





European Space Agency: Activities



ESA is one of the few space agencies in the world to combine responsibility in nearly all areas of space activity.









































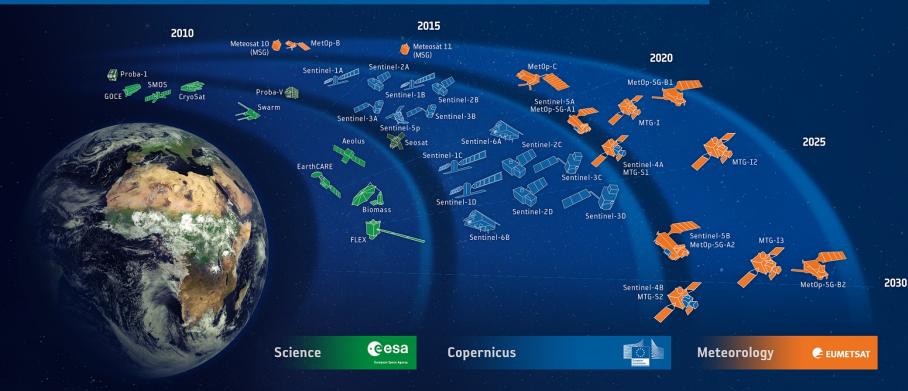








ESA-DEVELOPED EARTH OBSERVATION MISSIONS



A Strong European EO Service Portfolio

esa

- Services with formal specifications, standards, validation
- Developed in collaboration and agreement with over 400 national user organisations
- More than 450 suppliers (typically small companies), with 7800 highly skilled staff





Data





























Earth Observation and the Global Agenda



Sustainable Development

UN SDGs



Supporting Smart Decision-Making

Climate Action

Paris Agreement



Monitoring & Understanding

Disaster Risk Reduction

Sendai Framework



Providing Key Infrastructure



























Earth Observation and the SDGs



SDGs with major opportunities for EO data

Earth Observation potential contribution to the SDG Targets and Indicators



Analysis performed by the GEO EO4SDGs initiative











































ESA Collaboration with IFIs in EO



Since 2008, 65 small-scale demonstrations of EObased environmental information in support of multilateral bank development projects Responding to specific geospatial information needs MoUs and secondments in place with the World Bank and Asian Development Bank Reports available at www.vae.esa.int → Documents WORLD BANK GROUP

A Dedicated Programme of Work: EO4SD



- EO4SD Earth Observation for Sustainable Development An ESA initiative for wide-scale exploitation of satellite data in support of international development
- Engaging various IFIs and their client states, and flagship global/regional programmes
- Key questions:
 - What EO-based information is most needed?
 - How can it be used in international development activities and working practices?
 - What benefits does this information deliver to stakeholders (IFIs and their client states)?
 - Do the benefits justify the costs?
 - How can EO-based information be established on a long-term, sustainable basis?
- Currently running (2016–2019):







More thematic areas about to start or in preparation.



