Space for the Blue Economy

ESA and WB teaming up on the use of EO for marine & coastal resources management

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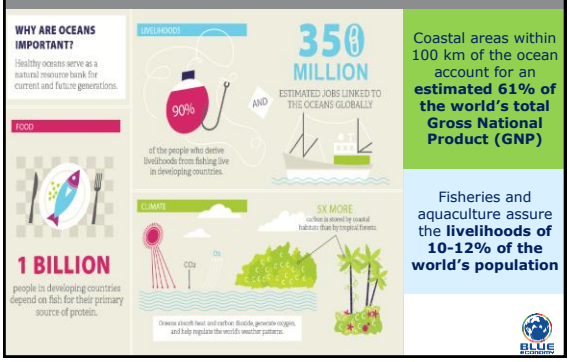
Directorate of Earth Observation Programmes
Sustainable Initiatives Office
European Space Agency ESA/ESRIN
Senior Geospatial Specialist | ESA Representative at the World Bank

GEO Week 2017 – Blue Planet side event | Washington DC, 24 October 2017
EO in support of SDG implementation and Monitoring in SIS

www.esa.int

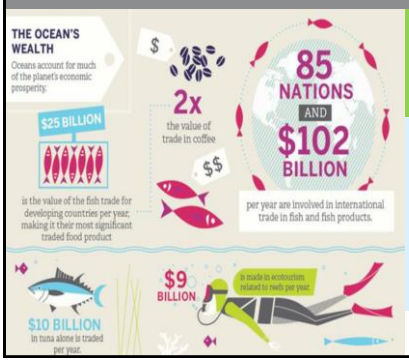
The ocean in a development context



Coastal areas within 100 km of the ocean account for an **estimated 61% of the world's total Gross National Product (GNP)**

Fisheries and aquaculture assure the **livelihoods of 10-12% of the world's population**

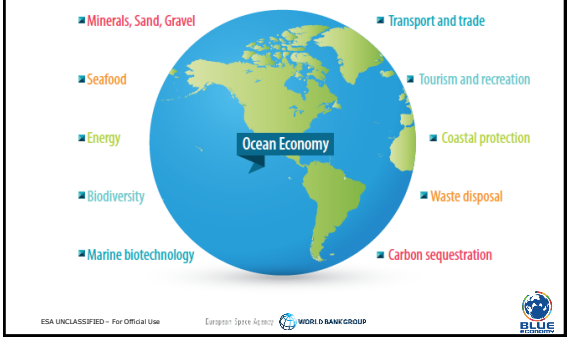
The ocean in a development context



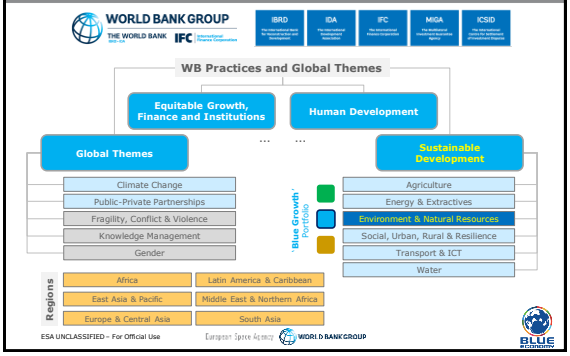
Our **Global Ocean's Wealth is assessed at US$ 1.5 Trillion**, according to OECD

Caribbean Sea:
- Fisheries sector generates US$ 1.2b annually in export earnings
- Tourism: ~ US$ 47b
- Sea-based oil and gas: ~ US$ 40b

The WB and the Blue Economy



The WB and the Blue Economy



The WB and the Blue Economy

WORLD BANK GROUP
THE WORLD BANK | IFC

IBRD | IDA | IFC | MIGA | ICSID

WB Practices and Global Themes

Equitable Growth, Finance and Institutions | Human Development

Global Themes | Sustainable Development

'Blue Growth' Portfolio

- Agriculture
- Energy & Extractives
- Environment & Natural Resources
- Social, Urban, Rural & Resilience
- Transport & ICT
- Water

US$ 6.4b

- $1b financing for sustainable fisheries and aquaculture, and for efforts to conserve and enhance coastal and ocean habitats
- $5.4b for coastal infrastructure such as waste treatment, watershed management and other activities that help reduce coastal pollution

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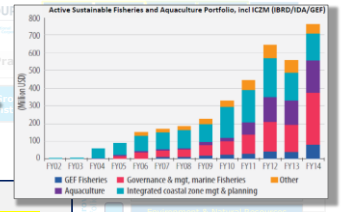
The WB and the Blue Economy

Significant **growth** trend in the World Bank's **investments** in the Ocean's **Natural Capital**



