The European Commission's science and knowledge service

Joint Research Centre

STI Roadmaps for SDGs Expert Group Meeting
Tokyo, 8-9 May 2018

Session 7: Plans to Impact – coordination, data/indicators, accountability and result frameworks, spending efficiency and effectiveness

Liliana Pasecinic, Deputy Head of Unit,
Institutional, International relations and outreach

JRC Role: facts & figures

Budget around **€ 400** million

6 locations in 5 Member States: Italy, Belgium, Germany, The Netherlands, Spain

Independent of private, commercial or national interests

Policy neutral:
has no policy agenda of its own

42 large scale research facilities, more than 110 online databases

30% of activities in policy preparation, **70%** in implementation

More than **100** economic, bio-physical and nuclear models

Work for more than **30** Commission policy departments

JRC

83% of core research staff with PhD's

Over 1,400
scientific publications per year

Work Programme: the drivers

JRC mission to support EU policies with independent scientific advice throughout the policy cycle

EC Work Programme

International commitments

UN-FCCC, SENDAI Framework, UN-CBD; UN-ECE, UN-CCD

JRC Work Programme

JRC Strategy 2030 – novelties e.g.

- Axes of Resilience and Fairness
- Knowledge and Competence Centres
- Science Development
- Transversal support to Commission

Framework Programme

Better regulation

Knowledge Management

United Nations A/RES/70/1

General Assembly

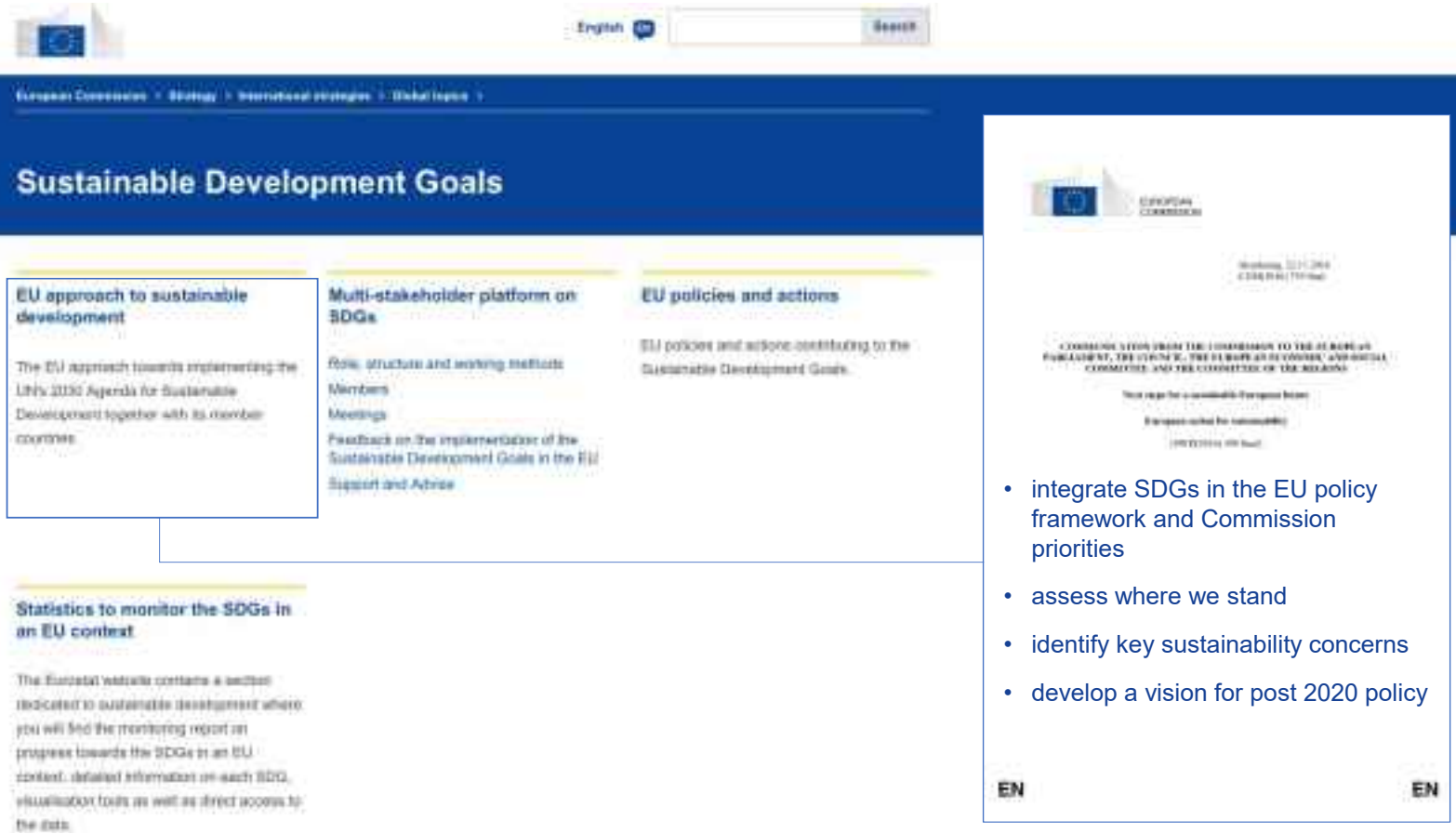
Distr.: General
21 October 2015

Seventieth session
Agenda items 15 and 116

Resolution adopted by the General Assembly on 25 September 2015

[without reference to a Main Committee (A/70/L.1)]

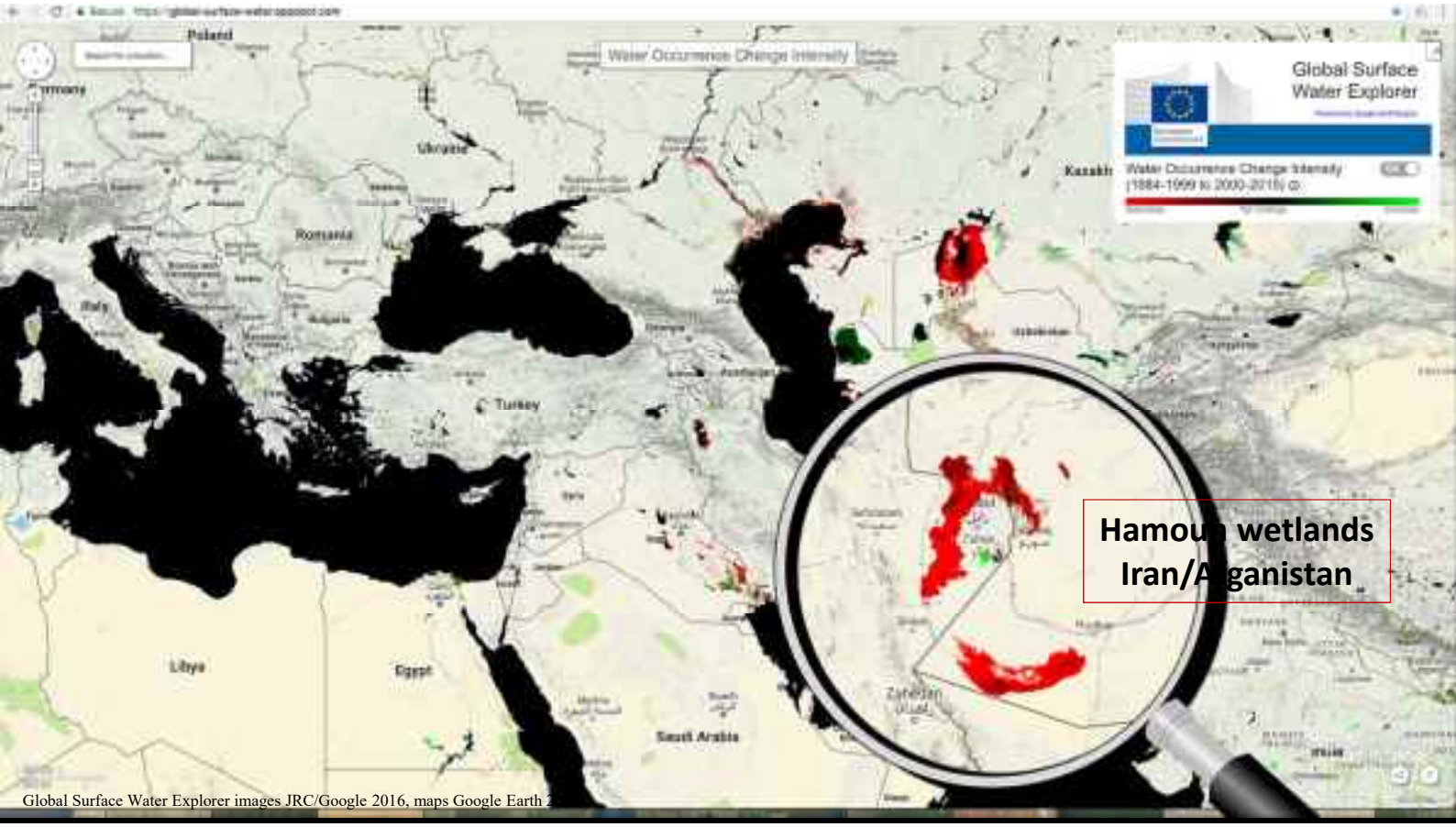
70/1. Transforming our world: the 2030 Agenda for Sustainable Development

