

Space4SDG's: focus on biodiversity and water management

E-shape solutions

14 - 15 February, The Hague, The Netherlands

Maria-Gabriella Sarah, European Space Agency
Strategy and Foresight department

14/02/2023

SUSTAINABLE DEVELOPMENT GOALS

SUSTAINABLE DEVELOPMENT GOALS



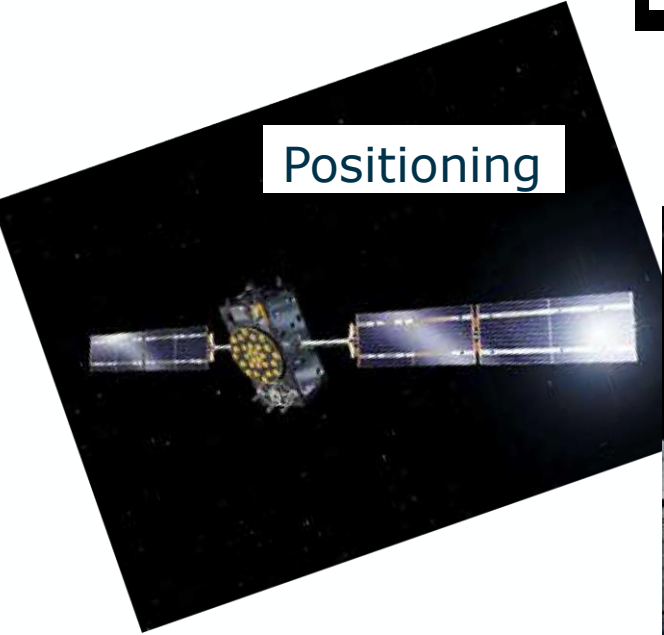
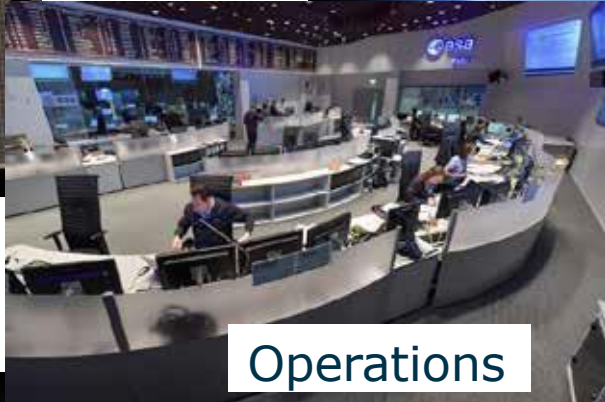
SPACE4SDGS



1 NO POVERTY 	2 ZERO HUNGER 	3 GOOD HEALTH AND WELL-BEING 	4 QUALITY EDUCATION 	5 GENDER EQUALITY 	6 CLEAN WATER AND SANITATION
7 AFFORDABLE AND CLEAN ENERGY 	8 DECENT WORK AND ECONOMIC GROWTH 	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE 	10 REDUCED INEQUALITIES 	11 SUSTAINABLE CITIES AND COMMUNITIES 	12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION 	14 LIFE BELOW WATER 	15 LIFE ON LAND 	16 PEACE, JUSTICE AND STRONG INSTITUTIONS 	17 PARTNERSHIPS FOR THE GOALS 	SUSTAINABLE DEVELOPMENT GOALS



All means → socio economic benefits





Latest news



Simba CubeSat to swivel from Earth to Sun to help track climate change

To launch ahead the return to flight launch of the 1st mission, Belgium's Simba CubeSat is a tiny sat with a big ambition to measure the...



Detecting methane emissions during COVID-19

While carbon dioxide is more abundant in the atmosphere and therefore more commonly associated with global warming, methane is around 30 times more...

Additional information

- ESA: Space for Sustainable Development
- UNODSA
- SDGs: Sustainable Development Knowledge Platform

Social networks activity

Tweets by @space4earth

Tweet 1: This month the @CopernicusEU #EcoProcessAssistance...
 Tweet 2: The earth is @CopernicusEU #EcoProcessAssistance...
 Tweet 3: The earth is @CopernicusEU #EcoProcessAssistance...