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The WB and the Blue Economy

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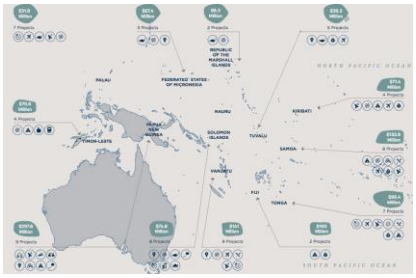
The WB and the Blue Economy

Pacific Islands **Oceanscape** Program



- Fisheries Management
- Climate Resilience
- Protection of critical fisheries habitats
- Regional monitoring & assessment

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The WB and the Blue Economy

Caribbean Blue Economy Development

"Investing in ocean health is synonymous with generating ocean wealth"
(World Bank & Nature Conservancy, 2017)

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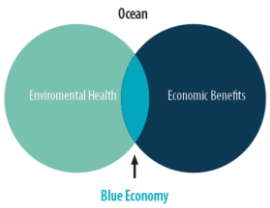
The WB and the Blue Economy

Two parallel trends in the global ocean



Blue Economy: A *Sustainable Ocean Economy* where economic activity is in balance with ocean health

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THE ESA EARTH OBSERVATION PROGRAMME

The Sentinel Family

- S1A/B
- S2A/B
- S3A/B
- S4A/B
- S5P
- S5A/B/C
- S6)-CS A/B

Sentinel-3 scanning Earth's color

Meteorological Missions

Copernicus Sentinel Missions

Earth Explorer Missions

Missions With Partners

Long-term (decadal) continuous, consistent data

The European Copernicus Initiative

Securing satellite data access on the long term

Sentinel 1 – SAR imaging
All weather, day/night applications, interferometry
2014 / 2016

Sentinel 2 – Multi-spectral imaging
Land applications: urban, forest, agriculture,...
Continuity of Landsat, SPOT
2015 / 2017

Sentinel 3 – Ocean and global land monitoring
Wide-swath ocean color, vegetation, sea/land surface temperature, altimetry
2016 / 2018

Sentinel 4 – GEO Atmospheric Chemistry
Atmospheric composition monitoring, trans-boundary pollution
2020

Sentinel 5 & Precursor – LEO Atmospheric Chemistry
Atmospheric composition monitoring (air quality, ozone and surface UV, climate)
2017 / 2020

Sentinel 6 Jason-CS – Altimetry Mission
High precision measurements of global sea-level (continuation of Jason ocean topography missions)
2020

Copernicus

Long term EO data to better monitor our Planet

Free and open data policy

* Joint EU/ESA Data Policy Principles adopted by ESA Council and by EU Parliament and Council (Nov 2013)

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BLUE ECONOMY

New Commercial Constellations

Complementing European Observing Capabilities

cosine | hyperscout

EARTH

ICEYE

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BLUE ECONOMY

Open access makes a difference

Landsat Scenes Downloaded from USGS EROS Center (Cumulative)

25,000,000
20,000,000
15,000,000
10,000,000
5,000,000
0
2008 2009 2010 2011 2012 2013 2014

Open access is not the ultimate goal:

Open Data
≠
Free Info

"Making free data cheaper"
Jed Sundwall

Open Data Policy:
Before: 53 scenes/day
After: 5,700 scenes/day

Annual Economic Benefit (2011)
USA $1.80 B
Global total $2.19 B

Credit: USGS, NASA, GEO Loomis et al. (2015) PE&RS

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Towards efficient data exploitation

tep
thematic exploitation platform

hydrology tep
urban tep
coastal tep
polar tep
geohazards tep
forestry tep
food security tep

"Bringing the people to the data"

- Simplify the extraction of information from EO data
- Enable large scale exploitation of EO data
- Stimulate innovation with EO data
- Maximize impact of European EO assets

Exploitation platforms
EO software | ICT resources | EO data In-situ data
Community
Collaboration

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Promoting geo-data literacy and use in international development

- **65 small-scale demonstrations** of EO services in support of IFI projects since 2008

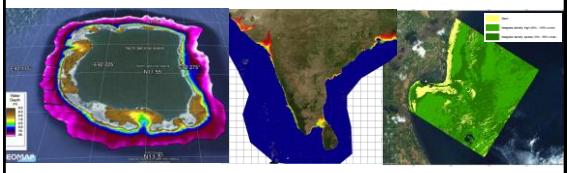
ADB | IFAD | European Bank for Reconstruction and Development | WORLD BANK | European Investment Bank | IDB | IFC International Finance Corporation

Satellite Data Informs Development

European Space Agency | WORLD BANK GROUP

BLUE ECONOMY

India Coastal Zone Management
Benthic habitat status, sediment transport



Project objective: Implement measures to protect Eastern Indian coastal areas and implement sustainable coastal management practices

