Mainstreaming EO for Climate Resilience

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ESA Earth Observation Programmes
Environmental Monitoring: Copernicus Sentinels

- sentinel-1 (RADAR VISION)
- sentinel-2 (COLOUR VISION)
- sentinel-3 (A BIGGER PICTURE)
- sentinel-4 (EUROPEAN AIR MONITORING)
- sentinel-5p | sentinel-5 (GLOBAL AIR MONITORING)
- sentinel-6 (SURFING THE SEAS)
Next-Gen. missions will replace current & expansion missions

Copernicus Space Component Evolution

2014

Current Sentinels

Sentinel Expansion

Sentinel Next Generation

Copernicus for Security
Copernicus: Future Missions

**CO2M - Anthropogenic CO₂ Monitoring**
Causes of Climate Change

**Cristal - Polar Ice & Snow Topography**
Effects of Climate Change

**CIMR - Passive Microwave Radiometer**
Sea: Surface Temp. & Ice Concentration

**LST – Land Surface Temperature Mission**
Agriculture & Water Productivity

**CHIME – Hyperspectral Imaging Mission**
Food Security, Soil, Minerals, Biodiversity

**ROSE-L – L-band SAR Mission**
Vegetation & Ground Motion & Moisture

Causes of Climate Change
Agriculture & Water Productivity
Food Security, Soil, Minerals, Biodiversity
Vegetation & Ground Motion & Moisture

Effects of Climate Change

Sea: Surface Temp. & Ice Concentration

European Space Agency
More EO satellites than ever

EO Satellite Launches Worldwide

> 50 kg, excl. meteo

Start Sentinel Era

Entrepreneurial Space Age

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EO serving the Global Agendas

Climate Action
Paris Agreement & 2030 Agenda
Monitoring Climate Change & Monitoring of SDGs

Official Development Assistance
Facilitating Development Worldwide

Disaster Risk Reduction
Sendai Framework
Supporting Disaster Resilient Societies
How do we address the Challenges?

Greatest Challenges

- Climate Change and SDG
- Leave no one behind
- Big data
- Need for expertise
- Transform observations to political decisions

Actions

- Provide unbiased, factual information about the state of our planet
- Full, free and open data policy
- Provide cloud processing platforms and tools
- Support & Knowledge Transfer
- Create awareness, promote EO for dev.
<table>
<thead>
<tr>
<th>Obstacles to the scaling-up and operational use of EO in sustainable development</th>
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<tbody>
<tr>
<td>Restrictive data access policies (including cost)</td>
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<td>Not enough “fit for purpose” products</td>
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<td>Frequency of observations insufficient to track changes at appropriate scales</td>
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<td>Needs for continuity of observations and long-term EO programs</td>
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<td>Lack of analysis ready data</td>
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<td>Difficulties to discover and access EO data</td>
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<td>Lack of clear and solid user-oriented methods and guidelines</td>
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<td>Capacity building and training</td>
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<td>Insufficient solid track records of successful case studies</td>
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International collaboration to scale up EO for Sustainable Development

- Global Datasets
- Good Practices Guidance
- Mainstream in national systems & processes
- Training & Capacity Building
- Tools & Platforms
- EO Knowledge Hub

- Build capacity to exploit EO
- Training courses
- Training material on EO best practices
- Mainly in developing and emerging economies
- Support method, guidelines for countries.
- Support national and governmental ministries use EO in decision making.
- Scientifically sound approaches.
- Product validation.
- Show Cases.
- Support method, guidelines for countries.
- Knowledge sharing
- Access to datasets
- EO best practices
- Method. guidelines
- Visual. Analytics
- On-line processing
- Toolboxes
- Capacity Building
- Access to global / regional datasets.
- In the absence of or to complement and enhance, national data sources.
- Countries which face major difficulties in collecting nat. data.
Partnership with MDBs since 2011

World Bank, Dec 2015
Asian Development Bank, Nov 2016

EO4SD 80+ projects showcasing EO products with MDBs (2011-2019)

Global Development Assistance (GDA) programme (2020 – 2024)
Information derived from EO data

- Essential Climate Variables (ECVs)
- Land cover and land cover changes (including vegetation type, population, assets, food production)
- Important/critical habitats for Nature Based Adaptation Solutions
- Threats (e.g., flood and drought risk based on soil moisture, vegetation and/or rainfall)
- Land surface temperature, evaporation from land, heat island
- Vegetation indicators (fraction of absorbed photosynthetically active radiation (FAPAR), leaf area index (LAI), above-ground biomass, productivity)

Application/Used for

- Sectoral Climate Services:
  - Ecosystems
  - Agriculture
  - Infrastructure
  - Energy
  - Water

- Investments Climate Risk Screening:
  - Growing season length variability
  - Extremely wet/dry days number and variability
  - Risk & Exposure

- Monitoring of climate change impacts:
  - Extreme events
  - Slow onset events
  - Vulnerability/Hot Spots
  - Conservation efforts

Benefits

- Reveal interactions between climate change trends and socio-economic systems vulnerability
- Enhance the ability to anticipate, absorb, accommodate, or recover from climate change impacts
Global Development Assistance Programme 2020-2024

**Systematic** inclusion of EO for all Aid projects and project phases:

- Identification,
- Preparation,
- Appraisal,
- Negotiation, and
- (most importantly) **Implementation**.

- How we can grow the body of scientific knowledge about climate change and resilience?
- How we can drive science & evidence to meet policy?
- Where are the bottlenecks?
- How do we avoid failures, mistrust and misinterpretations?
Satellite Observations, an essential source of information to study climate change

- Science and evidence driving Global/Regional ODA agenda
- Investing in tools & analysis to improve Aid planning & implementation
- Demonstration of impact of evidence-based decision making
- Expertise and capability transfer program
Thank you!