

Disaster Management & Recovery Framework: The Surveyors Response

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Disaster Management & Recovery Framework: The Surveyors Response

The impact on and the challenges ahead for the surveying
and geospatial professional

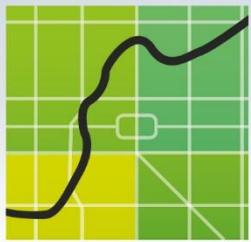


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Context: The global challenges ahead

Think: Global to local, and local to global

Protecting our planet and combating climate change



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Global Trends: Urbanization

80%

of global economic activity generated in cities – mostly in industry and services benefiting from density

2 billion

additional residents in cities between 2000-2030

1 billion

live in slums today to be near jobs and opportunity

1½ billion

exposed to cyclones and earthquakes in large cities by 2050 (up from 680 million 2000)

1.2 million km²

of new urban built up area by 2030—equivalent to a whole new world; rapid spatial expansion makes it difficult to provide services, houses, and transport

80%

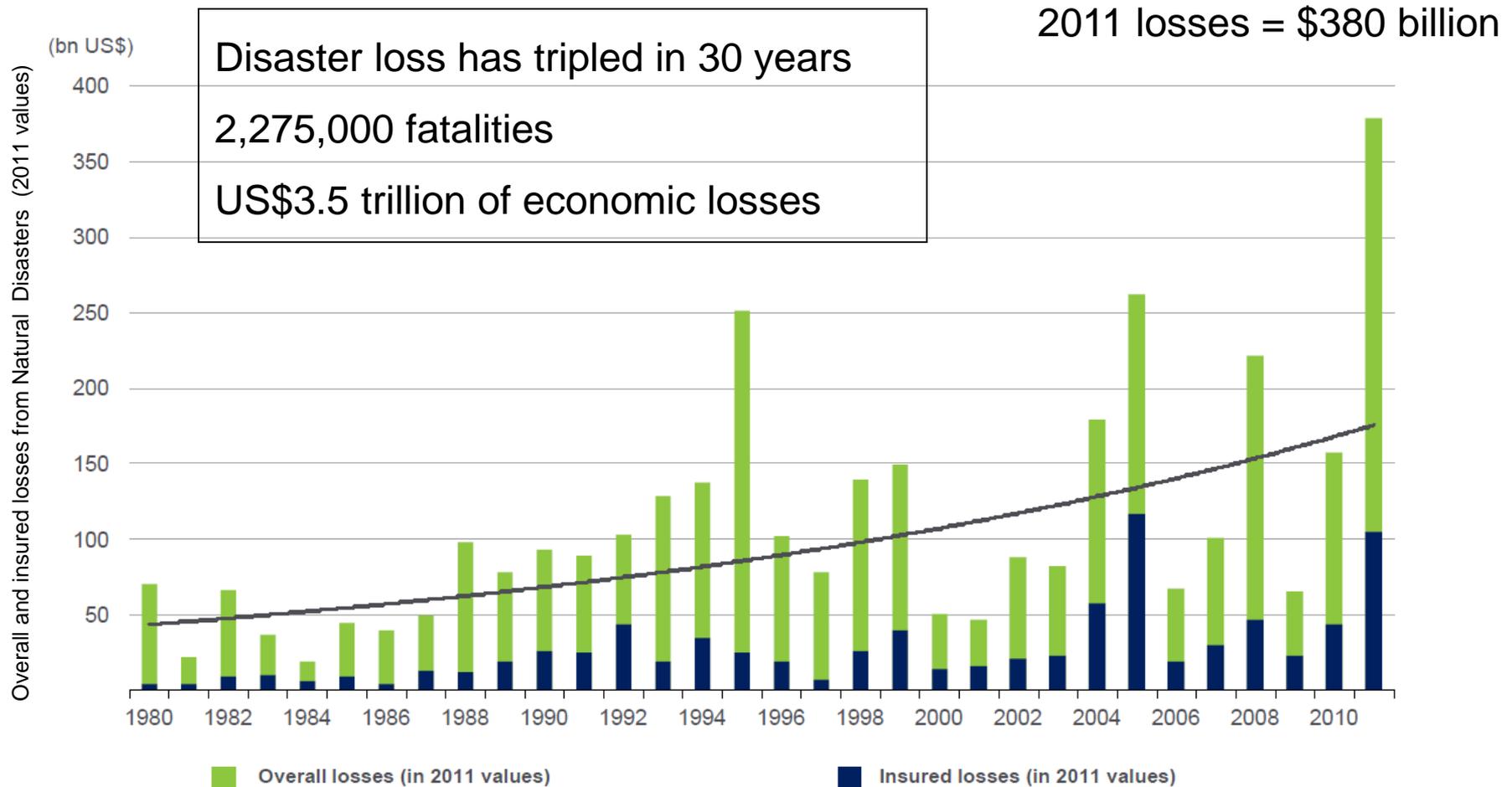
of Greenhouse Gas emissions +

70%

of energy consumption is attributable to cities.

