

Earth Observation for Sustainable Development In partnership with International Financing Institutions



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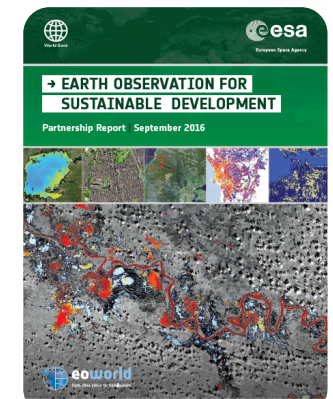
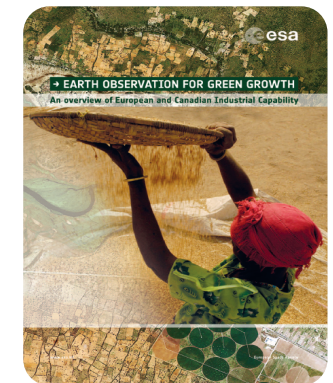
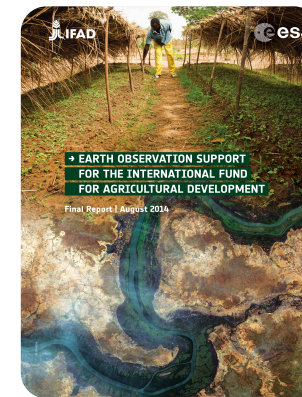
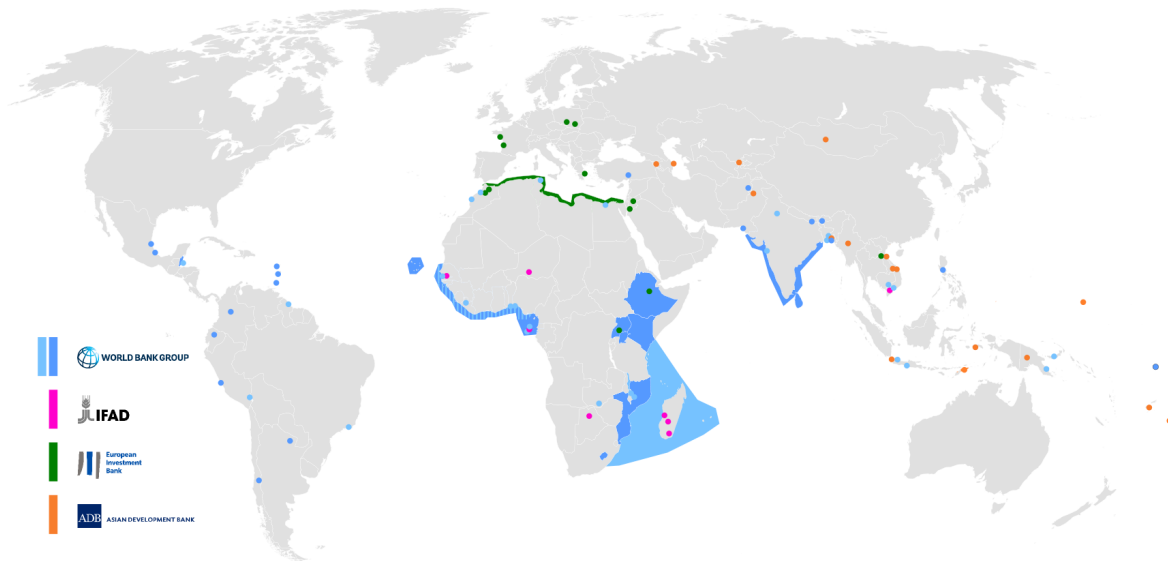