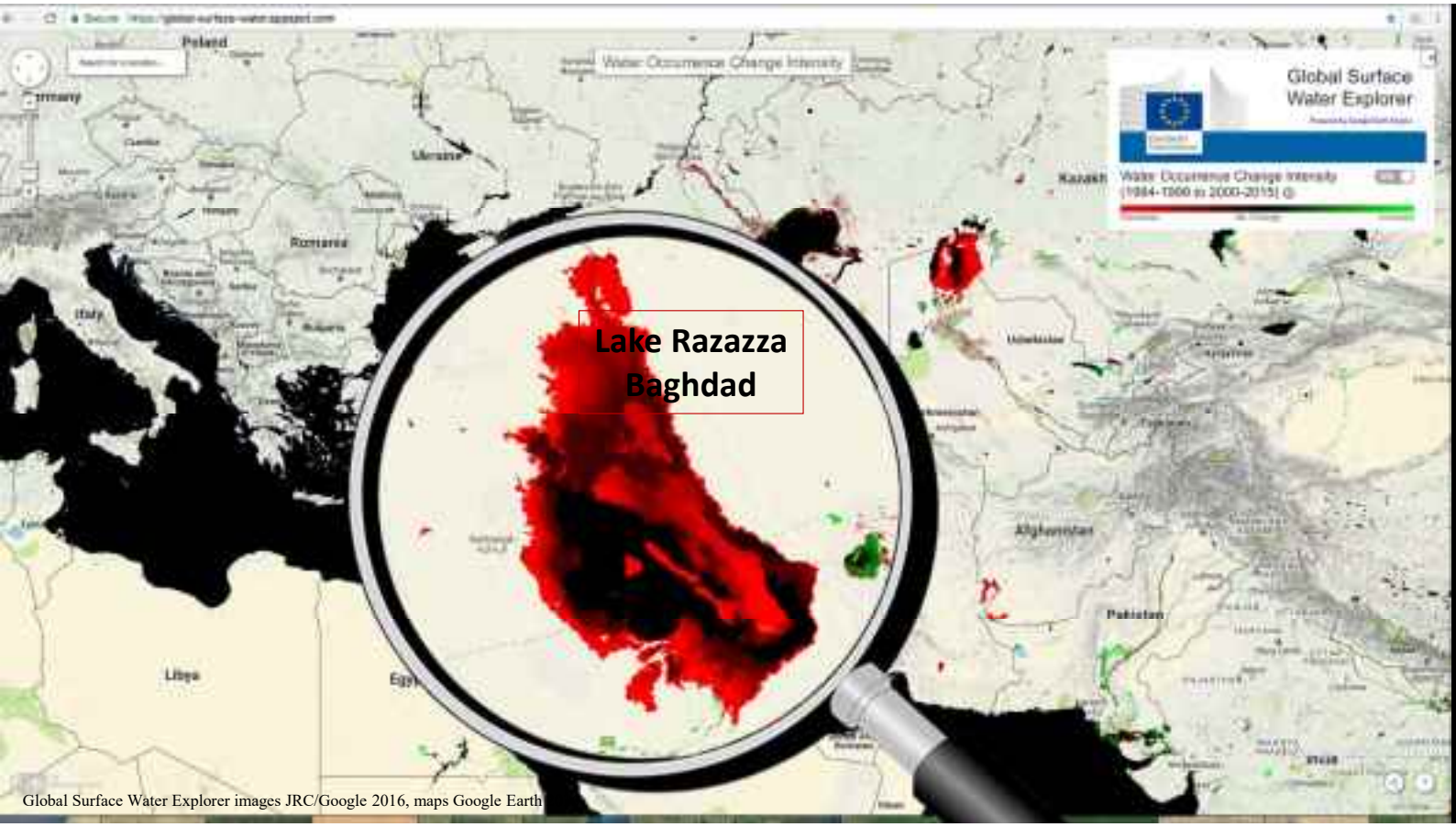


- integrate SDGs in the EU policy framework and Commission priorities
- assess where we stand
- identify key sustainability concerns
- develop a vision for post 2020 policy