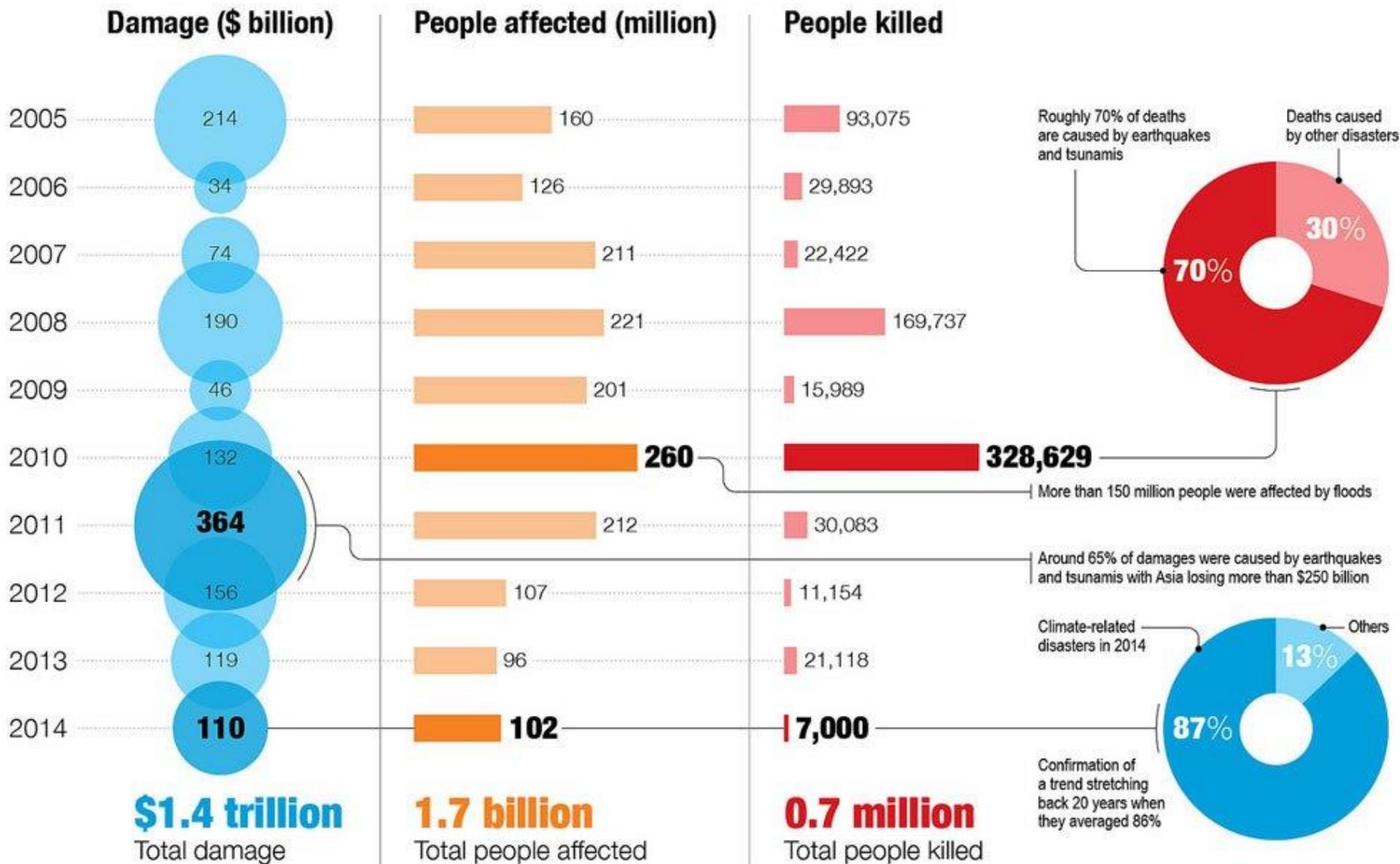
THE EVIDENCE HIGHLIGHTS URGENCY FOR ACTION

Increasing Risks in the World: A relentless increase in disaster loss



Source: Munich Re, Geo Risks Research and NatCatSERVICE.

The Economic and Human Impact of Disasters in the last 10 years



The Global Risks Report 2016

Figure 3: The Most Likely Global Risks 2016: A Regional Perspective



2015 Global Assessment Report

If an accelerated increase in disaster risk is to be avoided, the development drivers of risk, such as climate change, the overconsumption of natural capital, poverty and inequality will have to be addressed.

This is a problem not only for low-income countries, but for **middle-income countries** like Jamaica and the Philippines and for **high-income countries** like Greece. Although countries like Jamaica and Greece have far lower relative risk compared to the Philippines, the **overall impact on future development** will be very similar. While economic growth will be mainly undermined in Greece, the challenge facing the Philippines is one of social development. (→ Chapter 5)



GAR at a Glance

Sustainable development cannot be achieved unless disaster risk is reduced.



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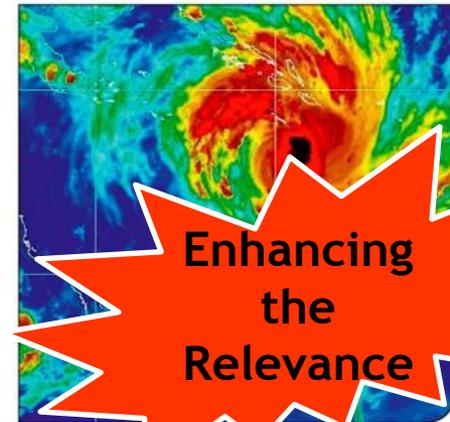
What can the surveying and geospatial professional community do about it?