Space for Earth
 @space4earth | 5,077 Tweets

Following

Bringing you collated news about Space for Earth @ESA @ESA @ESA @ESA

170 Following 2,997 Followers

Followed by Dieter Schmitt, MICHELANGELO, and 12 others you follow

Copernicus EU @CopernicusEU - Oct 11
 From 3-5 December, you have the opportunity to see how the #EU space programme enables solutions to tackle global challenges such as #climatechange, safety and security, emergencies and #mobility. Join us in #legislati... for the #EUSW2019! #space4earth

ACTIVITY
Concordia
 Thu, 03/06/2018 - 19:40
 Because of its seclusion, the polar bases on Antarctica, namely Concordia station, offer scientists a unique location to conduct research in many disciplines...

People SDG6 Clean Water and sanitation Prosperity SDG9 Industry, Innovation and Infrastructure SDG12 Responsible consumption and production

ACTIVITY
CULTIVATING MICROALGAE USING MADE-FOR-SPACE FORMULAS
 Thu, 03/06/2018 - 19:40
 A new facility is offering researchers and industry an opportunity to experiment with microalgae on larger scales than before. Based in Saint-Nazaire, France, the AlgoSals site is a stepping stone to industrial production of algae-based products...

People SDG2 Zero Hunger SDG3 Good Health and Well-being SDG6 Clean Water and sanitation Prosperity SDG11 Sustainable cities and communities Planet SDG7 Affordable and Clean Energy

ACTIVITY
CymonS
 Thu, 03/06/2018 - 19:40
 CymonS provides water management organisations with data of several water quality parameters at a large spatial and temporal scale. This data is used to initialise models for providing short term forecasts. CymonS especially provides information on the presence of cyanobacteria...

People SDG6 Clean Water and sanitation Planet SDG14 Life below water

ACTIVITY
EPAS wastewater treatment
 Thu, 03/06/2018 - 19:40
 EPAS (Eco Process Assistance) was founded as a spin-off from the Laboratory for Microbial Ecology of Ghent University and is now part of Veolia Water...

People SDG6 Clean Water and sanitation Prosperity SDG12 Responsible consumption and production

Status
 Choose some options

Target
 Choose some options

Keywords
 Choose some options

Apply

Advanced filter and download

For more information about the SDG targets, please visit this link.

Download Listed Activities:
 Download file

Additional information
 • ESA: Space for Sustainable Development
 • UNODSA
 • SDGs: Sustainable Development Knowledge Platform

Social networks activity
 Tweets by @space4earth
 Space for Earth Retweeted
 Eurlisy

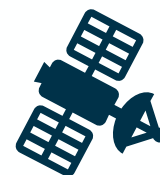
ESA online catalogue:
<https://sdg.esa.int>

Key questions

- **What** kind of **satellite applications** could support decision-makers, industry, citizens and researchers to tackle biodiversity/water management challenges?
- **How** could **space applications & technologies** represent an **added value** for ensuring reliable and objective information on soil, air, water, vegetation, and assets valuable for human well-being?

Space4SDGs can support the EU Biodiversity Strategy 2030 objectives → to build resilience against

- The impacts of climate change
- Forest fires
- Food insecurity
- Disease outbreaks - including by protecting wildlife and fighting illegal wildlife trade