Initial Phase : Raised interest of IFIs in EO

During period 2010 -2015

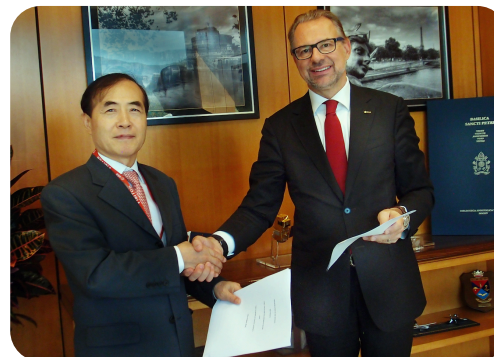


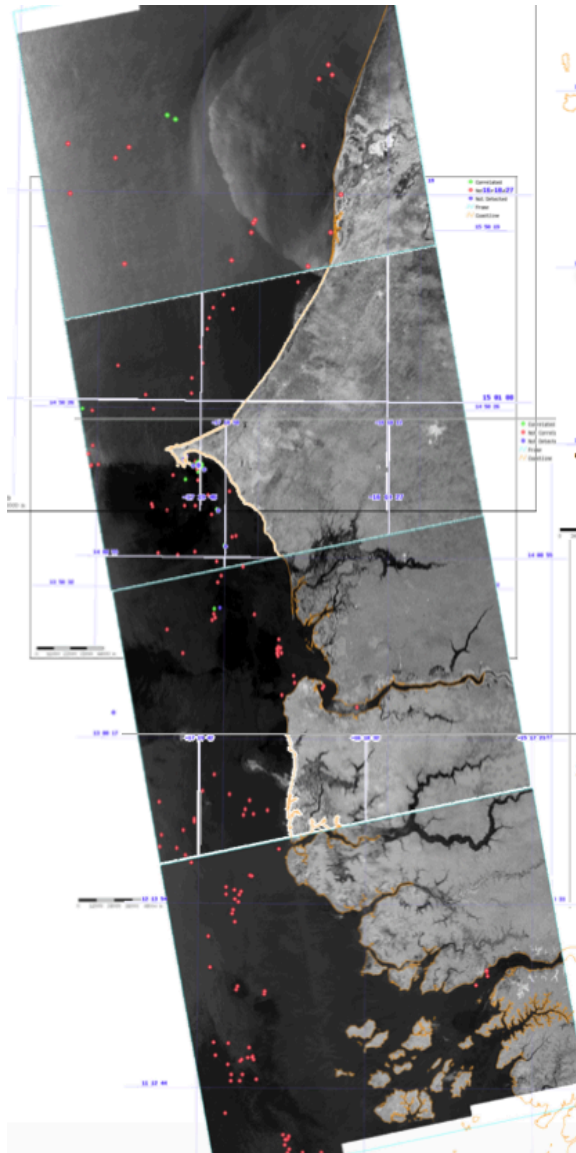
- 65+ small-scale demonstrations of EO-derived environmental information in the implementation of Official Development Assistance (ODA) projects; MoUs signed.



World Bank, Dec 2015

Asian Development Bank, Nov 2016





First use of Sentinel 1 data for fisheries protection in developing countries (West Africa).



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FEATURE STORY

European Commission Gets Tough with Illegal Unreported and Unregulated Fishing, With A Little Help from Liberia

December 28, 2015



International Financing Institutions (IFIs):

How could they use EO ?



Information Drivers

- Green Growth
 - Environmental impact / sustainability of economic development investments
- Climate Resilience / Proofing
 - Long-term durability of development investments
- Natural Capital Valuation
 - Economic valuation of Ecosystems for National and Global accounting (GDP)
- Open Development
 - Increasing drive towards transparency in knowledge resources