A global policy context

Measuring and monitoring sustainable development...



Engaging
the
Challenges



Enhancing
the
Relevance

with geography, place, and location



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Post-2015 Development Agenda

Our 3 pillars of potential influence

Science and Technology

Measure, Model and Monitor

Data integration

Provide the evidence

Innovation, Tools and Outcomes

Sustainable Development

Local to global issues

Social

Economic

Environmental

People

Cities

Livelihoods

Ecosystems

Development

Policy Framework

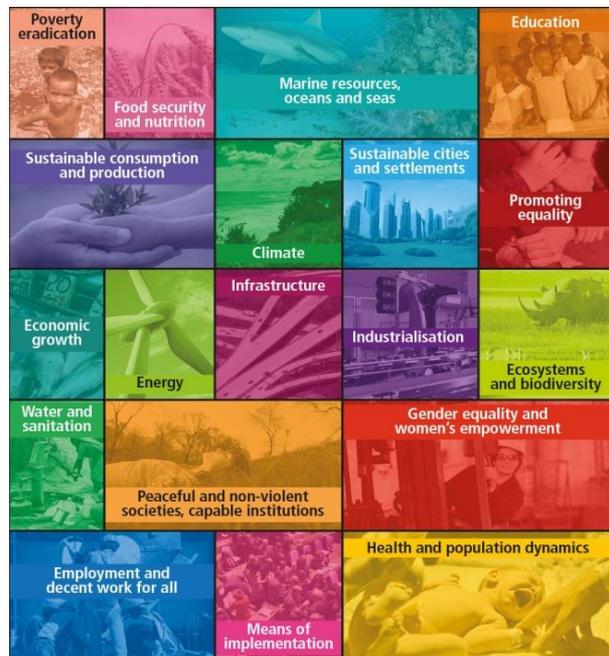
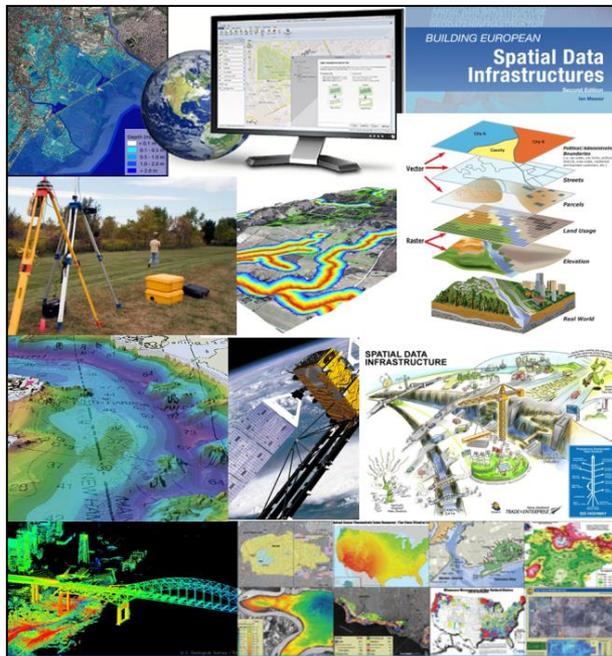
Political awareness

Evidence based policy

Inter-governmental

Decision making

Influence



Post-2015 Development Agenda



TRANSFORMING OUR WORLD:

THE 2030 AGENDA FOR SUSTAINABLE DEVELOPMENT



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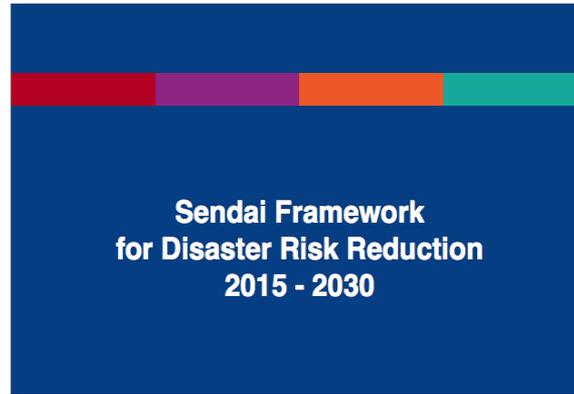
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Post-2015 Development Agenda



United Nations
Framework Convention on
Climate Change

UNITED NATIONS
**PARIS CLIMATE
AGREEMENT**
SIGNING CEREMONY
— 22 APRIL 2016 —



**Sendai Framework
for Disaster Risk Reduction
2015 - 2030**



TRANSFORMING OUR WORLD:



**THE 2030 AGENDA FOR
SUSTAINABLE DEVELOPMENT**



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Transforming our World: The 2030 Agenda for Sustainable Development



- An agreed global and united policy to manage and transform the social, economic and environmental dimensions of humanity and our planet.
- The blueprint to guide us for the next 15 years. Contains much more accountability than the MDGs with 17 goals, 169 targets, and a global indicator framework - 230 indicators.
- Implementation will require good policy, science, technology and data.
- Measuring and monitoring, from local to global, requires ‘data’....but where does the data come from, and in a sustainable manner?