6
CLEAN WATER
AND SANITATION

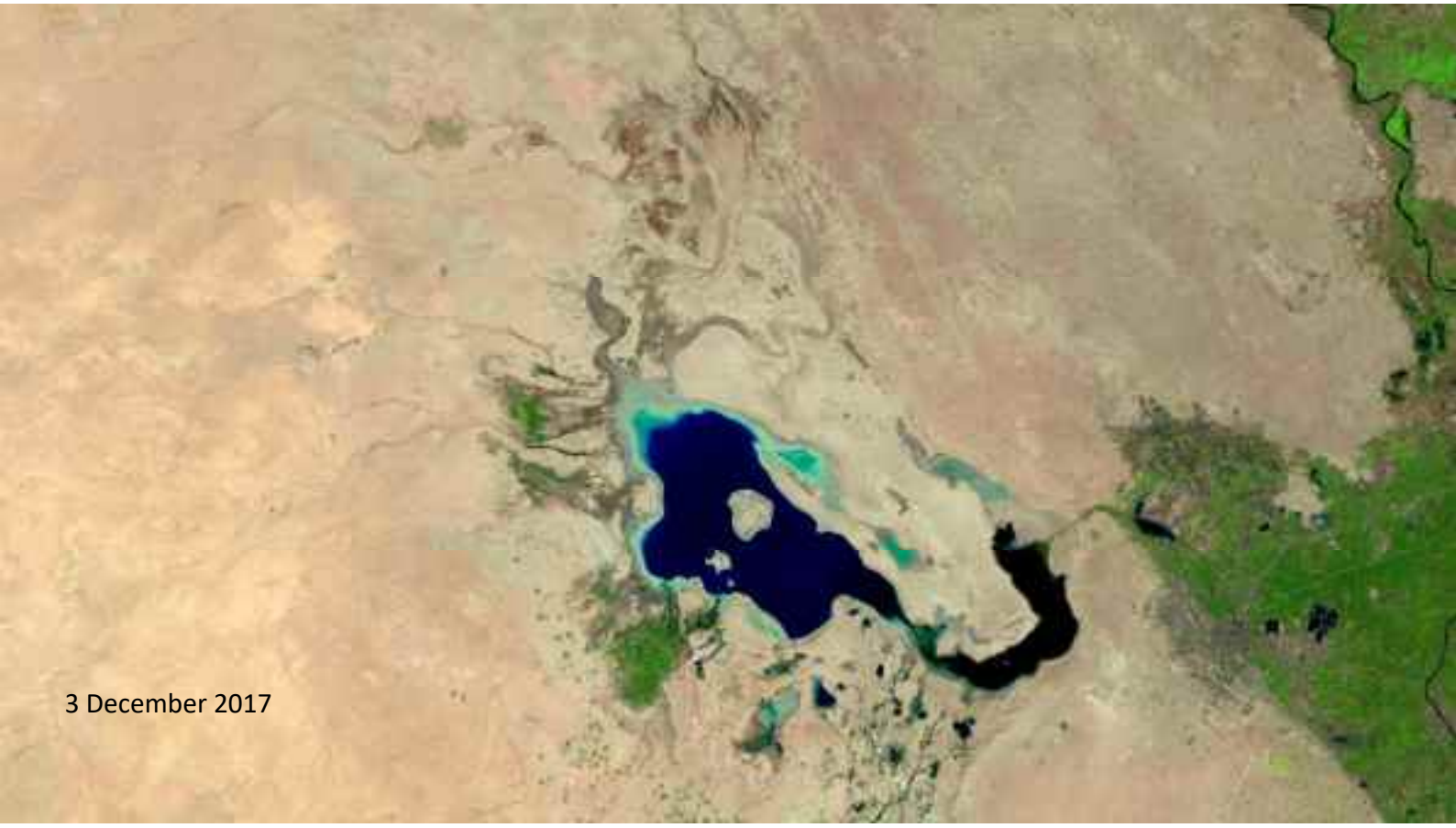

Water Occurrence
Mapping long-term global surface water occurrence
07
In an article published in Nature on 7 December 2016, JRC scientists describe how, in collaboration with Google, they have quantified changes in global surface waters and created interactive maps which highlight the changes in the Earth's surface water over the past 32 years.
Based on over three million satellite scenes (1 823 Terabytes of data) collected between 1984 and 2015, the Global Surface Water Explorer was produced using 10 000 computers running in parallel. The individual images were transformed into a set of global maps with a 30-metre resolution, which enable users to scroll back in time to measure the changes in the location and persistence of surface water globally, by region, or for a specific area. The maps are available for all users, free of charge.
Global Surface Water Explorer
Water Occurrence (1984-2015)
Water Occurrence Change Intensity (1984-1999 to 2000-2015)
Water Seasonality (2014-2015)
Google Earth Engine


Global Surface Water Explorer
Water Occurrence Change Intensity
Hamoun wetlands
Iran/Afganistan
Global Surface Water Explorer images JRC/Google 2016, maps Google Earth


Global Surface Water Explorer
Water Occurrence Change Intensity
Lake Razazza
Baghdad
Global Surface Water Explorer images JRC/Google 2016, maps Google Earth


6th November 1984


1 October 2000



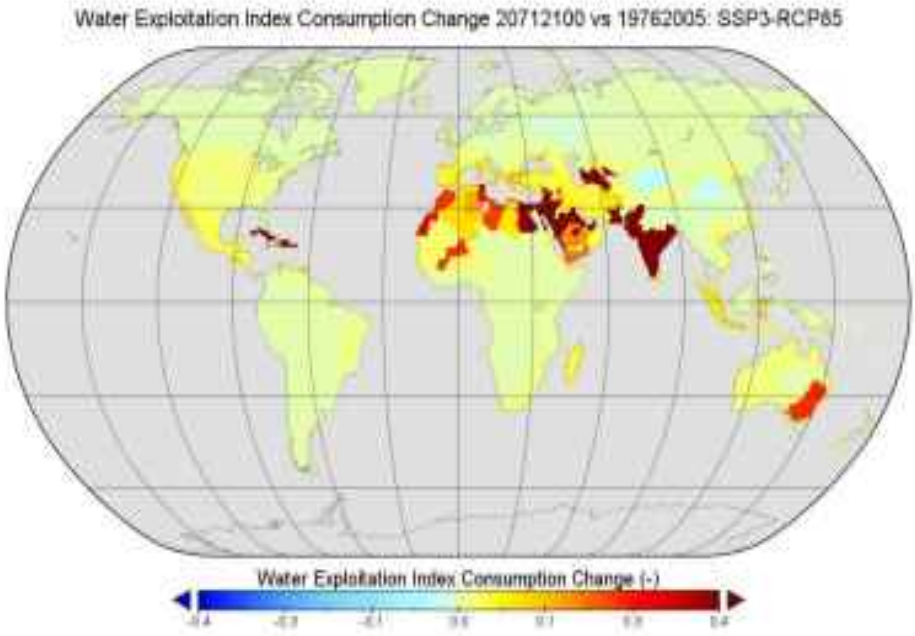
90,000 km^2 of once permanent surface water disappeared between 1984 and 2015

184,000 km^2 of previously dry land are now permanently submerged

24 countries have increased their lake area by over 1000 km^2 in the past 30 years – mainly through dam building

Russia, Canada, China, Turkmenistan, Brazil, United States, India, Kazakhstan, Argentina, Turkey, Peru, Uzbekistan, Myanmar, Indonesia, Australia, Pakistan, Mexico, Vietnam, Egypt, Bangladesh, Colombia, Venezuela, Thailand, Mozambique

Projected impacts of climate change and socio-economic change SSP3 on the Water Exploitation Index