Information Uses

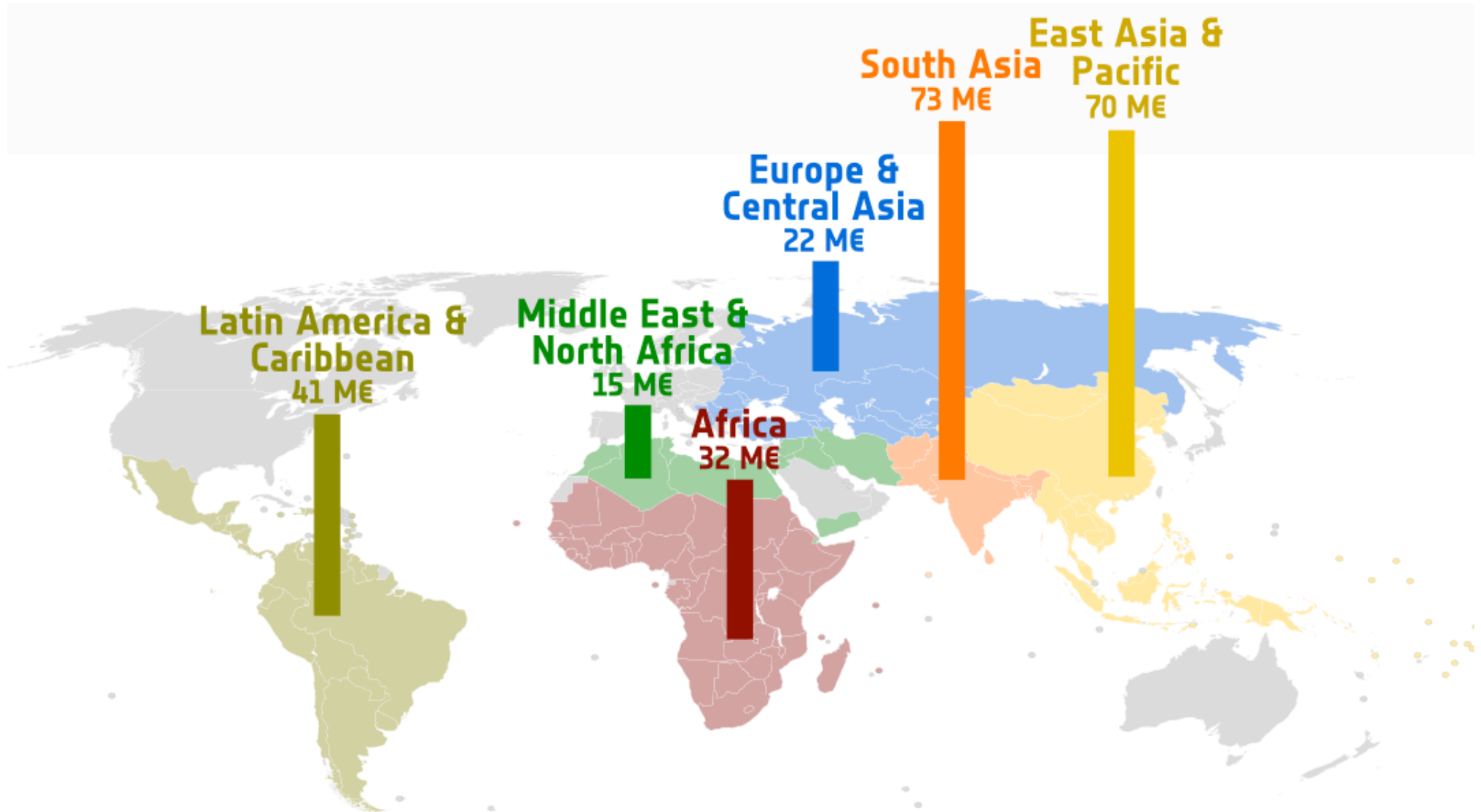
- In support directly to Programs / Projects
 - concept definition, planning, implementation
 - close-out and remission
 - as part of capacity-building in developing countries
- In support of Monitoring & Evaluation (M&E) methodologies
 - as *best-practice* to harmonize M&E tools:
 - Feasibility
 - Environmental Impact Assessments
 - Audits
 - SDG Indicators / Reporting
- In support of policy & planning
 - sectorial analyses,
 - country development planning