Transforming our World: The 2030 Agenda for Sustainable Development



Follow up and review:

76. We will support developing countries, particularly African countries, LDCs, SIDS and LLDCs, in strengthening the capacity of national statistical offices and data systems to ensure access to high quality, timely, reliable and disaggregated data.

We will promote 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.

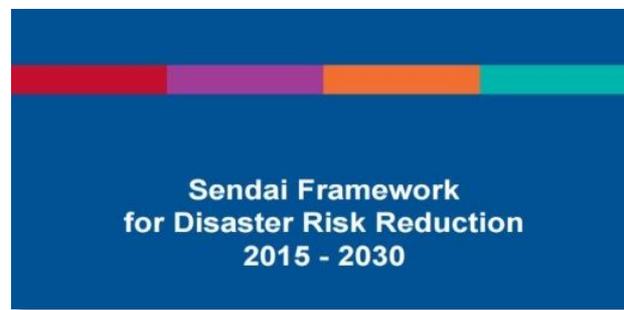


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A need for focused action within and across sectors by States at local, national, regional and global levels in 4 priority areas:

- Priority 1: Understanding disaster risk.
- Priority 2: Strengthening disaster risk governance to manage disaster risk.
- Priority 3: Investing in disaster risk reduction for resilience.
- Priority 4: Enhancing disaster preparedness for effective response and to “Build Back Better” in recovery, rehabilitation and reconstruction.

Geography, place or location feature in all 4 of these priorities seeking to shift our world onto a resilient path



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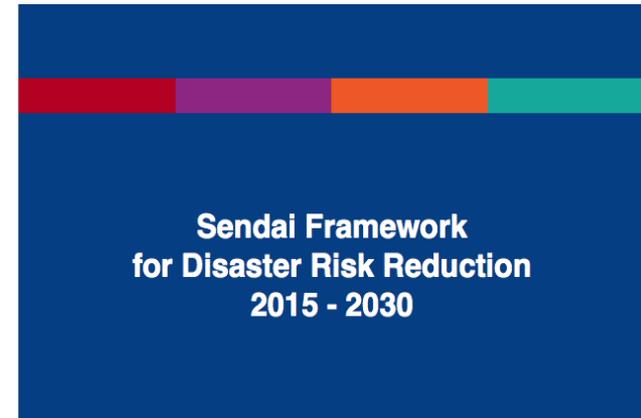
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Sendai Framework

Priority 1: Understanding disaster risk

- Develop, periodically update and disseminate, as appropriate, location-based disaster risk information, including risk maps, to decision makers, the general public and communities at risk of exposure to disaster in an appropriate format by using, as applicable, geospatial information technology.
- Promote real-time access to reliable data, make use of space and in situ information, including geographic information systems (GIS), ... to enhance measurement tools and the collection, analysis and dissemination of data.



Climate Change Conference (COP21)



PARIS2015
UN CLIMATE CHANGE CONFERENCE
COP21·CMP11

Interactive Dialogue 4%

PROTECTING OUR PLANET
and COMBATTING CLIMATE CHANGE



PARIS TAKES
CANNOT FAIL

Where are we today?



GLOBALLY
NATURAL DISASTERS
HAVE COST \$1 TRN. ALREADY



CONSUMPTION OF
NATURAL RESOURCES
WILL RISE 170%
BY 2040



RISING
INTENSITY +
FREQUENCY OF
WEATHER RELATED
EVENTS



AIMING FOR
MEAN TEMP.
to 2°C of PRE-
INDUSTRIAL LEVELS

What's the new goal?



BUILDING RESILIENCE
for LDCs REQUIRES
COLLABORATION... AND FINANCE



SET AN
AMBITIOUS, BINDING
FRAMEWORK



TOWNS.
CARBON-
NEUTRAL
CITIES



INSURE SMALL
FARMERS



SWITCH TO
CLEAN ENERGY

What must we recognize?



POLLUTERS
MUST HELP PAY
TO MITIGATE
IMPACT - on LDCs:
UNSUSTAINABLE
ACTIVITIES HAVE
A PRICE TAG



EVERYONE
MUST
BE INVOLVED



WE ARE
DWELLERS
NOT OWNERS



PRIORITISE
GROSS DOMESTIC
HAPPINESS



THE SCIENCE
IS CLEAR.
DO WHAT'S
RIGHT.

The 2030 Agenda, DRR and Climate Change

- Multiple targets on disaster risk reduction and resilience in the 2030 Agenda for Sustainable Development.
- These focus on poverty eradication; strengthening resilience of sectors such as agriculture, education, and infrastructure; reducing mortality and economic losses from disasters; and enhanced planning around resilience and adaptation.



Take urgent action to combat climate change and its impacts*

- All the targets can be linked to the Sendai Framework.
- Target 13.1: Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries.



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from disaster

What can the surveying and geospatial professional community do about it?