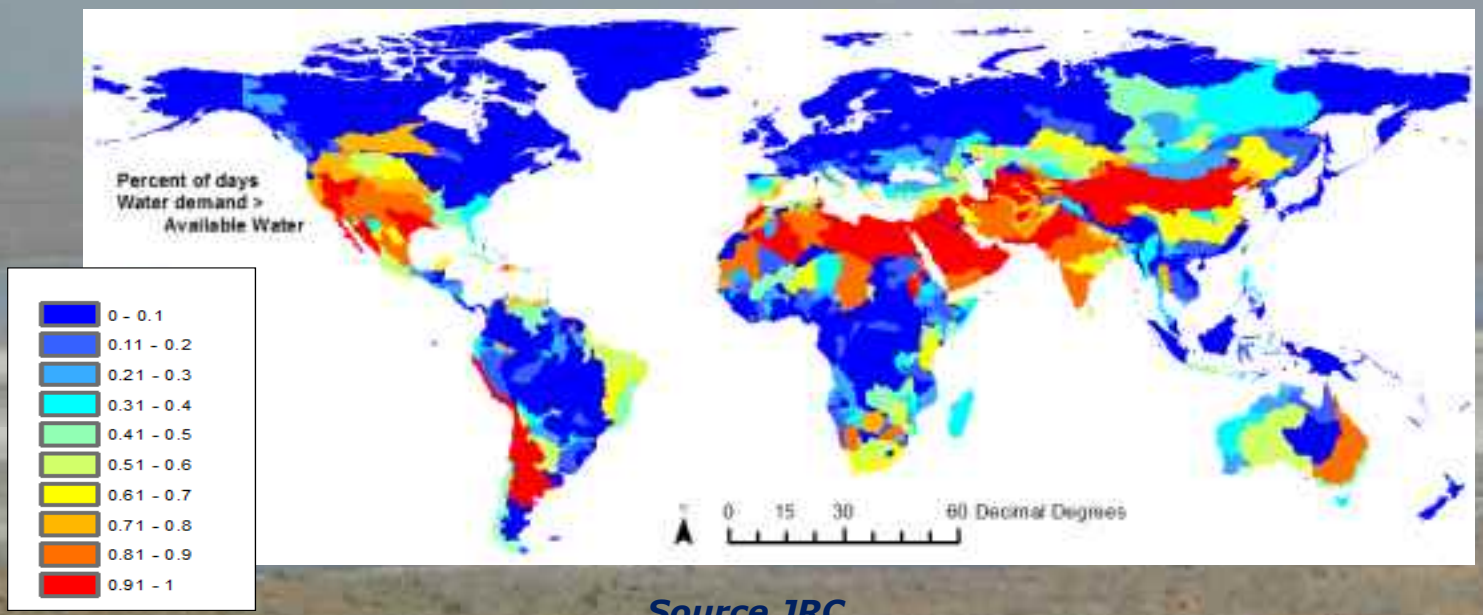


Source JRC

European Commission

6.4.2 Percentage of days when water demand is higher than water availability

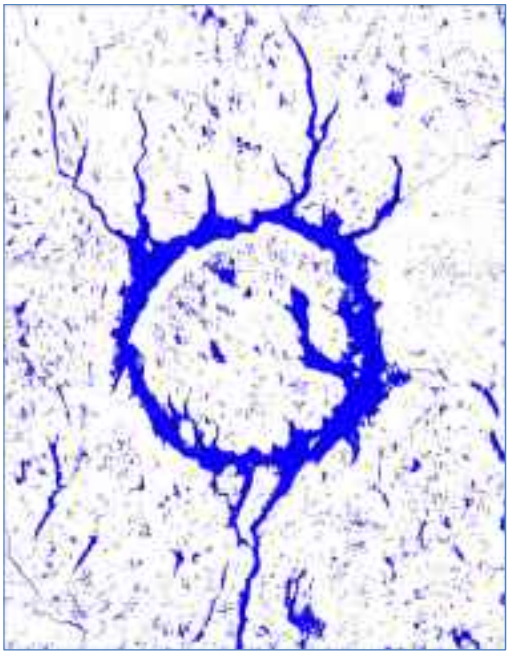
Integrate sectoral perspectives for an analysis of tradeoffs, synergies and development pathways



Source JRC

Measuring progress: The Global Surface Water Explorer

https://global-surface-water.appspot.com/



Target 6.6: By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, *aquifers* and lakes

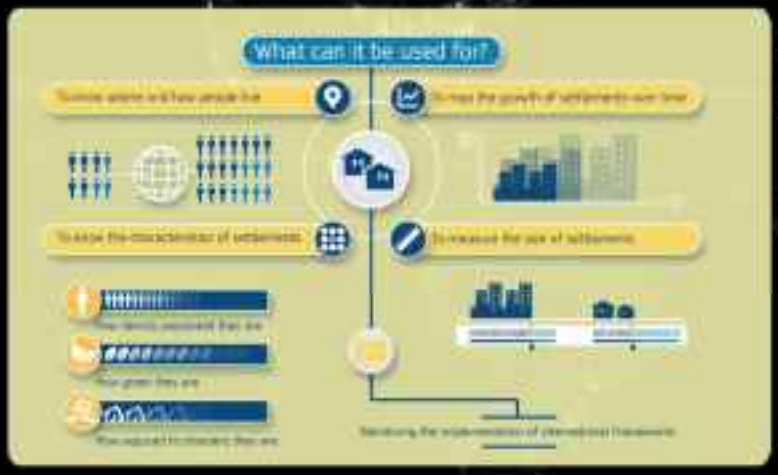
Indicator 6.6.1: Change in the extent of water-related ecosystems over time

GSWE maps and statistics are fully validated and have been distributed to over 180 countries by UN Environment for consideration as reporting against Indicator 6.6.1.a: Spatial extent

European Commission

Global Human Settlement Layer (GHSL)

The most complete, consistent, global, free and open data set on human settlements. from the village to the megacity, for the epochs 1975 – 1990 – 2000 – 2015



Full open free data and tools at
http://ghsl.jrc.ec.europa.eu
http:/www.geoportal.org/

http://ghsl.jrc.ec.europa.eu/

European Commission

The Global Human Settlement Layer

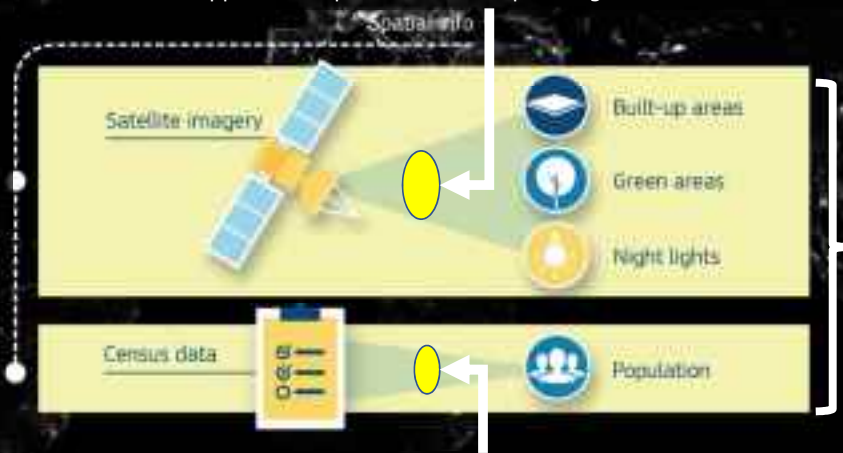
SATELLITE IMAGERY

GHSL Global: any open and free decametric-scale or better platform/data

Landsat MSS TM ETM - 15, 30, 80 m
Sentinel 1 2 – 10, 20 m

GHSL Regional/national: depending on bilateral data agreements
Europe, South Africa, Syria – Spot 2.5, 1.5 m
Brazil: CBERS 2.5, RapidEye 4m
China: DBAR tbd

Symbolic Machine Learning
New approach inspired to DNA sequencing and characterization



Spatial Data Modelling
New models facilitating the science2policy

GEO Human Planet Initiative

GROUP ON EARTH OBSERVATIONS

European Commission

The Global Human Settlement Layer basics

Operates in a open and free data and methods access policy (open input, open method, open output)

Reproducible, scientifically defendable, fine-scale, synoptic, complete, planetary-size, and cost-effective information production

Facilitating information sharing and multilateral democratization of the information production, collective knowledge building

GEO Human Planet Initiative

GROUP ON EARTH OBSERVATIONS

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GHSL Tools

- SDG 11.3.1 Land Use Efficiency
- Ratio of land consumption rate to population growth rate
- Tool for calculation at national and local scale available for download:
  - http://ghsl.jrc.ec.europa.eu/tools.php