Growing use of IFI financial resources for procurement of EO-based information



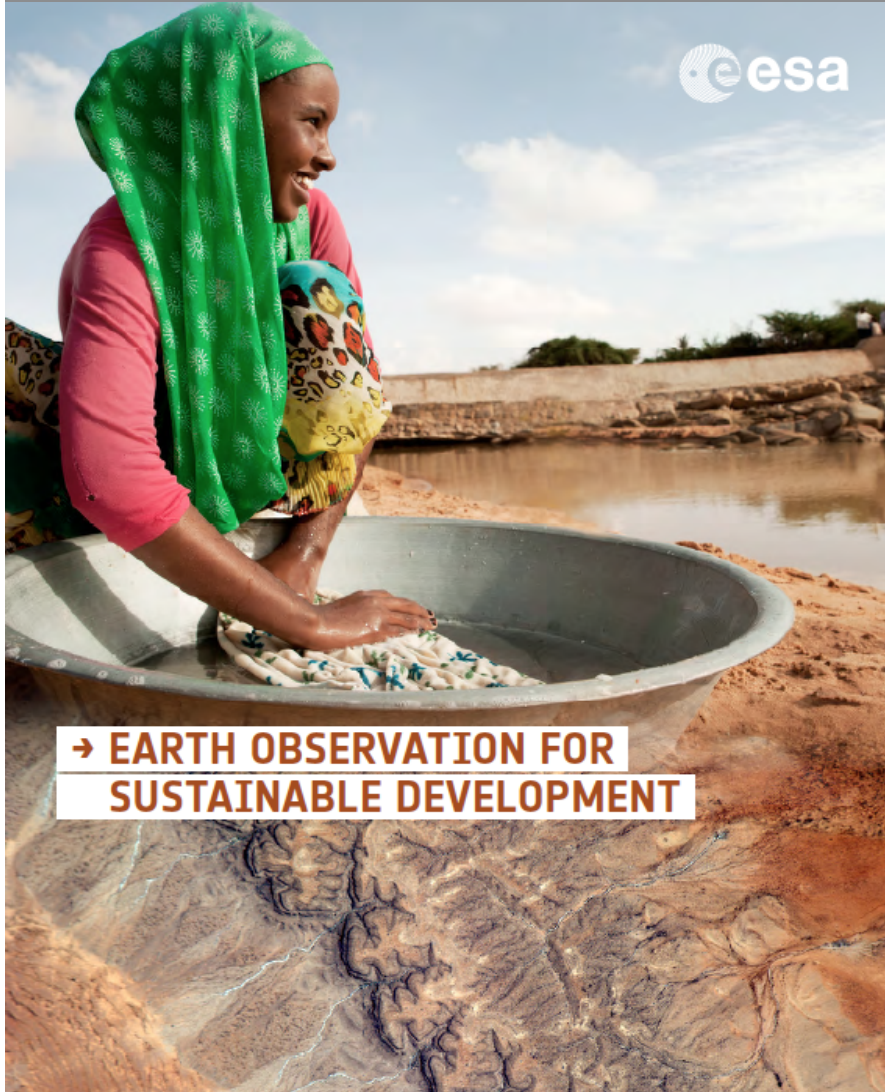
- Initial set of ESA-financed projects (total cost of 2.7 M€) have generated **directly** EO procurements by mainly GEF, World Bank & IFAD for additional activities:
 - **7 M \$US** (approved & allocated)
(forest management, urban extent, land degradation, smallholder agriculture)
 - **10-14 M \$US** (in planning)
(Great Green Wall Sahel & W. Africa, sustainable cities, food security, climate resilience landscape assessment W. Africa)
- In addition, frequent examples recent (2015) of use of EO in in 17-20 IFI projects, occurring **independently** of ESA demonstration activities.
- Longer-term '**What-If ?**' scenario for **systematic use** of EO in of **ALL** IFI projects leads to ROM figures for annual procurement of EO-based information as (2014 projects pipeline WB, ADB, IADB, AfDB):
 - **40-50 M€/yr** for projects preparation (0.1%)
 - **140-280 M€/yr** for projects implementation (1-2%)
- Spin-off **commercial procurement** from clients in the developing countries (both government and private sector), as a result of the business networking, presence and contacts made (**EO Asian Market only**):
 - **450 M\$** (2012), -> **1,500 M\$** 2022
 - European share was **45 M€** (2012)
 - Realistic to grow to **100 M€** ?