http://eo4sd.esa.int





















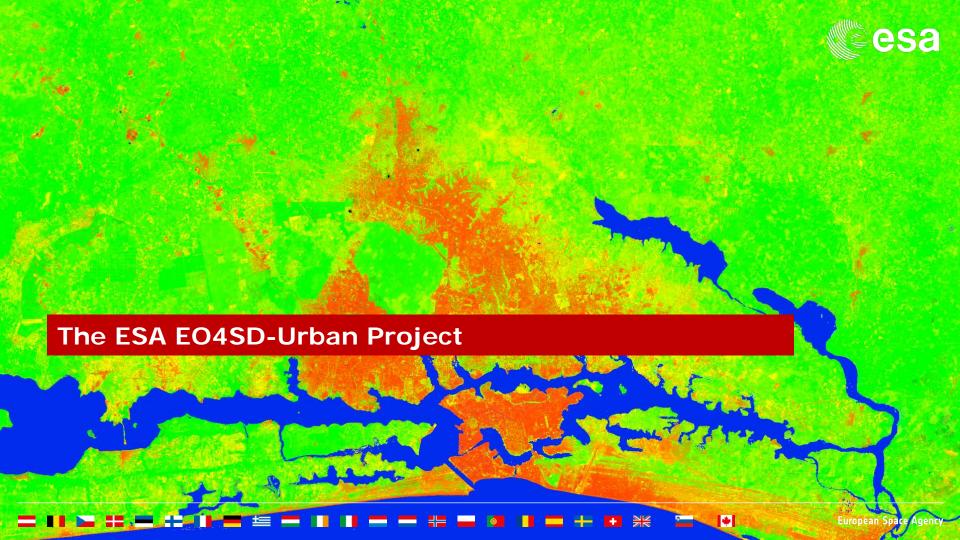






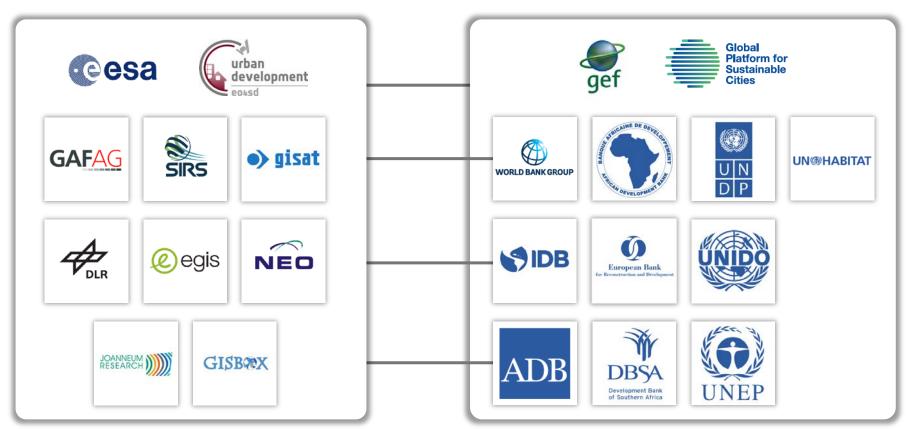






EO4SD-Urban



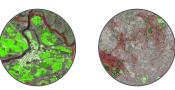


EO Products for Urban Development



Green Areas/Networks

Extent, Imperviousness and Change









Building Footprint



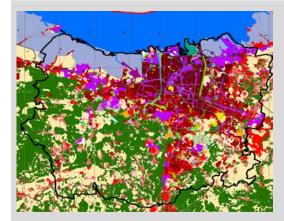
Population Density



Waste Sites



Baseline Products Urban and Peri-Urban Land Use / Land Cover











Transport Infrastructure











Informal

Landslide Risk



Terrain Motion

























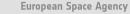






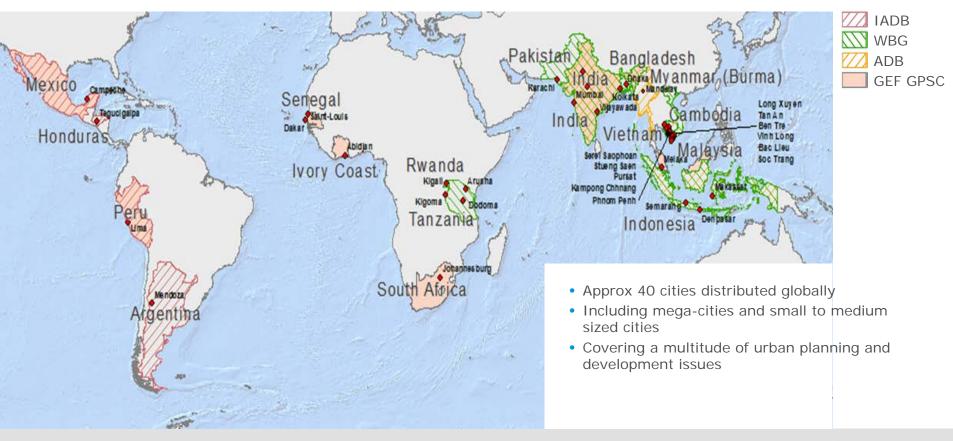






EO4SD-Urban: Geographic Spread





EO4SD-Urban: Phase 1 (2016-2017)



Achievements:

- all cities received products
- Eight GPSC cities received urban extent and imperviousness products for 2015
 - · meanwhile, these are ready for all **GPSC** cities!
 - DLR now working on an urban extent temporal evolution product!

