GROUP ON EARTH OBSERVATIONS

UN-GGIM
UNITED NATIONS COMMITTEE OF EXPERTS ON GLOBAL GEOSPATIAL INFORMATION MANAGEMENT

## Geospatial Information and Earth Observations:

# Supporting Official Statistics in Monitoring the SDGs

SUSTAINABLE DEVELOPMENT GOALS

**In adopting the 2030 Agenda for Sustainable Development, world leaders agreed that a global indicator framework would be an essential method to measure, monitor and report progress on achieving the 17 transformational Sustainable Development Goals (SDGs) and 169 associated Targets. They also recognized the critical importance of "transparent and accountable scaling-up of appropriate public-private cooperation to exploit the contribution to be made by a wide range of data, including earth observation and geospatial information, while ensuring national ownership in supporting and tracking progress".**

To track progress towards these Goals and Targets, the global indicator framework will also need to capture the multifaceted and ambitious aspirations for the continued development of nations and societies. Effective reporting of progress toward these indicators will require the use of multiple types of data, both what we have in hand - traditional national accounts, household surveys and routine administrative data – and new sources of data outside the national statistical system, namely Earth observation and geospatial information, and Big Data, in general.

Integrating all of these data will, indeed, produce a quantum leap in how we monitor and track development and advance the well-being of our societies. Since Earth observation and geospatial information are often continuous in their spatial and temporal resolutions, their use in SDG monitoring will also prove essential in capturing the sustainability of developments underpinning the SDG framework. Earth observation and geospatial information, which include satellite, airborne, land- and marine-based data, as well as model outputs, will expand monitoring capabilities at local, national, regional and global levels, and across sectors.

Simultaneously, exploiting various data sources, including Earth observation and geospatial information, will significantly reduce the costs of monitoring the aspirations reflected in the goals and targets, and make SDG monitoring and reporting manageable and sustainable within the limited resources available to national governments. In addition, use of Earth observation and geospatial information to measure and monitor progress toward achieving the SDGs will provide developing countries and regions with increased capacity to acquire, analyze and utilize these data for other policy-making purposes.

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1 http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E

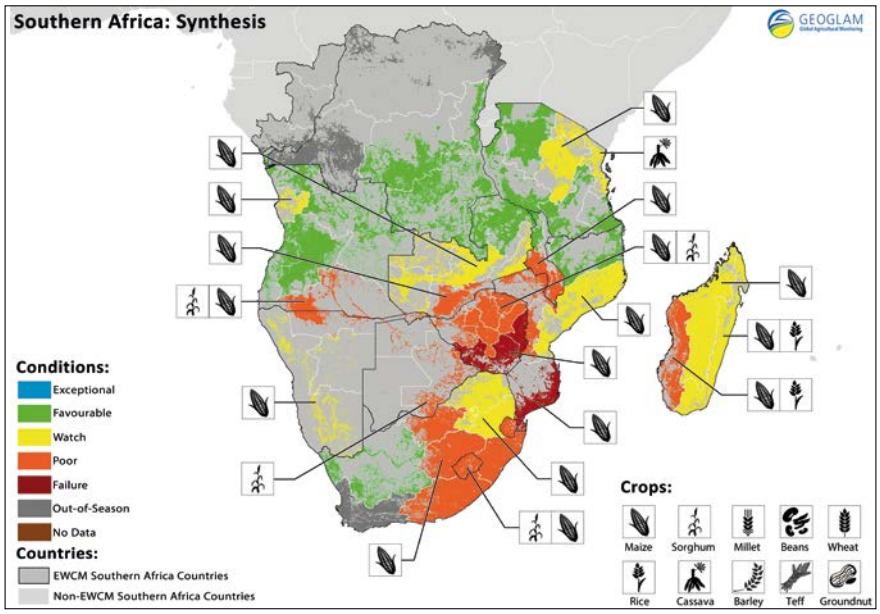
# SUSTAINABLE DEVELOPMENT STATISTICS INFORMED BY EARTH OBSERVATIONS AND GEOSPATIAL INFORMATION


**Target 2.c** Adopt measures to ensure the proper functioning of food commodity markets and their derivatives and facilitate timely access to market information, including on food reserves, in order to help limit extreme food price volatility.

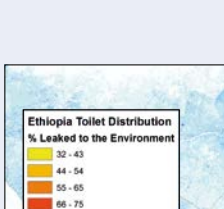
## MONITORING CROP CONDITIONS WITHIN COUNTRIES AT RISK OF FOOD INSECURITY

Crop condition map synthesizing information for all Early Warning Crop Monitor (EWCM) crops. Crop conditions over the main growing areas are based on a combination of national and regional crop analyst inputs along with earth observation data. Crops that are in other than favourable conditions are displayed on the map with their crop symbol.

*"Development planning and SDG outcomes can be visualized with maps." (CIESIN)*




GEOGLAM Early Warning Crop Monitor




**Target 6.3** By 2030, improve water quality by reducing pollution, illuminating dumping and minimizing the least hazardous chemicals and materials, halving the proportion of untreated waste water and substantially increasing recycling and safe reuse globally.