Geographic distribution of 'What If ?' scenario (i.e. EO in ALL IFI projects; WB, ADB, IADB, AfDB)

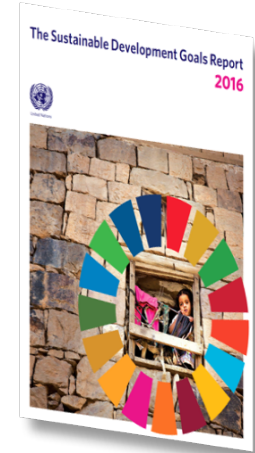


Longer-Term Vision : Transfer EO into ODA

(next ~ 8 years)



- **Phase 1** (25 M€, 3 years, in EOEP-5) : **Consolidate Requirements, Engage Stakeholders** (IFIs & Client States) via regional demonstrations of EO for **10** specific thematic areas
- **Phase 2** (65 M€, 5 years, EW element, C-MIN19) : **Mainstream & Transfer EO** into operational working processes & financing of ODA as 'best-practice' source of environmental information in Environmental Safeguards Systems (ESS) and Monitoring & Evaluation methodologies, SDGs of highly relevant.



Phase 1 : Consolidation of Requirements

Implementation : Activities



- **Phased approach;** Set-up phase (1st year) followed by Large-scale regional demonstrations (next 2 years),
- **Phase A : Strategic Planning & Stakeholder Engagement**
 - Engage IFI's and key stakeholders in IFI client states,
 - Define mechanisms for sustainable transfer of EO and define common actions to address issues across the project life-cycle,
 - Elaborate and prepare the EO demonstrations required (European data access, service specifications, support tools, capacity-building).
- **Phase B : Service Demonstration & Transfer Preparation**
 - Develop EO service clusters, and execute/scale-up EO service demonstrations,
 - Connect to existing international networks and development support initiatives,
 - Implement cooperative training and capacity building, both within IFI (for project preparation) and IFI Client countries (project implementation); priorities : SE Asia, LAC, Africa,
 - Prepare the sustainable transfer of EO services into routine working practices of large scale ODA programmes and projects.

EOEP-5 Block 4: *EO for Sustainable Development*



- **10 Large-Scale Activities** in remaining high-priority thematic domains to consolidate Requirements & Engage Stakeholders (IFIs & Client States) via regional demonstrations of EO, (each contract 2 M€, 3 years)
 - **2016** (started) : *Agriculture, Urban, Water Resources*
 - **2017** (ITT June) : *Marine Resources & Coastal Environment, Disaster Risk Mitigation & Reduction, Fragile & Conflict States, Climate Resilience & Proofing.*
 - **2018** (ITT June) : *Energy & Extractives, Forest Management, Ecosystems Services,*
- **EO for SDGs** for in-depth review of the SDG Global Indicator Framework, assess potential use of EO in SDG targets, showcase EO for a few of SDG Indicators country-level demonstration in partnership with the National Statistical Office (1 contract, 400 K€, Q2)
- **EO 'Walk-in Clinic'** for rapid-response, small-scale exploratory uses of EO information in Bank projects/activities (1 contract 2 M€, 3 years, ITT 2017), pre-qualified EO information suppliers, 2-3 competing consortia for EO service provision (40 K€ Euro max units).
- **EO for Environmental Safeguards policies**, Monitoring & Evaluation Methodologies, Environmental Impact Assessments (1 contract, 500 K€, 1.5 years, ITT Q1 2018).



→ EARTH OBSERVATION FOR SUSTAINABLE DEVELOPMENT
A EUROPEAN SPACE AGENCY INITIATIVE

AGRICULTURE AND RURAL DEVELOPMENT
 Large-scale exploitation of satellite data in support of international development

E04SD AGRICULTURE AND RURAL DEVELOPMENT

Main Partners

- International Fund for Agricultural Development (IFAD)
- World Bank (WB)
- International Finance Corporation (IFC)
- Inter-American Development Bank (IADB)
- Asian Development Bank (ADB)

Main Thematic Components and EO-Based Information

- **Large-scale crop area and type estimate** (ie. crop cover mapping and status assessment)
- **Irrigation and irrigation systems management** (ie. energy balance, water productivity and water stress)
- **Agriculture productivity assessment** (ie. yield estimation, ground water, precipitation monitoring)
- **Rural infrastructure investments planning and monitoring** (ie. transport networks mapping)
- **Land Degradation Assessment** (ie. land use, rainfall, soil moisture, precipitation, fAPAR, NDVI indicators)
- **Ecosystem services in agriculture sector** (ie. water quality assessment, nitrogen content, land surface properties)
- **Environmental Impact Assessment** (ie. landscape level classification and change mapping including fragmentation, and agriculture commodities production impact on deforestation)