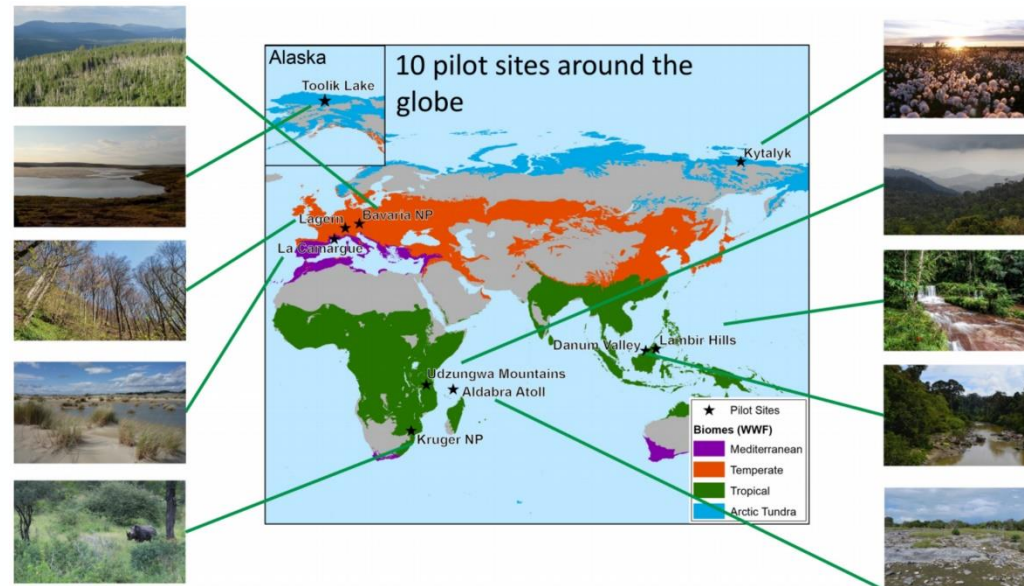
Biodiversity

GlobDiversity

- Enabling the integration of satellite observations into biodiversity strategies → Develop, validate, showcase and scale up a number of High Resolution **RS-enabled EBVs**

on the structure and function of terrestrial ecosystems

- **build a global knowledge system** on the biodiversity of ecosystems



➤ Space added value

Earth Observation data

➤ Users

Industries, Governments, Local communities



Project Final Report

To

Chair of Earth Observation

Co-Editor

Chair of Earth Observation

Submitted by



EO4 City Biodiversity Index

- Capturing the **status** and **trends** of **biodiversity** and **ecosystem services** in urban landscapes → understanding if metropolitan area develops in a sustainable manner.
- Re-orientate **conservation efforts** in **urban areas**