European Commission

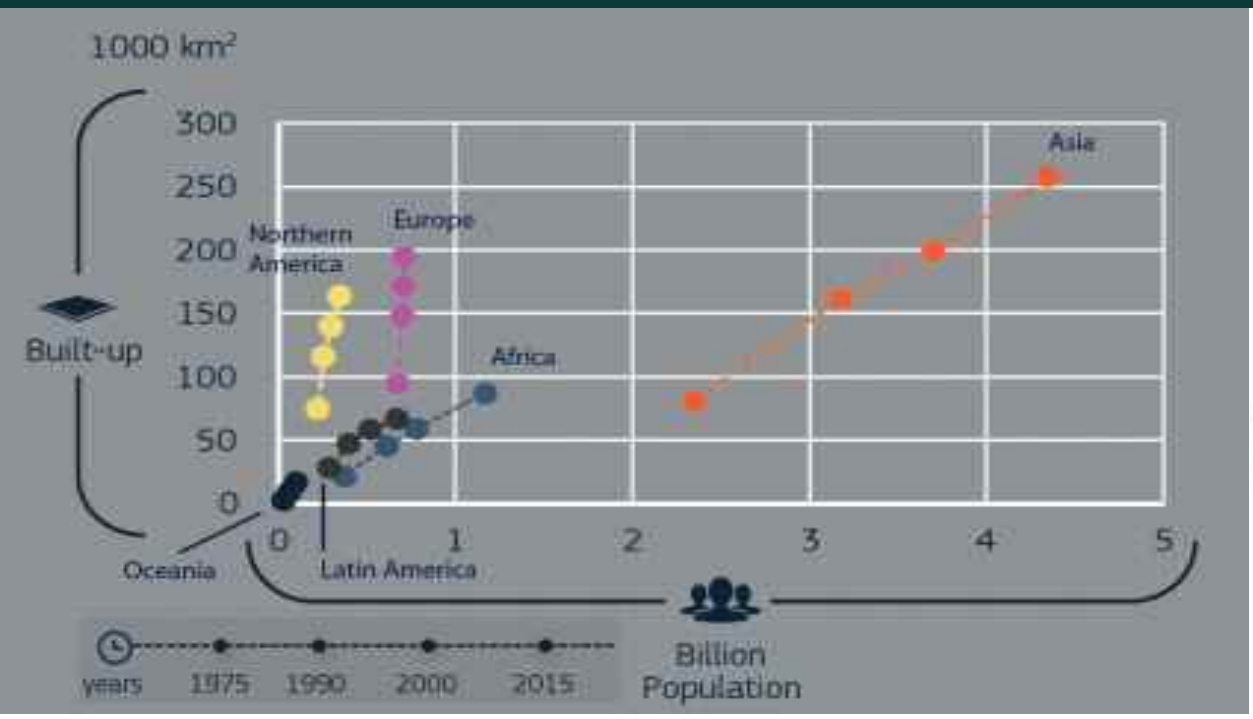
GHSL – City Centre Database

The City Centres Database describes more the 10.000 urban centres identified by the application of the "Degree of Urbanization" model to the GHSL baseline data.

http://ghsl.jrc.ec.europa.eu/ccdb2016Overview.php

European Commission

Objective monitoring of development patterns



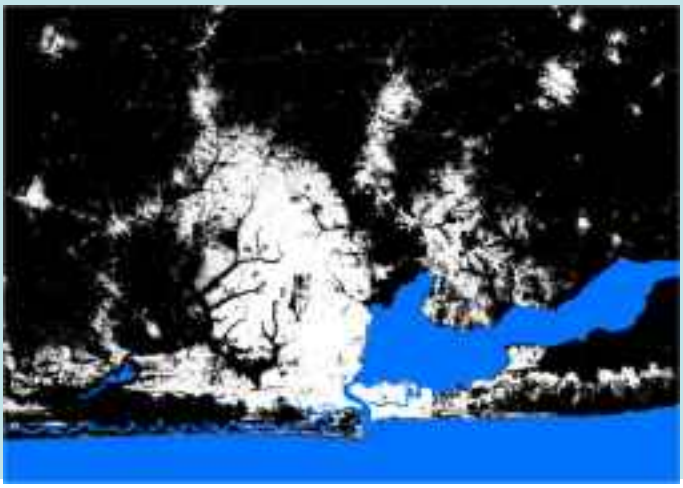
Large regional differences of built-up surfaces and population dynamics