We have an actionable agenda!! But what does this really mean in national implementation?



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Sustainable data for sustainable development

The monitoring of the MDGs taught us that data are an indispensable element of the development agenda:

- Despite improvement, critical data for development policymaking are still lacking.
- Real-time data are needed to deliver better decisions faster.
- Geospatial data can support monitoring in many aspects of development, from health care to natural resource management.
- New technology is changing the way data are collected and disseminated.
- Global standards and an integrated statistics system are key elements for effective monitoring.
- Data should be open, easily accessible and effective for decision-making.



<http://www.un.org/millenniumgoals/>



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The need for data integration and analysis

- By integrating different spatial datasets into a NSDI, the full multifunctional nature of a spatial system, essential for assessing sustainable development and climate change scenarios, can be achieved.
- A NSDI plays an important role in combining information on a national scale, helping to ensure both effective resource use and the development of comprehensive knowledge.
- The more comprehensive the integration of data, the more comprehensive the climate change impact analyses able to be undertaken, and the better the ultimate policy decisions able to result from those analyses.



FIG REPORT

The Surveyor's Role in Monitoring, Mitigating, and Adapting to Climate Change



FIG Task Force on Surveyors and Climate Change



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Integration of global professional communities

Statistics

Geospatial



Observations

Surveying



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Source: Kees de Zeeuw

Transforming our World: The 2030 Agenda for Sustainable Development



Data, monitoring and accountability:

17.18 By 2020, enhance capacity-building support to developing countries, including for least developed countries and small island developing States, to increase significantly the availability of high-quality, timely and reliable data disaggregated by income, gender, age, race, ethnicity, migratory status, disability, *geographic location* and other characteristics relevant in national contexts.



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Transforming our world -
The 2030 Agenda for
Sustainable Development



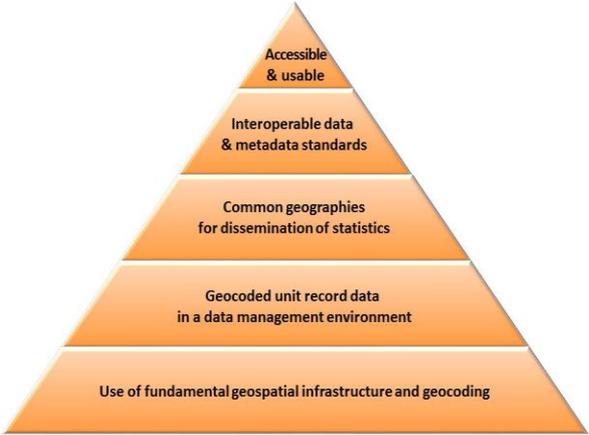
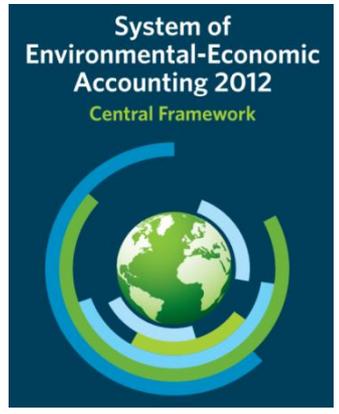
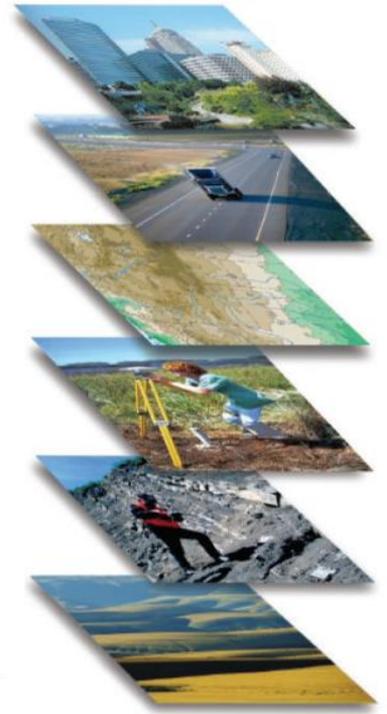
The global statistical
community
has laid the
groundwork
for the successful
monitoring
and realization
of this new agenda.



THE GLOBAL EARTH OBSERVATION
SYSTEM OF SYSTEMS



**Coordination of
Geographic Information
and Related Spatial Data Activities**
Office of Management and Budget • Circular A-16 revised