	X	Phase 1
Γ	Х	Phase 2

^{*} as GEF implementing agency

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ADB	Future Cities Programme	Myanmar	Mandalay	×		- 17		x	x	x	x	x	x	X	×	х	X	X										
ADB	Kolkata Environment Improvement	India	Kolkata	×	x	x	X	X.	×	x	x	×	x	x	×													
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Examples of Input Imagery



VHR example: WorldView-2

- 0.5 m resolution
- normally available a few times per year
- commercial



HR example: Sentinel-2

- 10 m resolution
- available every 5 days
- free and open



250 m 125

















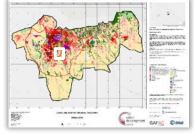




Example: Land Use/Land Cover 2010



Arusha, Tanzania











































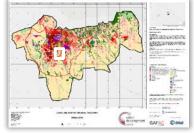




Example: Land Use/Land Cover 2015



Arusha, Tanzania





















1,5



















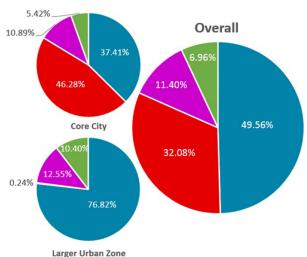




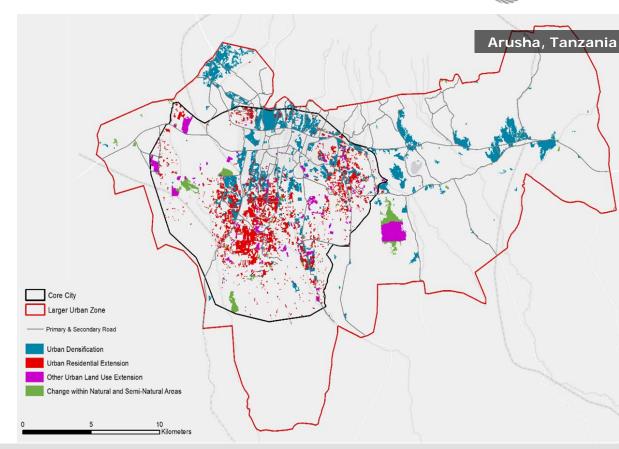


Example: Land Use/Land Cover Change 2010–2015





- Residential densification is more dominant in peri-urban zone
- Residential extension is more dominant in core urban zone





