Source: Atlas of the Human Planet 2016

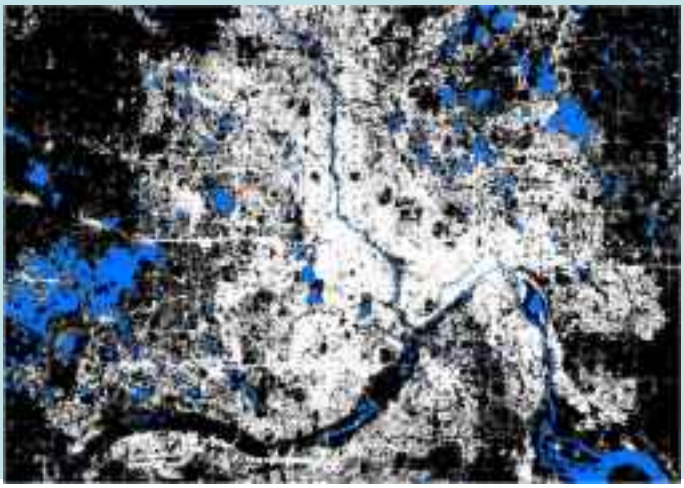
European Commission

Objective city-level comparison

Lagos, Nigeria:
~ 5 million inhabitants



Minneapolis, US:
~ 0.5 million inhabitants

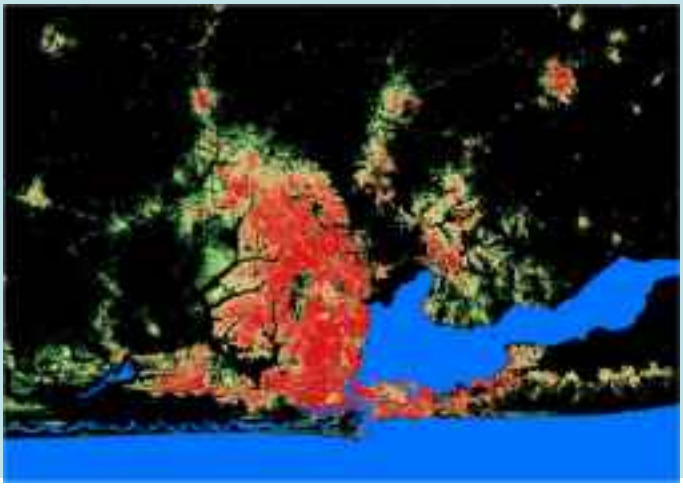


Built-Up Area 2015

European Commission

Objective city-level comparison

Lagos, Nigeria:
~ 5 million inhabitants



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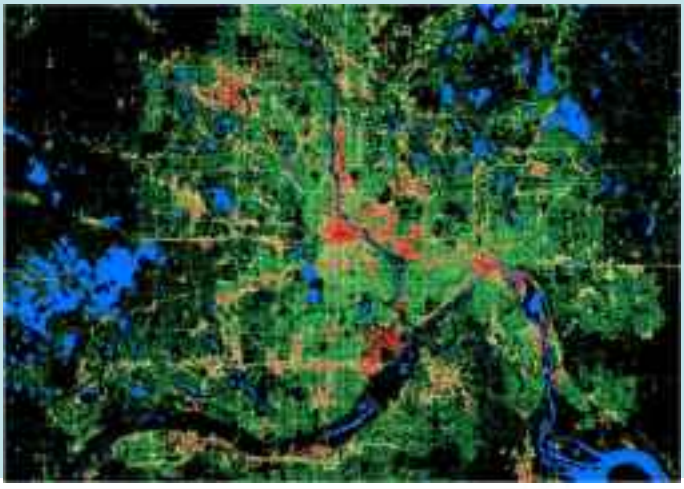
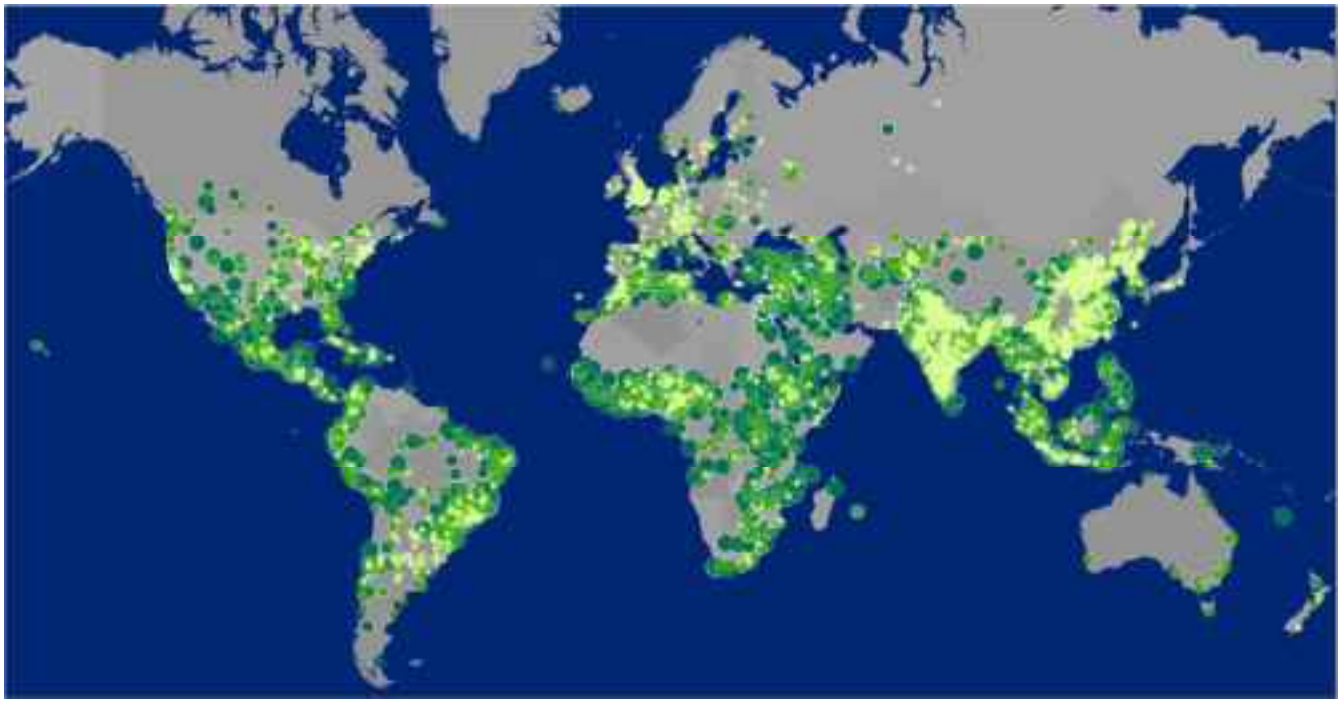


Green Areas 2015

European Commission

Growing cities

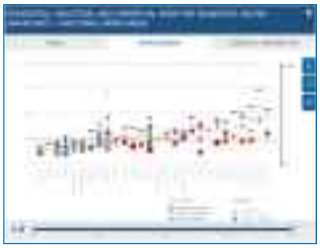


Shrinking cities

Urban Data Platform: better knowledge on cities

- 60 indicators on demography, urban development, economic development, transport and accessibility, environment and climate, resource efficiency and social issues.
- Interactive interface to explore, visualize, compare and download data for:
  - **807 European cities,**
  - **672 Functional Urban areas and**
  - **271 Metropolitan regions**
- European coverage (EU28+) – being extended to African Cities (in 2019)

UDP interface relating Urban Indicators to SDGs.



Residential, industrial and commercial areas per inhabitant by metropolitan regions.

Residential, industrial and commercial areas per inhabitant by degree of urbanisation.

http://urban.jrc.ec.europa.eu

Knowledge on European Cities vs. SDGs

The Urban Data Platform provides information on :

1 – No poverty

3 – Good Health and well-being

4 – Quality Education

8 – Decent Work and Economic Growth

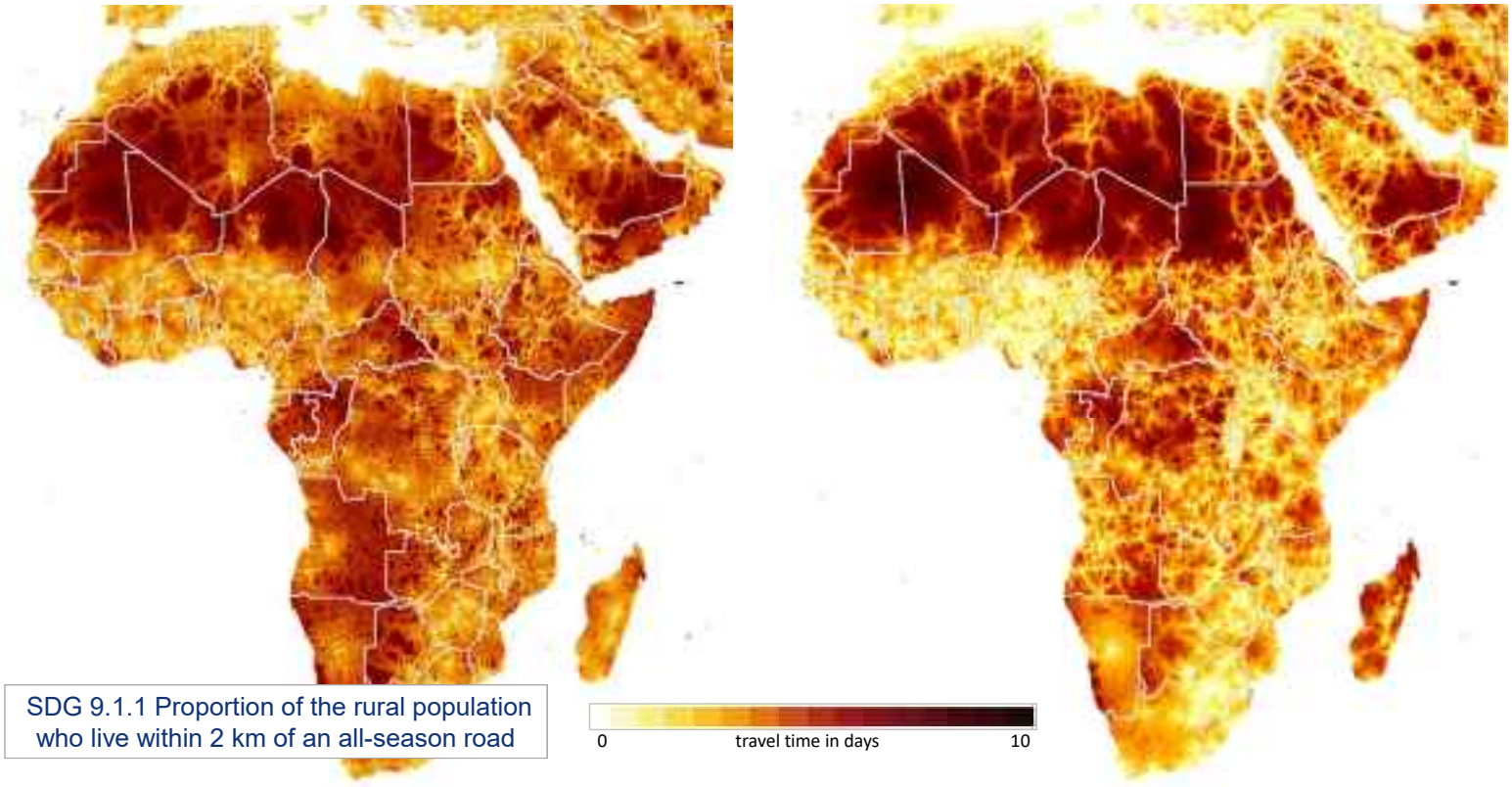
9 – Industry, Innovation and Infrastructure