BigData UN Global Working Group

The National Spatial Data Infrastructure

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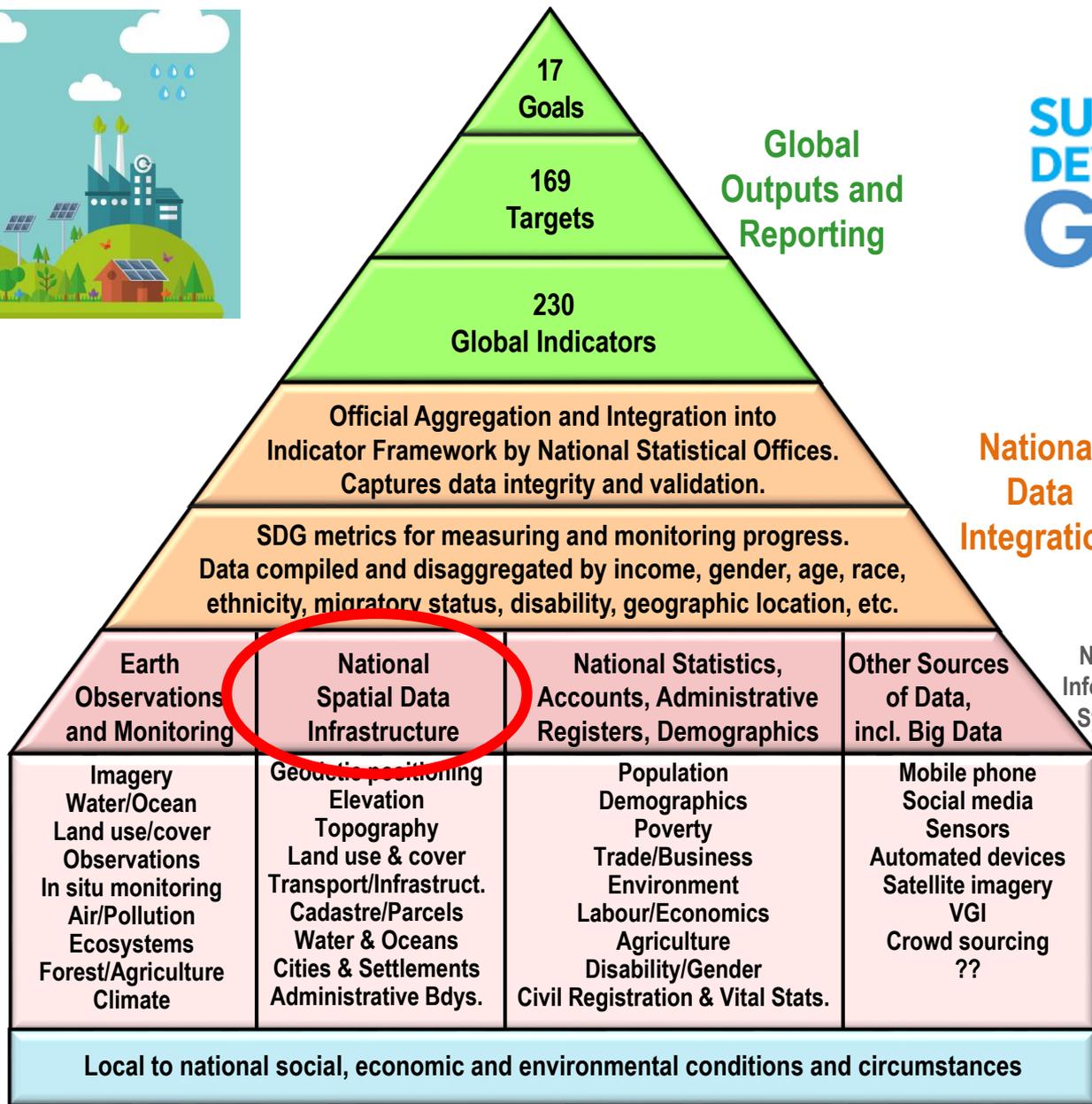
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SUSTAINABLE DEVELOPMENT GOALS



Global
Outputs and
Reporting

National
Data
Integration

National
Information
Systems

Data
Inputs

Fundamental
baseline data
and new
data sources



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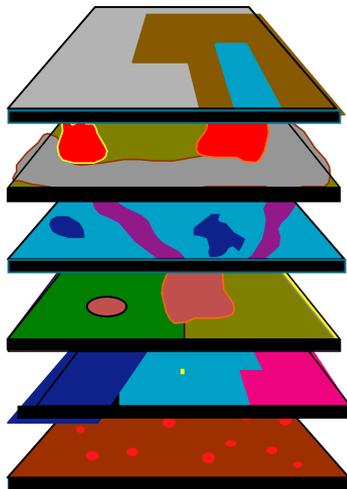
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High quality, timely and reliable data

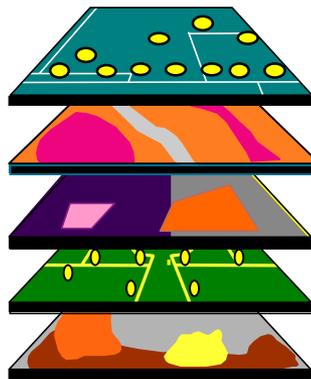
Geodetic
Elevation
Water/Ocean
Land use/cover
Transport
Cadastre
Population
Infrastructure
Settlements
Admin. Bdys.
Imagery
Geology/soils
Observations
etc.