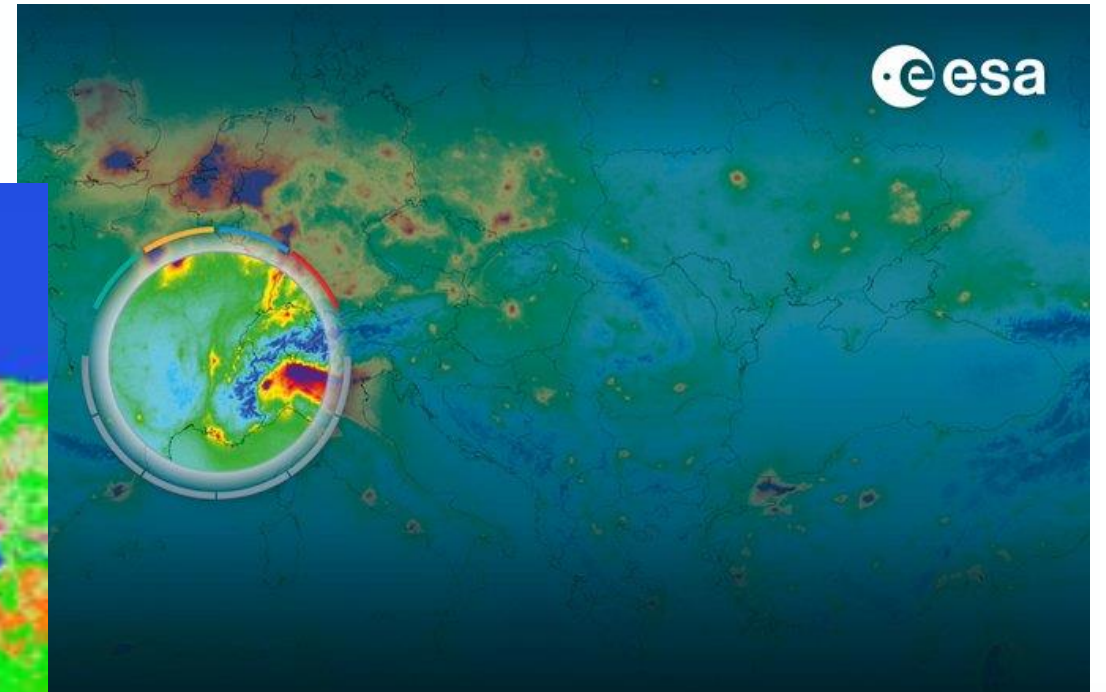
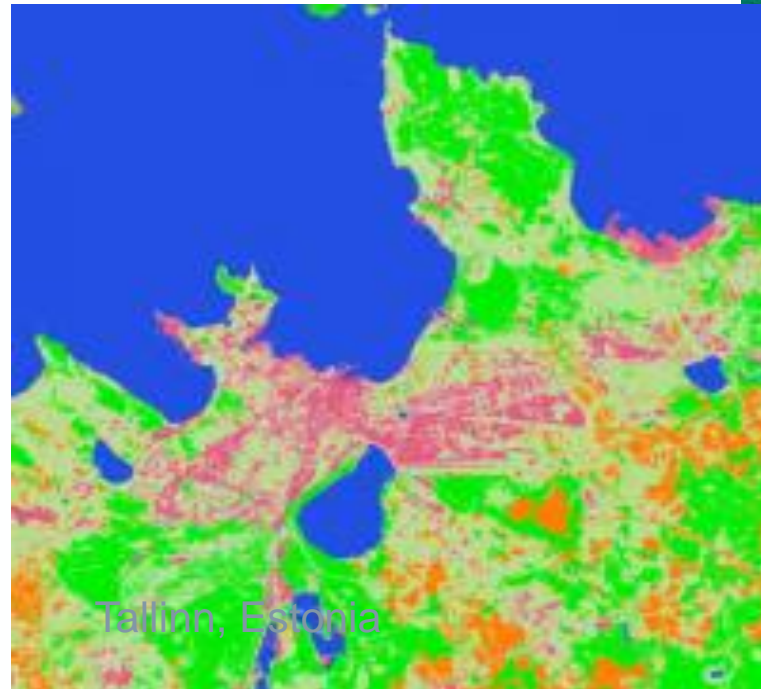
➤ Space added value

Earth Observation data

➤ Users

Industries, Governments,

Local communities



Forestry TEP: Thematic Exploitation Platform

- On-line platform services providing access to EO data, tools and ICT resources for forest management.
- ➔ improve forest management while ensuring sustainability and **carbon sequestration**.
- ➔ *Create* and **share** processing services, tools and generating value-added **forest information products**

➤ Space added value

EO Satellite data combined with in situ data, SatCom

Users

Industries, Governments, Local communities,
National and Regional forest administrations



Lack of forest management



Food security Tep

- **On-line platform** services providing access to EO data, tools and ICT resources for food security
➔ **Supports sustainable agriculture, aquaculture and fisheries** by providing access to data, processing tools and computing resources in a cloud environment
- **Facilitates collaborative research and bench marking of methods,** development of innovative Apps and services

