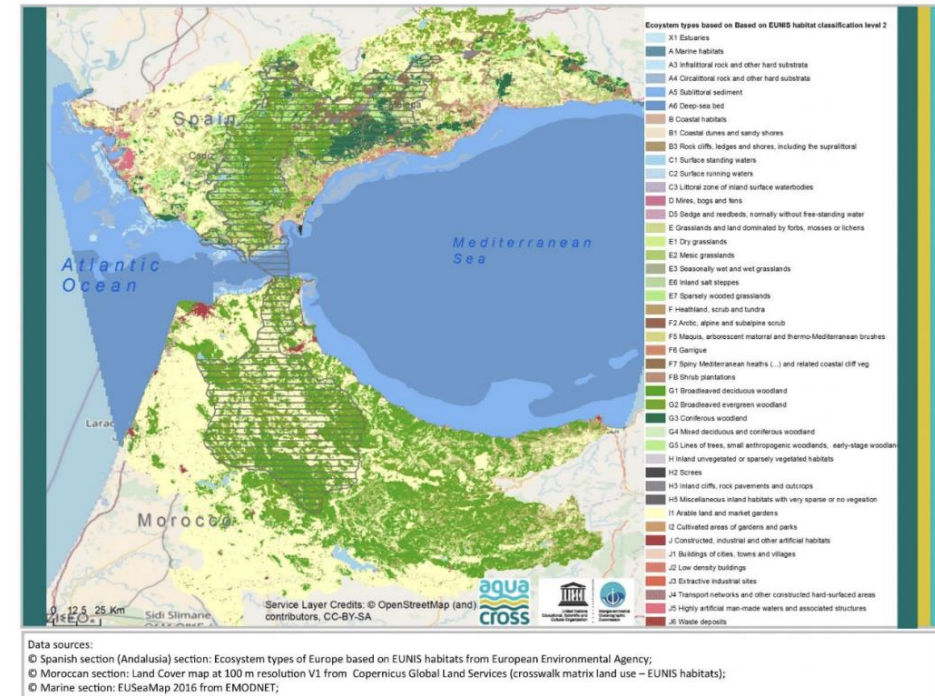
(Copernicus EMS © 2019 EU, [EMSR339] Beira NE: Delineation Map)

Source:  
<https://emergency.copernicus.eu/mapping/ems/copernicus-ems-monitors-flooding-mozambique>



# Natural Resources Management

- **Where:** Northern part of Morocco and Andalusia in Spain
- **Copernicus Land Cover 100 m** was used to map the **ecosystems types** following the EUNIS classification.
- Copernicus land cover data has been used to classify and map the **types of ecosystems** their services and evaluate the conservation status.
- Sustainable use of forests, other terrestrial ecosystems and biodiversity



Ecosystem Typology based on Habits EUNIS types, level 1 and level 2

Source: IOC/UNESCO. 2019. "Analysis of Transboundary Water Ecosystems and Green and Blue Infrastructures: Intercontinental Biosphere Reserve of the Mediterranean: Andalusia." Paris.  
<https://unesdoc.unesco.org/ark:/48223/pf0000367239.locale=en>