National Spatial Data Infrastructure

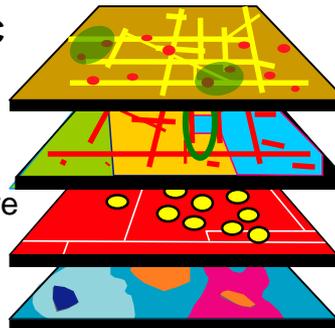
SOCIAL

Society
Poverty
Education
Health
Population
Employment
Water
Sanitation
Equality
Gender
Governance



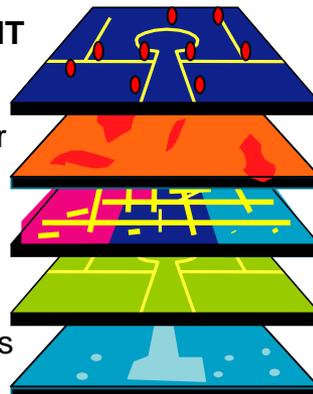
ECONOMIC

Well-being
Cities
Water
Energy
Infrastructure
Industry
Sanitation
Economy



ENVIRONMENT

Water
Seas/oceans
Land use/cover
Ecosystems
Forests
Agriculture
Climate
Biodiversity
Natural hazards
Pollution



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Geospatial Information and Earth Observations: Supporting Official Statistics in Monitoring the SDGs



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.

Positioning geospatial information to address global challenges

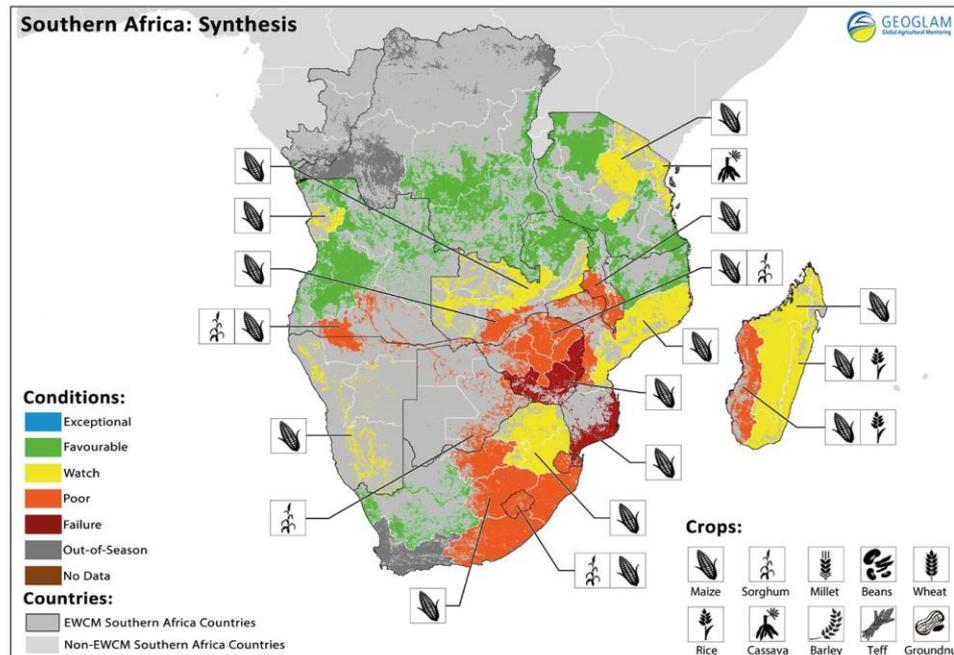


Target 2.c Adopt measures to ensure the proper functioning of food commodity markets and their derivatives and facilitate timely access to market information, including on food reserves, in order to help limit extreme food price volatility.

**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)

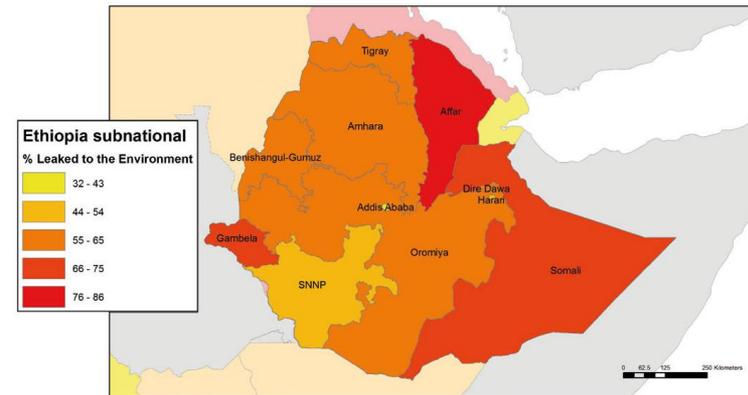
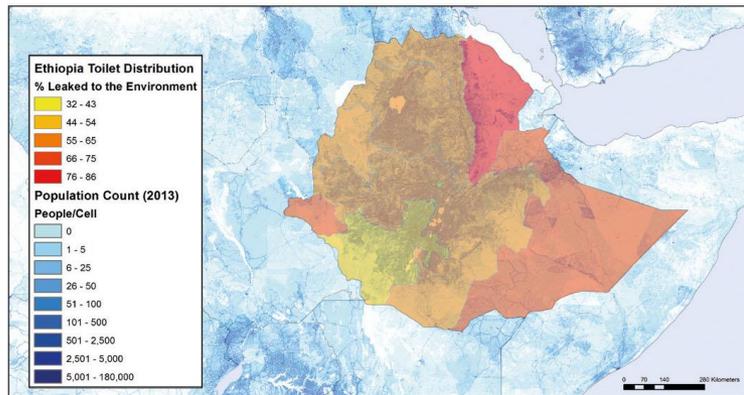