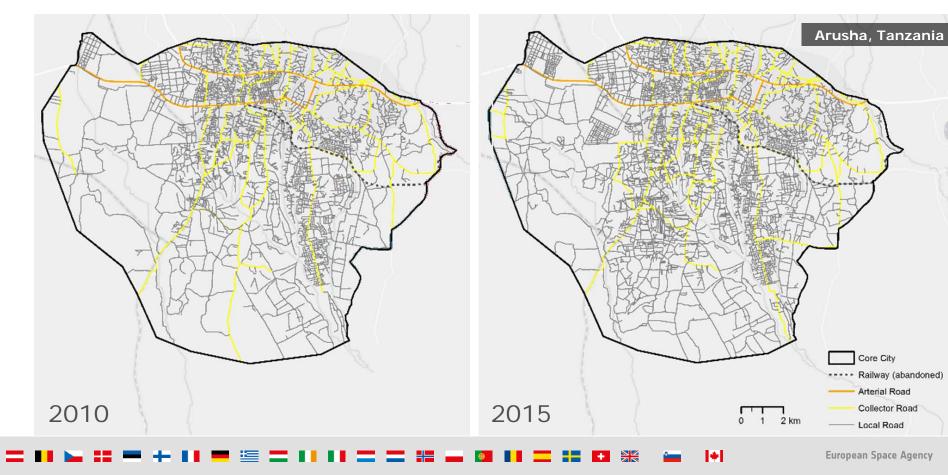






Example: Transport Network 2010–2015





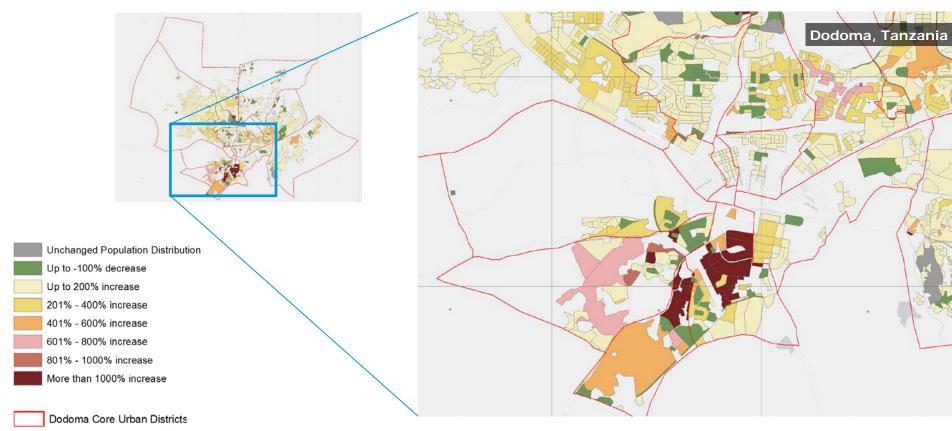
Example: Urban Green Areas 2010–2015





Example: Population Distribution 2010–2015





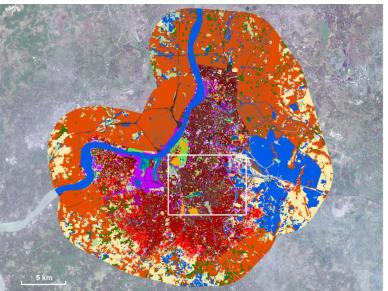
Example: Informal Settlements



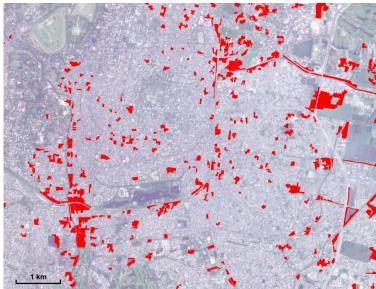
Kolkata, India

Land Use and Land Cover (February-March 2017), based on Pléiades (0.5 m resolution) in

the city centre and Sentinel-2 (10 m resolution) for periurban areas



Delineation of informal settlements





Artificial areas Urban / artificial areas

> ormal very high density residential (Sealing level > 80%) Formal high density residential (Sealing level: 50% - 80%) Formal low density residential (Sealing level: 10% - 50%) informal settlement (Sealing level > 80%) Village settlement (Sealing level < 10%) Commercial and industrial units Non-residential urban fabric Roads and associated land ailways and associated land

> Vacant land not obviously being prepared for construction

Other natural and semi-natural areas incl. Wetlands

Sports and leisure facilities



































Example: Flood Risk

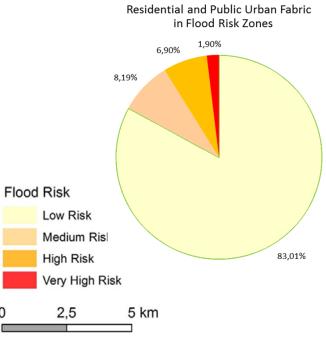
esa

Requires:

- precise Digital Terrain Model
- adequate EO archive data coverage

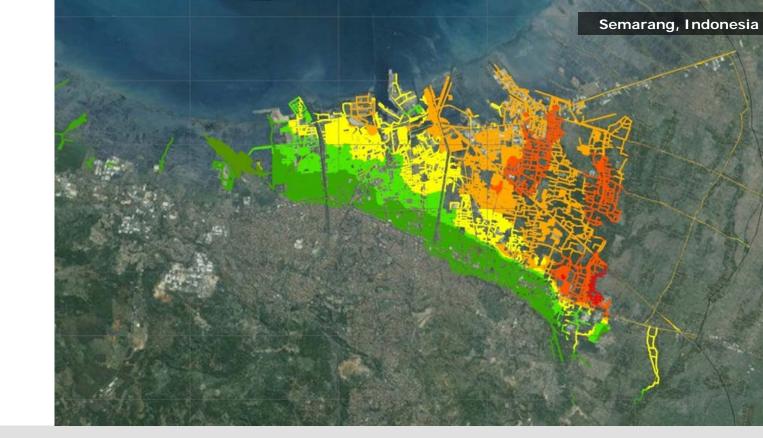


Semarang, Indonesia

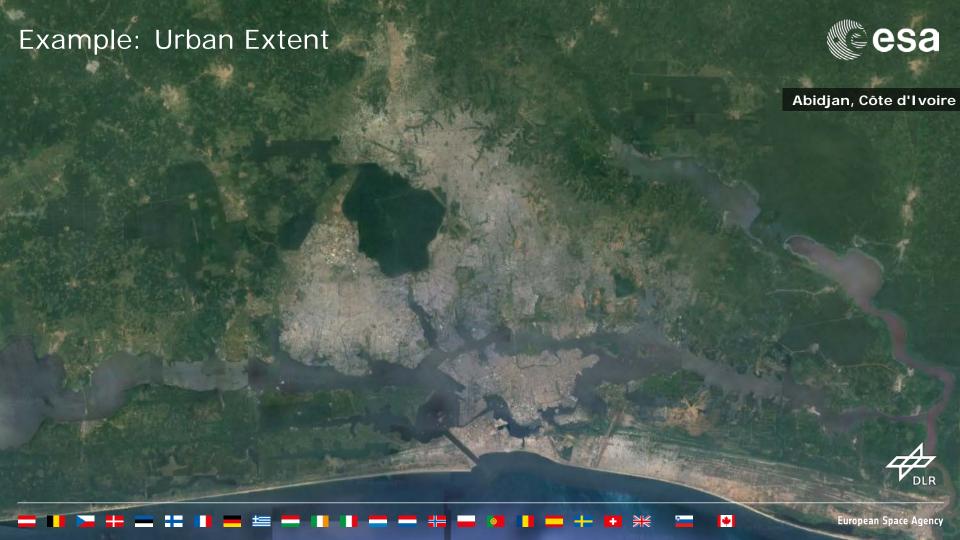


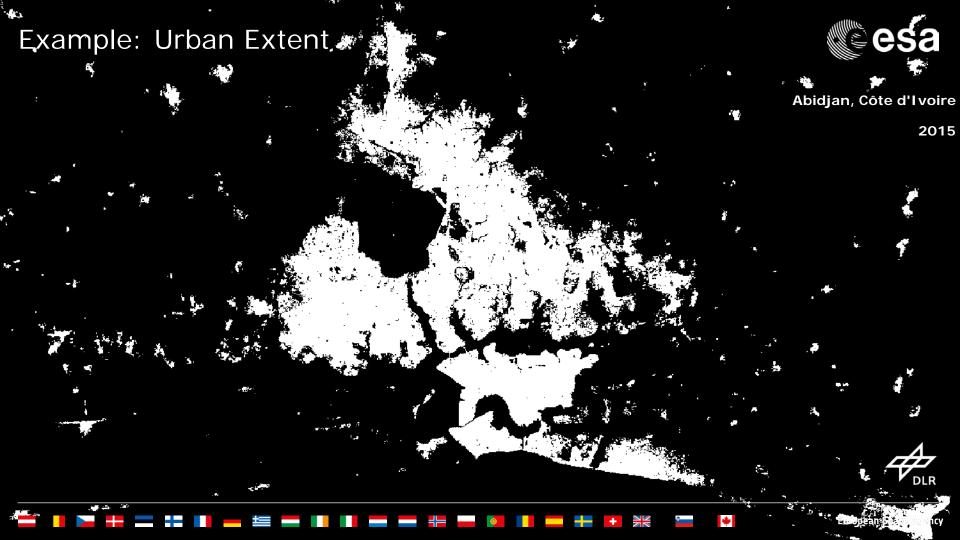
Example: Terrain and Infrastructure Motion