Preliminary List of Candidate Regions/Countries

- **Africa**
 - East and Southern Africa (ie. Kenya, Tanzania, Uganda, Ethiopia)
 - Sahel and Sahara Belt (ie. Senegal, Mali, Burkina Faso)
 - West Africa (ie. Ghana)
- **Latin America**
 - Southern Cone Countries (ie. Uruguay, Paraguay, Northern Provinces of Argentina)
 - Andes and Altiplano (ie. Bolivia, Peru)
- **Asia**
 - Southeast Asia (ie. Bangladesh, Cambodia, Vietnam)

Main Development Programs and Initiatives

- IFAD's Adaptation for Smallholder Agriculture Programme (ASAP)
- Great Green Wall Initiative (GGWI) and the Sahel and West Africa Program (SAWAP)
- Terrafrica Program & the Comprehensive African Agricultural Development Programme (CAADP)
- Global Agriculture and Food Security Program (GASFP)
- GEF Programs on Food Security and Sustainable Forest Management
- Other regional and country-level programs to be decided in Phase I

→ EARTH OBSERVATION FOR SUSTAINABLE DEVELOPMENT
A EUROPEAN SPACE AGENCY INITIATIVE

URBAN DEVELOPMENT
 Large-scale exploitation of satellite data in support of international development

E04SD URBAN DEVELOPMENT

Main Partners

- World Bank (WB)
- Asian Development Bank (ADB)
- Inter-American Development Bank (IADB)

Main Thematic Components and EO-Based Information

Primary products

- Urban extent
- Urban and peri-urban land use/land cover
- Building footprints, available right-of-way, façade-to-façade space, etc.
- Building inventories (residential, industrial, commercial, public, etc.)
- Transport infrastructure inventories
- Waste site inventories (illicit/legal)
- Inventories of other important man-made features, evident property boundaries, etc.
- Extent of informal settlements/slums
- Type of informal settlements/slums
- Ecosystem status of peri-urban areas
- Inventories of urban green areas (related to surface imperviousness/soil sealing)
- Population distribution and density (either disaggregated census or building block estimates)

Secondary products

- Past and present air quality: tropospheric NO₂, SO₂, O₃
- Past and present air quality and the effects of long-range transport of smoke, dust and sand: optical depth (aerosol thickness) for PM₁₀, PM₅ and/or PM_{2.5}
- Past and present urban thermography (Urban Heat Islands and related urban public health effects)
- Elevation products, building heights, 3D city models
- Flood history, flood risk, and associated infrastructure exposure
- Inventories of landslides, landslide/geotechnical risk, and associated infrastructure exposure
- Past and present urban terrain/infrastructure motion (displacement) due to water extraction, mining, etc., and associated infrastructure exposure.

The activity will focus on the primary products in terms of coverage and effort (indicatively 80%). The secondary products, can be offered when specific cases require such data, or as general awareness-raising demonstrators with limited coverage. The provision of well-established, off-the-shelf (non-ESA) commercial products (e.g. elevation data) as standalone products will be avoided. Most flood and terrain-motion services have high operational maturity and are planned to form the basis of a dedicated E04SD subproject on Risk Management. Efforts will be made to assist the users with higher-level analytical products using innovative geostatistical methods, addressing (especially for the primary products) e.g fragmentation, connectivity and access, and environmental impact.

Preliminary List of Candidate Urban Areas

- At least 40 cities
- Emphasis on low-capacity environments (low- and lower-middle-income developing countries)
- Selected megacities and their hinterlands
- Secondary (emerging) cities, generally between approx. 300,000 and 3 million in population, smaller in smaller countries

Main Development Programs and Initiatives

- World Bank Global Urban Growth Data Initiative
- World Bank Resilient Cities Program
- World Bank Low-Carbon, Livable Cities Initiative
- ADB Cities Development Initiative for Asia
- ADB Urban Financing Partnership Facility
- IADB Emerging and Sustainable Cities Initiative (ESCI)
- GEF Sustainable Cities Integrated Approach Pilot: Global Platform for Sustainable Cities (GPS-C)
- Other regional and country-level programs to be decided in Phase I