GEOGLAM Early Warning Crop Monitor



Target 6.3 By 2030, improve water quality by reducing pollution, eliminating 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

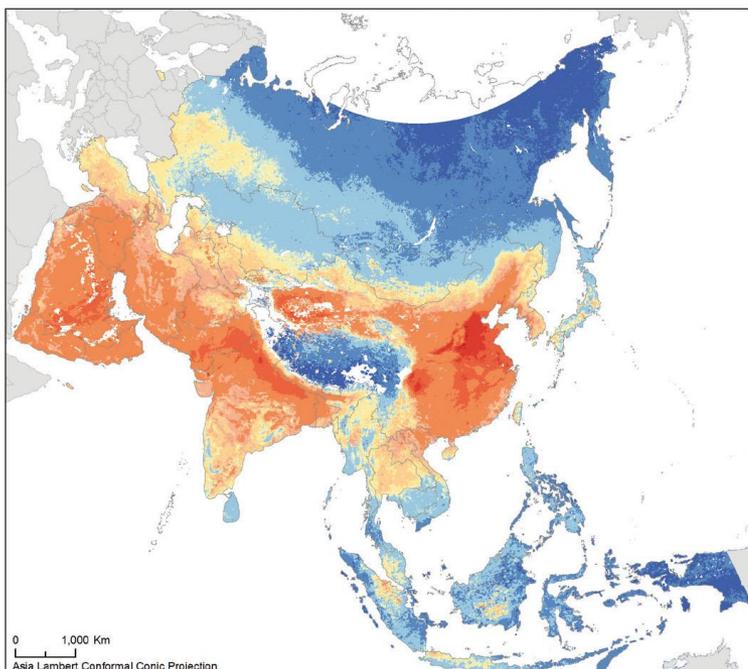
Integrating data from Earth observations and geospatial information with national surveys to monitor the impact of untreated wastewater on the population. The map on the left shows the extent of leakage of wastewater, excreta and grey water, with areas in red denoting extensive pollution. The map on the right integrates all data and shows where there is high impact, i.e., high leakage in densely populated areas.





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

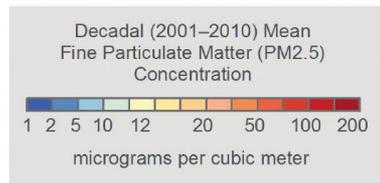
MEASURING AIR QUALITY IN CITIES AND ACROSS REGIONS



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.

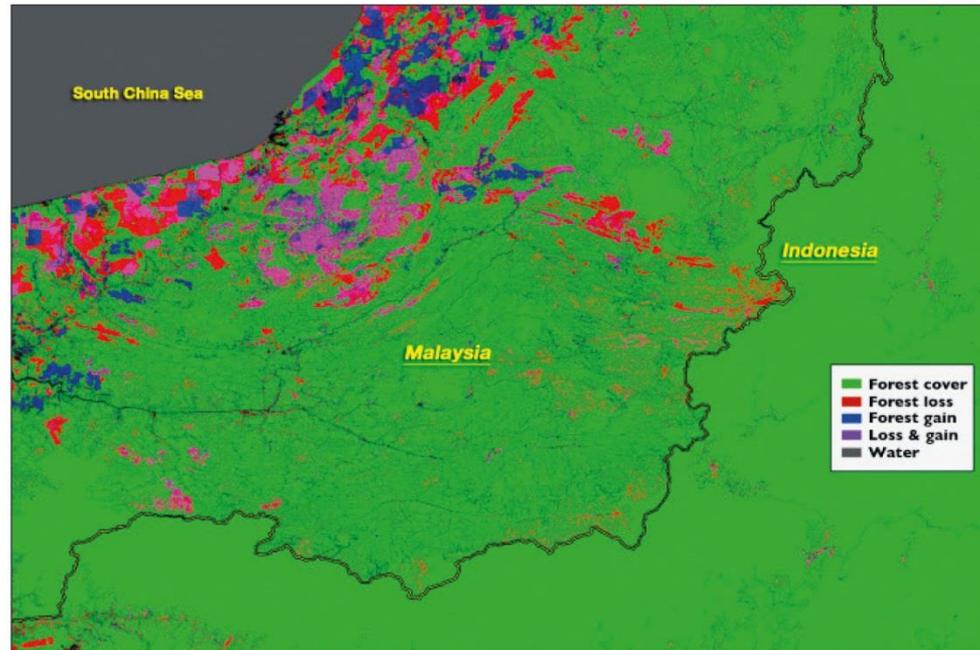




Target 15.2 By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally.

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.”





	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 Affordable 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										



Integration of global professional communities

Statistics

Geospatial



Observations

Surveying



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Source: Kees de Zeeuw

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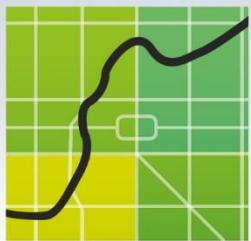


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