11 – Sustainable Cities and Communities

13 – Climate Action

15 - Life on Land

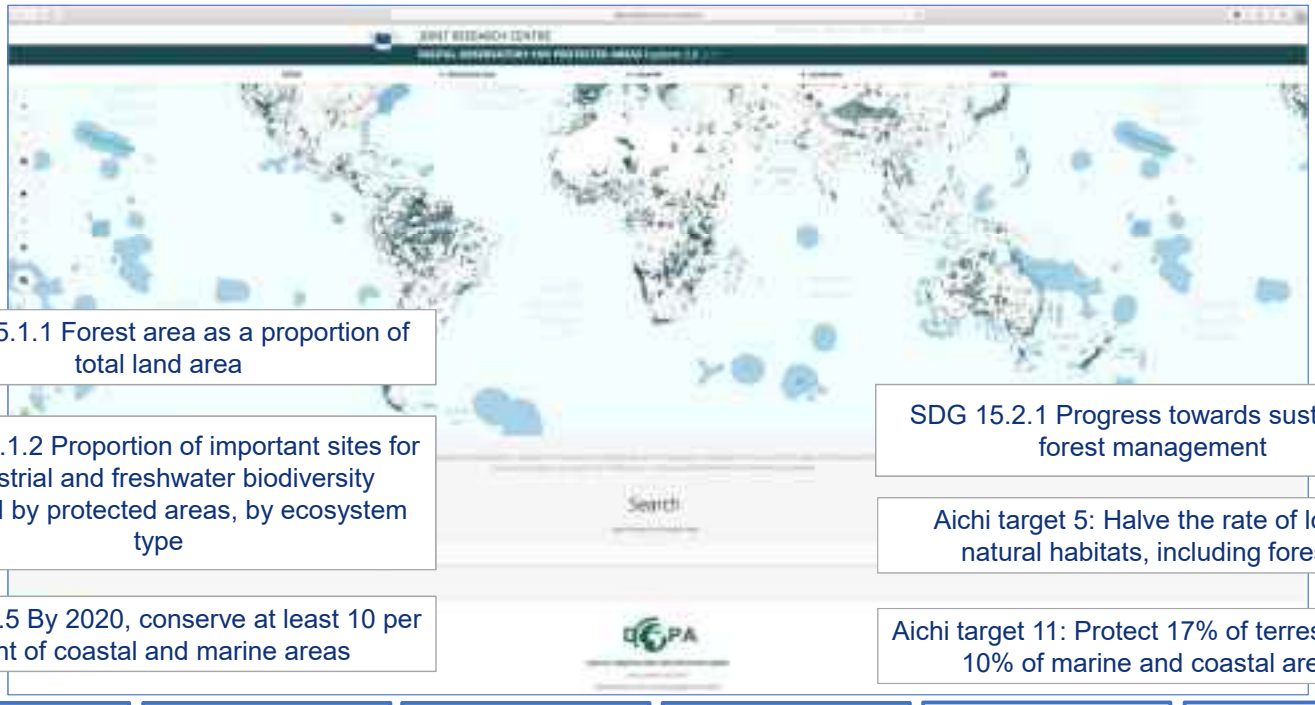
European Commission



SDG 9.1.1 Proportion of the rural population who live within 2 km of an all-season road

Travel time to cities of 50 000+ people (Left 2000, right 2015)

Source Andrew Nelson (JRC and ITC)
Weiss et al. Nature volume 553, 2018



SDG 15.1.1 Forest area as a proportion of total land area

SDG 15.1.2 Proportion of important sites for terrestrial and freshwater biodiversity covered by protected areas, by ecosystem type

SDG 14.5 By 2020, conserve at least 10 per cent of coastal and marine areas

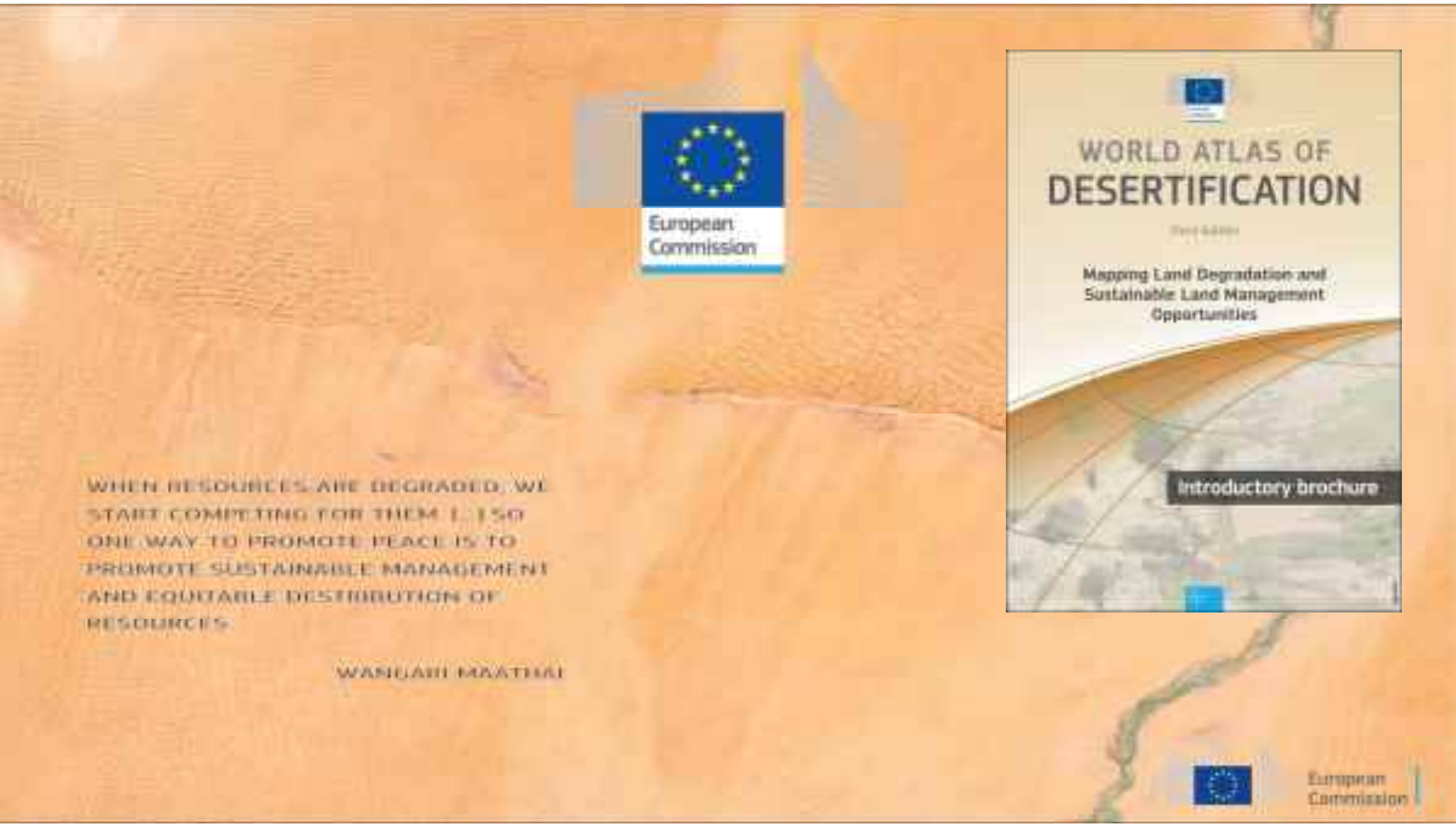
SDG 15.2.1 Progress towards sustainable forest management