→ EARTH OBSERVATION FOR SUSTAINABLE DEVELOPMENT
A EUROPEAN SPACE AGENCY INITIATIVE

WATER RESOURCES MANAGEMENT
 Large-scale exploitation of satellite data in support of international development

E04SD WATER RESOURCES MANAGEMENT

Main Partners

- World Bank (WB)
- Asian Development Bank (ADB)
- Inter-American Development Bank (IADB)
- International Fund for Agricultural Development (IFAD)

Main Thematic Components and EO-Based Information

- **River basin characterization and change monitoring** (e.g. hydrological network mapping, long-term climate change analysis)
- **Water supply and sanitation** (e.g. monitoring of water quality, extent and level of lakes and rivers to support management for agricultural, industrial and urban water use)
- **Hydrological management** (e.g. modeling and forecasts of runoff, river discharge and groundwater abstraction)
- **Water productivity** (e.g. mapping of biomass production, evapotranspiration and crop type)
- **Risk management of natural hydrological hazards** (e.g. mapping and forecasting of flooding, drought, landslides)
- **Industrial activity assessment** (e.g. monitoring of freshwater fisheries, aquaculture, hydropower and mining)
- **Environmental Impact Assessment** (e.g. design of dams, irrigation impact on wetlands)

Preliminary List of Candidate Regions/Countries

- **Africa**
 - East and Southern Africa (e.g. Zambezi basin, Uganda, Kenya, Malawi)
 - West and Northern Africa (e.g. Niger basin, Lake Chad basin)
- **Latin America**
 - Andes and Altiplano (e.g. Lake Titicaca basin, Bolivia, Peru)
- **Asia**
 - Southeast Asia (e.g. Myanmar, Bangladesh, Lower Mekong region)

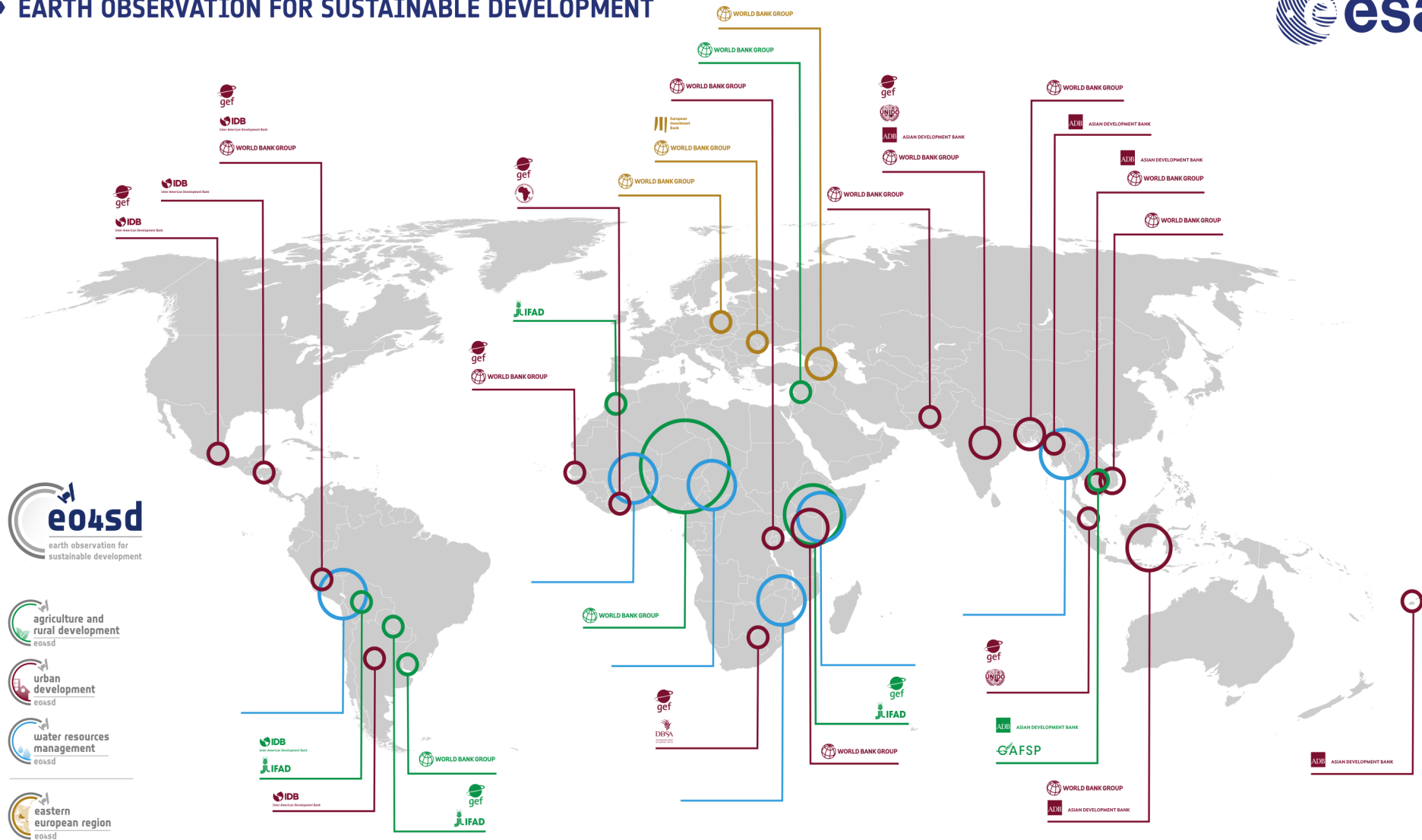
Main Development Programs and Initiatives