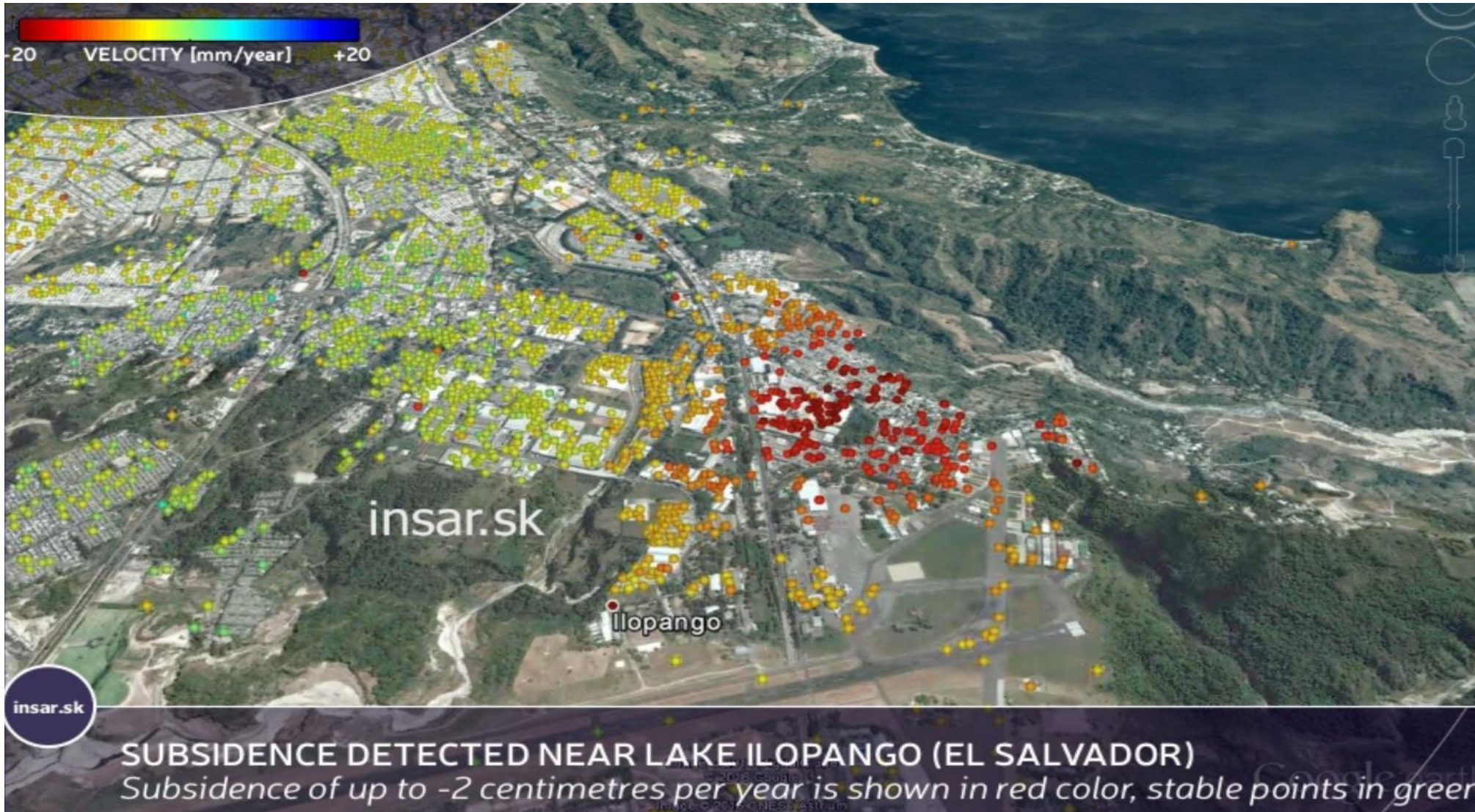
# Renewable energies

- **Where:** Burkina Faso
- Copernicus land cover data was used to **map the urban and rural settlements**, used for the **distribution of the population**
- Key input for the identification of the **Least Cost Electricity** Option in Burkina Faso.





# Monitoring of infrastructure stability





# Earthquakes

- *Terrain deformation analysis (pre and post event)*



- *Reconstruction monitoring (after 1 year the event)*



- *Capacity building & skill transfer*



- *Field visit & EO service validation*



Focus →

*Help the authorities better understand the hazards associated with seismic activity, flooding and landslides*

*Support more informed decisions in elaborating a redevelopment master plan after the earthquake of 2018*

# Application of Copernicus in the EC Delegation in the Philippines

Giovanni SERRITELLA, EEAS-MANILA

# Application of Copernicus in the EC Delegation in Costa Rica

Joselyn VARGAS-MAYORGA, EEAS-SAN JOSE

# Course evaluation

# Wrap Up

- The climate and environmental urgency have been largely recognized by the international and European policy agenda.
  - International action: SDGs and related environmental agreements, Paris Agreement, Sendai Framework on Disaster Risk Reduction, the EU Green Deal
- Deep Dive on Digitalisation (tools, actors, opportunities, threats, divides)
- Digitalisation can support the Green Deal
  - Duality of Tech / Environment
- IF policies are in place, digital can support clean energy, circular economy; Sustainable Digital Infrastructure, environmental monitoring, environmental transboundary cooperation, sustainable behaviours and practice
- Earth Observation / Copernicus

# Follow up: Key Leads

- Team Lead, Digitalisation in F5
  - Mr. Andrea LEONE [Andrea.LEONE@ec.europa.eu](mailto:Andrea.LEONE@ec.europa.eu)
- Focal point in F5 for green and digital:
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- Focal points for the D4D Hub:
  - Barbara BARONE [Barbara.BARONE@ec.europa.eu](mailto:Barbara.BARONE@ec.europa.eu)
  - Georgiana MACOVEI [Georgiana.MACOVEI@ec.europa.eu](mailto:Georgiana.MACOVEI@ec.europa.eu)
- Capacity4Dev: <https://europa.eu/capacity4dev/digitalisation-4-development>

# Thank you!

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Slide 4: picture, Hootsuite and We Are Social; Slide 10, 11: picture, International Center for Journalists; Slide 14: picture, Chen et al. (2016); Slide 15: picture, Future Water Institute - University of Cape Town; Slide 16: picture, mWater.Co; Slide 25: picture 1, techinasia.com; Slide 25: picture 2, Bertelsmann Stiftung; Slide 26: picture, MyLittlePlasticFootprint