EO contribution: Unique capability to map status of natural coastal protection resources and characterize changing coastal erosion/coastal flooding risk

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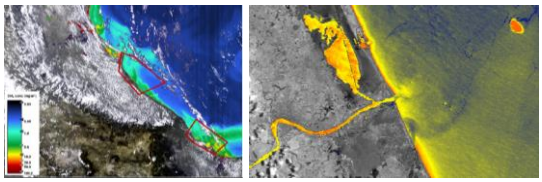
Mexican Coastal Watersheds



Project objective: Preserve the ecosystems in priority coastal areas of global importance in terms of biodiversity, and to protect them from the effects of climate change

EO contribution: Unique capability to provide homogeneous integrated monitoring and assessment from drainage network to coastal zone

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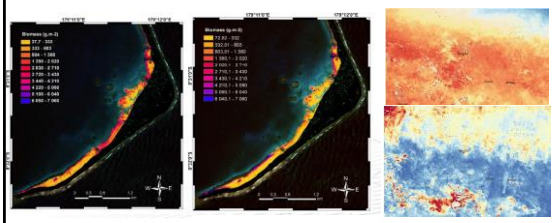
Analyzing coral degradation in Tuvalu



Project objective: Support Tuvalu in assessing pressures and drivers on coral reef degradation

EO contribution: Unique capability to combine oceanographic and land cover data to understand coral degradation dynamics

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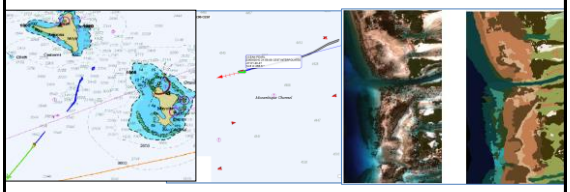
Western Indian Ocean Marine Highway



Project objective: Improve safety of navigation for commercial shipping south of Madagascar and minimize associated environmental risks

EO contribution: Unique and effective demonstration of oil slick detection and polluter identification capability, cost effective monitoring of coral reef degradation status

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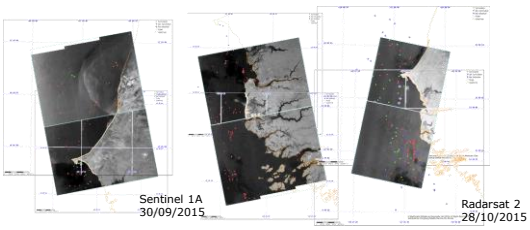
West Africa Regional Fisheries Program



Project objective: Improve management of West African EEZs and reduce levels of IUU fishing

EO contribution: Cost effective surveillance tool to detect vessels engaged in fishing and integrate with transponder and license data; additional capability to detect pollution

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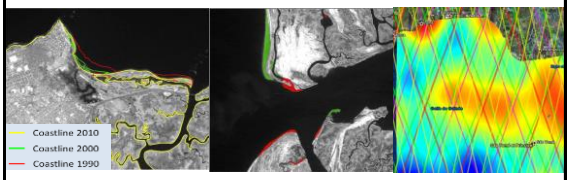
West African coastal erosion



Project objective: Conduct systematic assessment of status and rate of change of coastal erosion in West Africa to support climate resilience planning

EO contribution: Unique opportunity to combine oceanographic trends with land use change and coastline change information to understand pressures and coastal erosion dynamics

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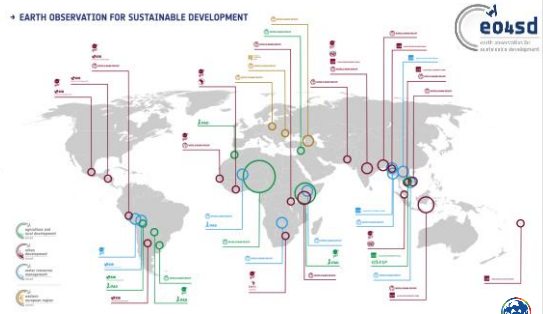
Promoting geo-data literacy and use in international development

- **Phase 1** (3 years)**:** **Consolidate Requirements**, engage stakeholders (IFIs & Client States) via regional demonstrations of EO
- **Phase 2** (5 years)**:** **Mainstream & transfer EO** into operational working processes & financing of ODA as 'best-practice' source of geo-information
- **Thematic priority areas:** Urban, Agriculture, Water Resources, Disaster Risk Reduction, Fragile States, Climate Resilience, **Marine/Coastal**, Forest, Ecosystem Services, Energy

urban development eo4sd | agriculture and rural development eo4sd | water resources management eo4sd

Promoting geo-data literacy and use in international development



Earth Observation: A Necessity

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Input from G. Campbell and P. Patil to this presentation is acknowledged and much appreciated