

UN SDGs and EO satellite imagery

AquaWatch

CSIRO Earth Observation Future Science Platform 8th June 2016

LAND AND WATER BUSINESS UNIT www.csiro.au



Earth **Observation & Geo-spatial** information resources for SDG monitoring (GEO matrix)

Source: GEO "Supporting Official Statistics in Monitoring the SDGs", March 2016

SU DE		Population distribution	Cities and infrastructure mapping	Elevation and topography	Land cover and use mapping	Oceanographic observations	Hydrological and water quality observations	Atmospheric and air quality monitoring	Biodiversity and ecosystem observations	Agricultural Monitoring	Hazards, disasters and environmental impact monitoring
1	No poverty										
2	Zero hunger										
3	Good health and well-being										
4	Quality education										
5	Gender equality										
6	Clean water and sanitation										
7	Afordable 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										



s ir BE	Tource: GEO "Supporting Official Statistics In Monitoring the SDGs", March 2016	Population distribution	Cities and infrastructure mapping	Elevation and topography	Land cover and use mapping	Oceanographic observations	Hydrological and water quality observations	Atmospheric and air quality monitoring	Biodiversity and ecosystem observations	Agricultural Monitoring	Hazards, disasters and
1	No poverty										
2	Zero hunger										
3	Good health and well-being										
4	Quality education										
5	Gender equality										
6	Clean water and sanitation										
7	Afordable and clean energy										
8	Decent work and economic growth										

How many goals to be monitored with EO satellite data use ?



Australia identifies at least 9 goals where EARTH OBSERVATIONS could be <u>directly</u> used and relevant either to monitor the indicators to help measuring the goals' progress, or to help achieving the goals



Australian Bureau of Statistics is Co-Chair of the UN Global Working Group on Big Data for Official Statistics and Chair of the sub group on the Use of Satellite Imagery, Remote Sensing and Geospatial Data for Official Statistics

 CSIRO writing chapter for report to the UN Statistics Commission on the use of satellite earth observation for use in official statistics.









Multi-temporal Wetland Identification and Delineation products (Landsat 1975, 1990, and 2002) for exemplary sites between Izmir and Bodrum (upper part: region around Tahtali Dam; lower part: Bodrum airport area).

http://www.earthzine.org/wp-content/uploads/2011/12/Figure-3.jpg









GOAL 15 "Protect, restore, and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss."





TARGET 15.2

"By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally"

INDICATOR 15.2.2 Net permanent forest lost

Land cover (time series) to be monitored, such as the global initiative GFOI (to foster the sustained availability of observations for national forest monitoring systems)







Land cover map for Colombia using 2011 ± 2 years of MODIS NDVI and surface reflectance MOD13A1 data, filtered for lowquality observations and adding elevation (TS-F-C2-E)

http://www.mdpi.com/2072-4292/7/12/15833/htm



How to determine minimum EO data requirements ?

Guiding questions to decide whether or not EO satellite data can help monitor issues/SDGs indicators:

Justification	Do you need to use EO?
Suitability	Can EO provide the required data products?
Spatial resolution	What is the appropriate size of pixel?
Temporal frequency	How frequent do these EO need to be done?
Record length	How far back in time does your data record to go?
Reliability	Do you need guaranteed continuation of data supply into the future?
Accuracy:	What degree of accuracy is needed in the data product?
Maturity	Do you want to use only data products that common in use?
Complexity	What data management and analysis capacity is available?





DECISION TREE

Define the problem: context of the topic (or indicator) to be measured/monitored

Define the status of existing EO data/networks



QUESTIONS - Rationale

Which issues to be addressed? Policy and or regulatory drivers Who are the stakeholders and beneficiaries?

Metrics available?

Condition of the data networks?

Impediments of sharing, collating, archiving the data?

Any papers/case-studies already written?

Any monitoring/modelling?

Justification

Will complement ground-based monitoring networks or serve as the sole information source? Will it be used in conjunction with modelling?

Are the EO data streams suitable for long-term official statistics?

Would EO complement/replace traditional official statistics, or would it be a new methodology?

Suitability

What variables can EO provide?

Are data products readily available? Or will they be in future?

Spatial resolution: What is the appropriate pixel size?

Temporal frequency: How frequent do these observations need to be?

Record length: How far back in times does your data record need to go?

In-situ data requirements : How much in situ data are used in data product?

Reliability: What's the certainty of supply of that product across space and through time?

Accuracy: What's the uncertainty associated with the data estimates?

Maturity: How established the data product is?

Complexity: What is the level of complication involved in the process of converting the EO processed data into the data product

Updates on SDGs

(from IAEG-SDG: Informal briefing to the General Assembly on the global SDG indicator framework - 28th Jan 2016)

- Statistical Capacity building plan in discussion
 - Will become essential for national statistical systems
 - Should we be part of the process regarding "Big data" and satellite data?
- Indicators:
 - GLOBAL indicators are still in discussions (will be further formalized post March 2106)... However, member states will also develop indicators to complement global ones, to take into account national priorities/environment

From CEOS discussions: Should we start promoting EO satellite data / DataCube=Analysis Ready data projects to some countries (national statistics agencies willing to use EO satellite data to monitor specific and relevant indicators)? CEOS and GEO: yes!!