## POPULATION DENSITY OVERLAID ON UNTREATED WASTEWATER LEAKING TO THE ENVIRONMENT, ETHIOPIA SUB NATIONAL



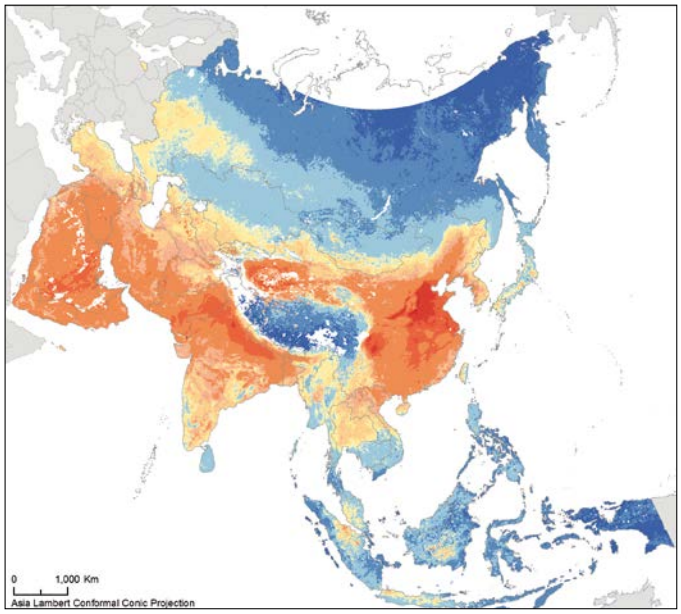

WHO/UNICEF Joint Monitoring Programme (JMP) for Water Supply and Sanitation

Integration of Earth observation and Geospatial Information data with national surveys for monitoring the impact of untreated wastewater on the population. The map on the left shows the extent of leakage of wastewater, excreta and grey water with areas in red denoting extensive pollution. The map on the right integrates all data and shows where there is high impact, i.e. high leakage in densely populated areas.

*"Technological innovations are increasing our measuring abilities and cost-reductions are making it feasible." (CIESIN)*


**Target 11.6** By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality andmunicipal and other waste management.

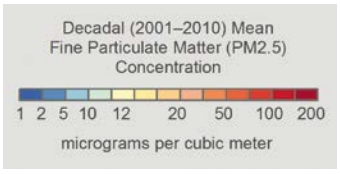
## MEASURING AIR QUALITY IN CITIES AND ACROSS REGIONS




CIESIN Columbia University, April 2015

**Global Annual PM2.5 Grids from MODIS, MISR and SeaWiFS Aerosol Optical Depth (AOD), 2001–2010: Asia**

Measurements from satellites provide information on air quality in communities and regions. For example, this map shows baseline data on particulate matter that could be used by statistical agencies, public health organizations, and environmental protection officials to develop more in-depth indicators, for example by deploying sensor networks to efficiently generate complete national data in near real-time.

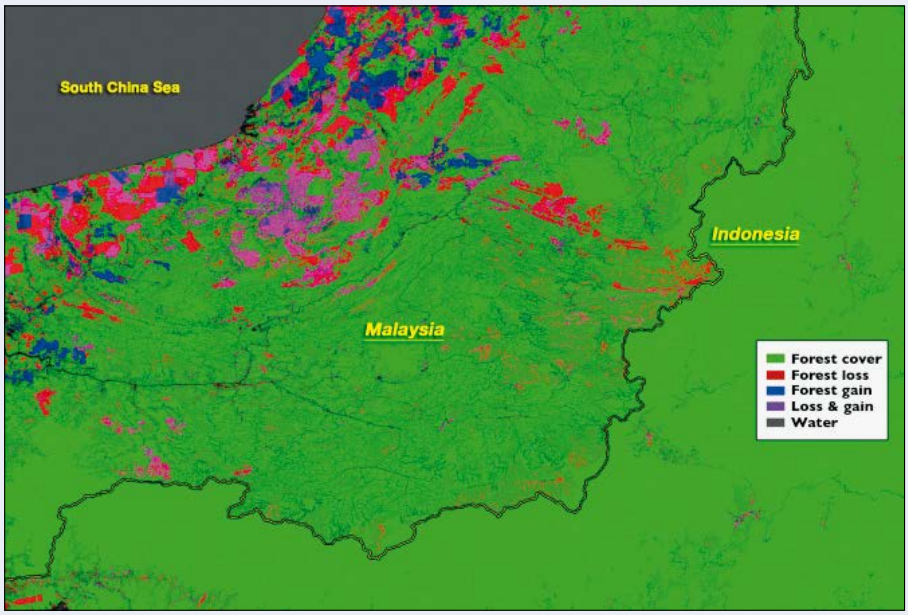




**Target 15.2** By 2020, promote the implementations of sustainable management of all types of forests, halt deforestation, restore degraded forests, and increase afforestation and reforestation by X% globally.

## EARTH-OBSERVING SATELLITES CAN TRACK TREE COVER EXTENT AND FOREST LOSS AND GAIN OVER TIME

The border between Malaysia and Indonesia on the island of Borneo stands out in the Landsat-based map of forest disturbance. Red pixels represent forest loss between 2000 and 2012.




NASA Goddard, based on data from Hansen et al., 2013.

*"Mapping SDG-related data will improve measuring and monitoring of progress toward the SDG Indicators."*

# EARTH OBSERVATION AND GEOSPATIAL INFORMATION RESOURCES FOR SDG MONITORING

SUSTAINABLE DEVELOPMENT GOALS

| | 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 | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |

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