➤ Space added value

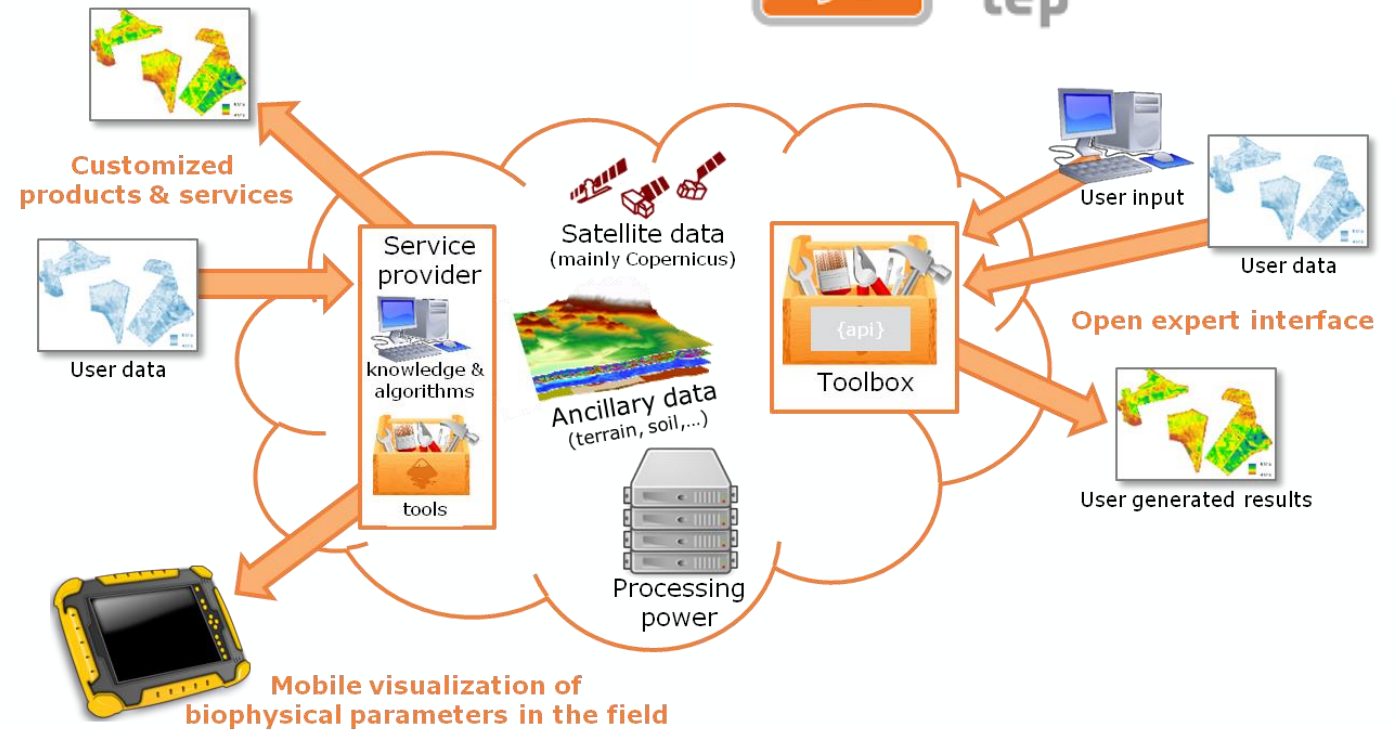
EO data combined with in situ data, SatCom

➤ Users

Industries, Governments, Local communities



food security tep



- Use of high-end Real Time Kinematic (RTK) satellite **Navigation** (satellite data) to **steer and control** tractors to **raise productivity** and **reduce labour cost** in the + avoids double spraying of pesticides by precision of positioning

➤ Space added value

EO data with NAV data for precision of positioning (Galileo , GPS)

➤ Users

Farmers, local governments, private industries



Water management

360 Blue

- Aims to **determining water related risks**, supporting optimization of **water management**, and assessing **water footprints, availability and quality**
- Uses **satellite images and open data sources**



➤ Space added value

EO satellites, Satcom combined w IoT

➤ Users

Private companies, in the food and beverage, construction and agriculture industries, hydro engineering consultancy companies, local governments, environmental agencies



AIGANOVA

- **grey water** recycling system to **optimise** the **external water** and **energy resources** required for **large consumers of water** (e.g. hotels)
- **Minimise** the **overall cost of the life cycle of a water facility.**

➤ Space added value

Long Life missions to Mars (MELiSSA project) knowledge

➤ Users

Private companies, in the food and beverage, local governments construction and agriculture industries, environmental agencies hydro engineering consultancy companies



UNDERSEE

- Aims to **monitor** and **predict water quality changes** in rivers, lakes and oceans
- Enables to **move from a reactive to a preventive** decision – making approach based on **actionable**

➤ Space added value
EO data, GNSS and SatCom.