- Water Partnership Program (WPPP)
- Cooperation in International Waters in Africa (CIWA)
- Pilot Program for Climate Resilience (PPCR)
- Cooperation Fund for the Water Sector (CFWS)
- GEF Programs on sustainable management of transboundary water systems
- Sahel and West Africa Programme (SAWAP)
- Other regional and country-level programs to be decided in Phase I

Agriculture, Urban, Water Regions / Countries



→ EARTH OBSERVATION FOR SUSTAINABLE DEVELOPMENT



- Official Development Assistance (ODA) is a sector of huge (and long-term) economic activity with increasing attention on **environmental sustainability (green growth) and climate change (resilience, proofing)** of the (mainly large infrastructure) investment projects to promote economic growth in developing countries,
 - Earth Observation can deliver **key environmental information that supports** the definition, planning, implementation, monitoring and assessment of many (not all) major projects and programmes.
 - Europe has **world-leading capabilities in Earth Observation** (both ESA and national EO missions) and a highly skilled and experienced EO information services industry. WB and ADB recently signed long-term, strategic cooperation agreements with ESA.
- > Significant opportunity to take EO to a new, highly relevant user community; CEOS and GEO can be key.**

→ COOPERATION WITH INTERNATIONAL FINANCING INSTITUTIONS



Earth Observation for a Transforming Asia Pacific
 A portfolio of twelve EO projects supporting Asian Development Bank activities 2014–2016
<http://esamultimedia.esa.int/multimedia/publications/EOTAP/>



**Earth Observation for Sustainable Development –
 ESA-World Bank Partnership Report September 2016**
 Report describing ESA's newest batch of EO support projects in partnership with the World Bank 2013–2015.
http://esamultimedia.esa.int/multimedia/publications/ESA_WB_Partnership_Report_2016/



**Earth Observation Support for the International Fund For Agricultural Development –
 Final Report August 2014**
 Report describing an EO support projects in partnership with UN-IFAD.
<http://esamultimedia.esa.int/multimedia/publications/IFAD/>



**Earth Observation for Sustainable Development –
 ESA-World Bank Partnership Report June 2013**
 Summary report of the first batch of projects in cooperation with the World Bank.
http://esamultimedia.esa.int/multimedia/publications/ESA_WB_Partnership_Report_2013_complete/



**Earth Observation Information Services for European Investment Bank Projects –
 Progress Report September 2012**
 Summary report of projects in cooperation with the European Investment Bank.
http://www.vae.esa.int/files/EOeuropa_progressReport.pdf



Thank You !

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For further
 information.