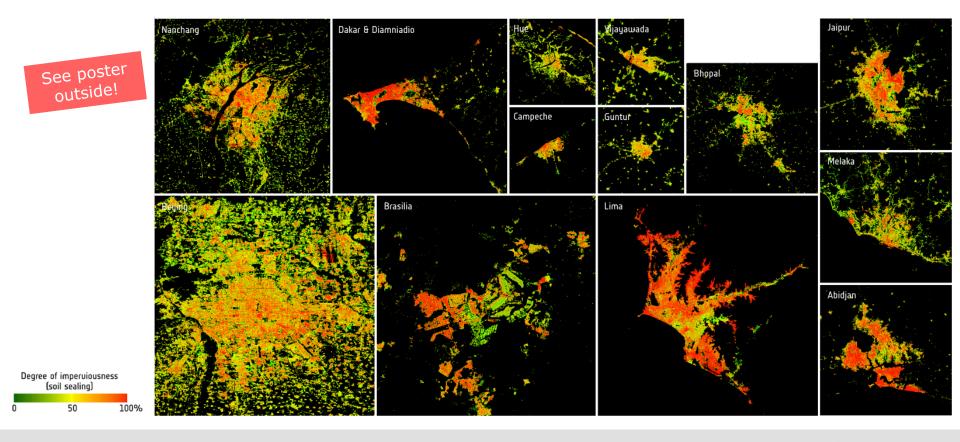






Example: Degree of Imperviousness



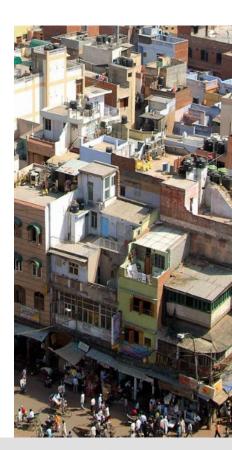


EO4SD-Urban: Value of the EO Products



Product generation is based on:

- Verified user requirements
- Harmonised and standardised state-of-the-art methodologies
- Comprehensive and transparent documentation
- Application of statistically sound accuracy assessment
- Stringent Quality Control to ensure:
 - transparency
 - repeatability
 - completeness
 - validity
- User feedback needed (and some already given) to improve the services
- Geospatial products can be used to monitor SDG 11 Indicators





















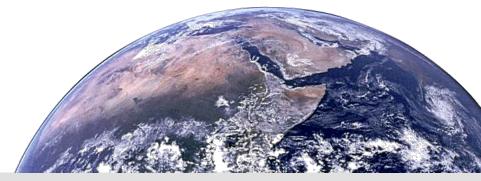




EO4SD-Urban: Outlook to Phase 2 (2018–2019)



- Processing of geo-spatial products for additional urban projects in the different geographical regions will continue
 - Stepping up the support to GPSC!
- Emphasis will be put on spatial analytics for urban planning
- Stakeholder feedback at the end of the project will provide the overall utility for urban planning
 - This should support mainstreaming EO into urban development programmes

















New Activity in 2018: EO Clinic



- ESA's present collaboration with the MDBs is of a longer-term and larger-scale character, responding to flagship activities, like GPSC
 - Ad-hoc requests in many, short-term and speculative requests for EO support coming from Banks and their client countries in many thematic areas (including urban)



- EO Clinic: new 24-month activity starting in Q4 2018 to:
 - fill the gap to address the above enquiries
 - raise interest in EO further across banks, with new bank projects with no or very little previous contact with satellite-based EO
- Through the EO Clinic, development projects will be able to get help with their geospatial information problems
 - ESA will fund small work orders with a pool of pre-qualified European EO service providers to investigate/demonstrate the use of EO towards solving the issue
 - Work orders will be small-scale and of exploratory nature, not replacing largerscale procurement of commercial EO services
- Regional development banks (e.g. AfDB, DBSA) and new GPSC cities welcome!























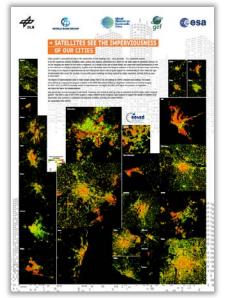




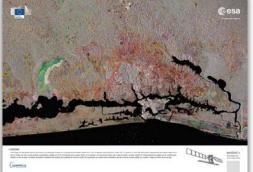


Our Special GPSC African Workshop Posters!

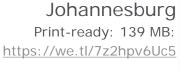




Imperviousness Print-ready resolution, 280 MB: https://we.tl/nFhT56QY9W Low resolution, 5 MB: https://we.tl/jJcrcW7V3w



Abidjan Print-ready: 195 MB: https://we.tl/nQUkPotFF6







Dakar Print-ready: 244 MB: https://we.tl/nUbwThMXJT

All three at low resolution, 20 MB: https://we.tl/8mlabNIZbd

