➤ Users

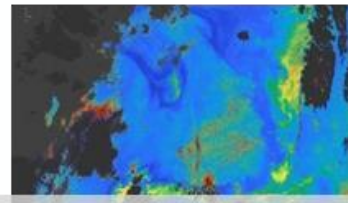
Researcher centres, environmental agencies,
aquaculture producers



Real-time in-situ water data



Space Data



Forecast models

3 DAYS FORECAST

101001010
0011
011010011



UNDERSEE

END
USERS



AQUACULTURE
COMPANIES

ENVIRONMENTAL
ENTITIES

RESEARCH CENTRES



DAMMINGS



- Build a **dam motion monitoring service platform** based on **GNSS** (Global Navigation Satellite System), **InSAR** (Interferometric Synthetic Aperture Radar)
- **Demonstrate** the advantages of **combining both techniques** to monitor dams and their surroundings

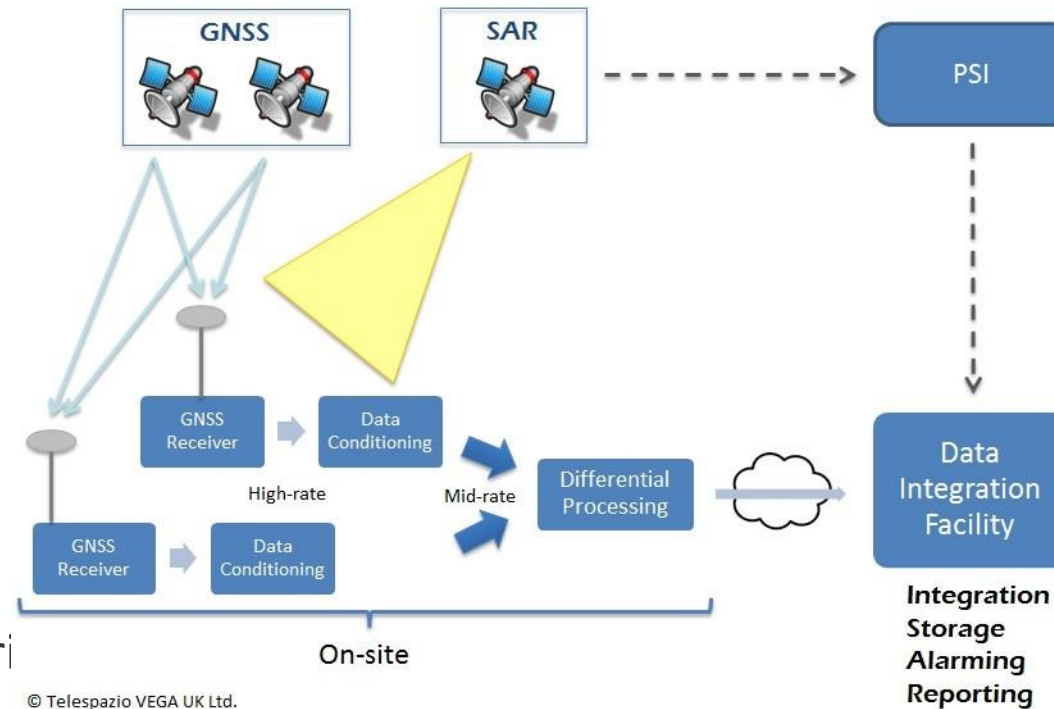
➤ Space added value

GNSS, InSAR, SatCom

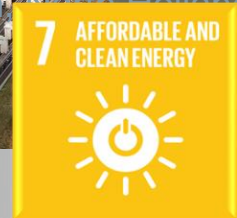
➤ Users

Governments,

Local communities, Industri



Afsluitdijk Dam, North Holland, Netherlands



EO4SD Water Resource Management



- **EO4SD initiative supports international development assistance by helping countries to better measure and manage their water resources.**
- Achieves a step **increase** in the uptake of satellite-based environmental information in the **IFIs (Internat. Financial Instit.)regional and global programs** in sustainable development projects related to water management
- Uses **satellite images and open data sources**

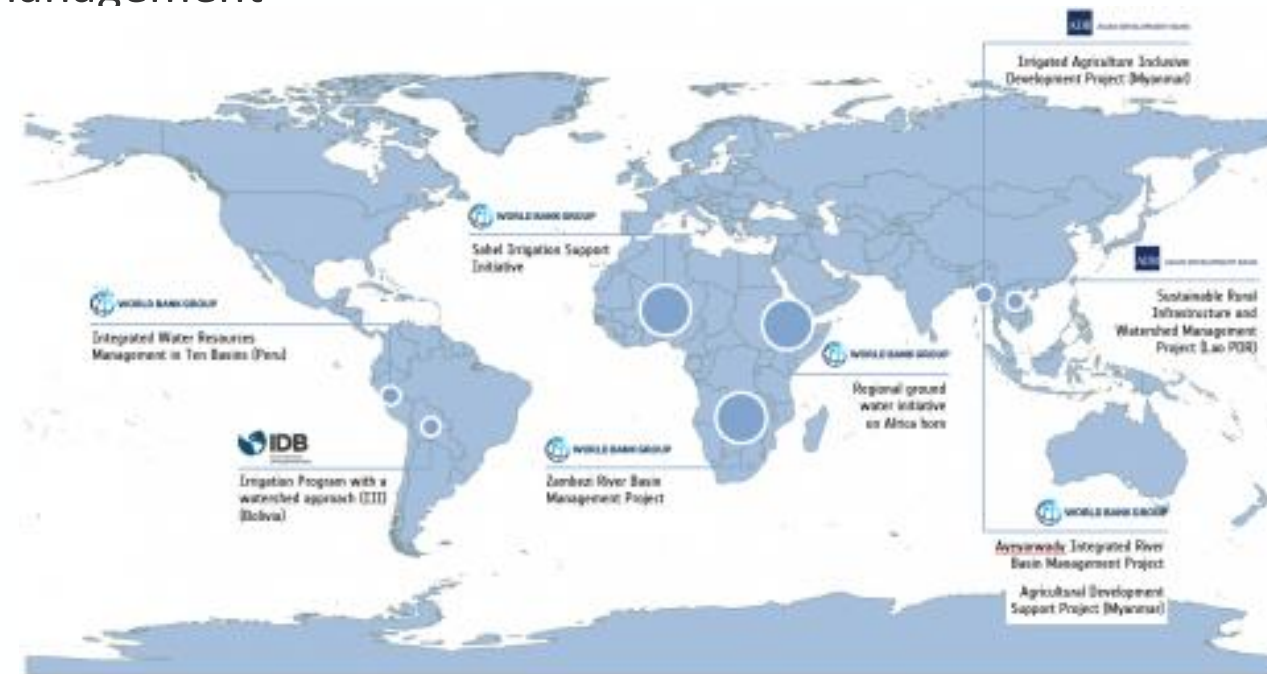


➤ Space added value

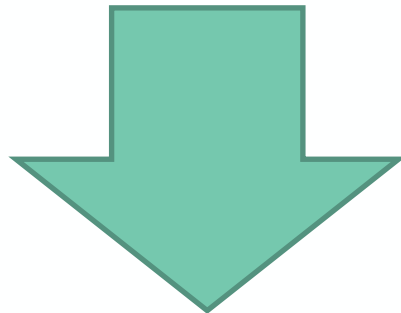
EO data

➤ Users

International and regional organizations,
local governments, NGOs



- A **coordinated approach** across ESA programmes
- Ensure **information easily available**
- Making the **link** between **space** (experts) and **ground** (users)
 - understanding the needs and “translating” them into space projects
- Support those able to “pass the message” – **Uniting with other actors**



UNOOSA compendium linked to ESA catalogue



Thank you for your attention!