Aichi target 5: Halve the rate of loss of natural habitats, including forests

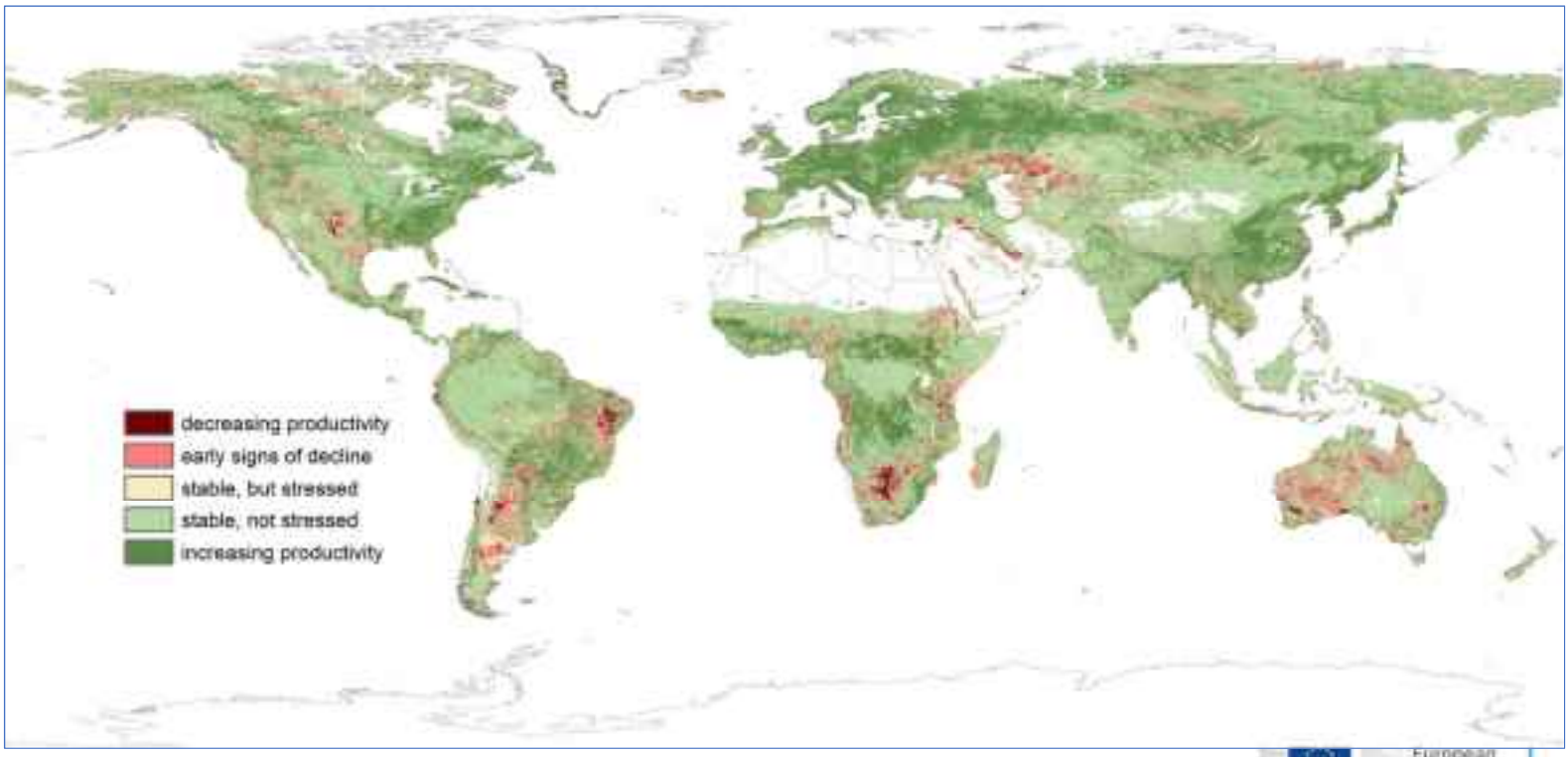
Aichi target 11: Protect 17% of terrestrial and 10% of marine and coastal areas

UNFCCC | CBD | UNCCD | Sendai | Paris | SDGs

MSG 6th March 2004 (Source copyright EUMETSAT)
Sahara dust figures (Prof Andrew Goudie, Oxford)



Land Productivity Dynamics



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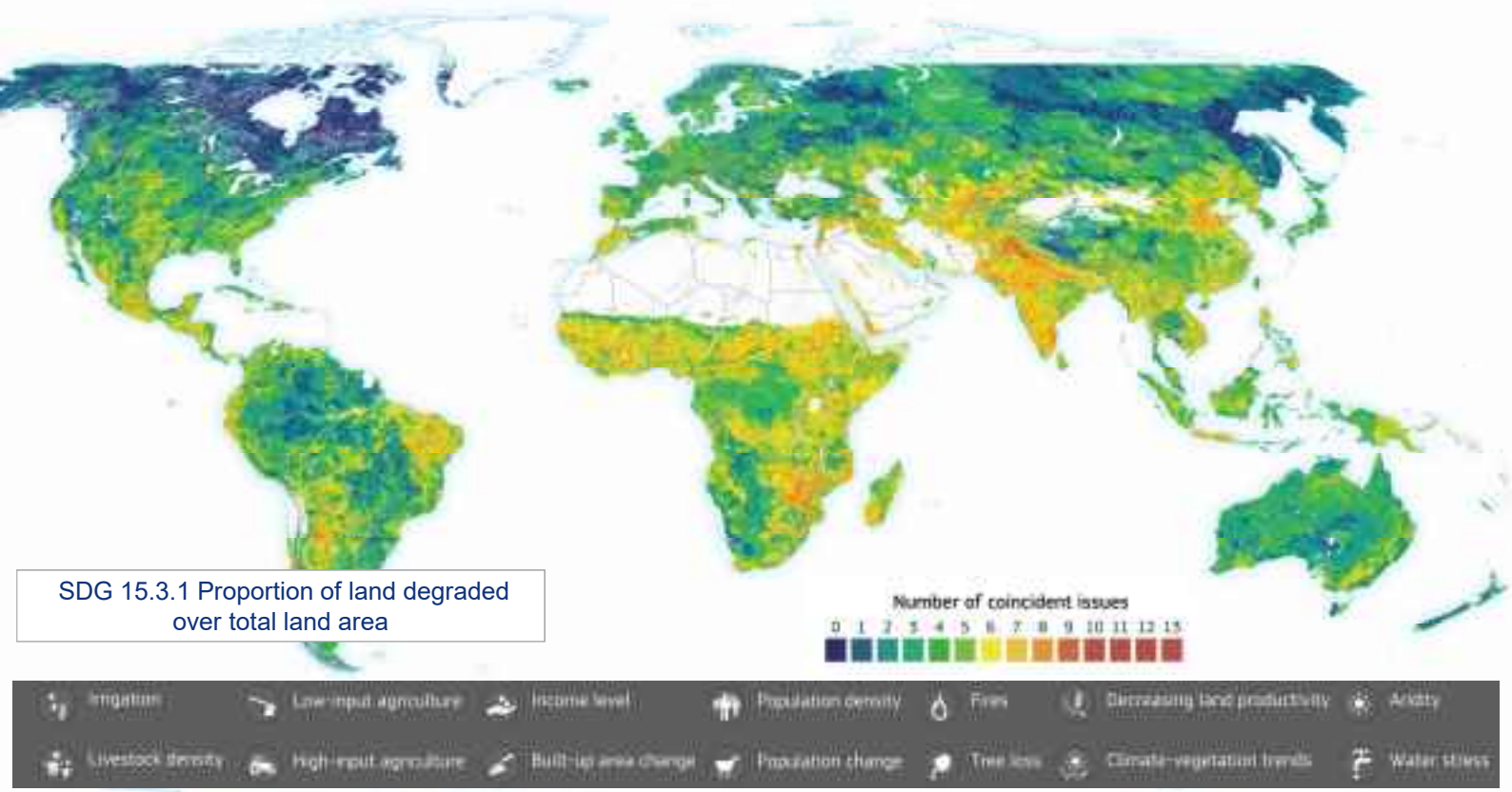
Source: JRC from World Atlas of Desertification, 3rd Edition,

Convergence of Evidence

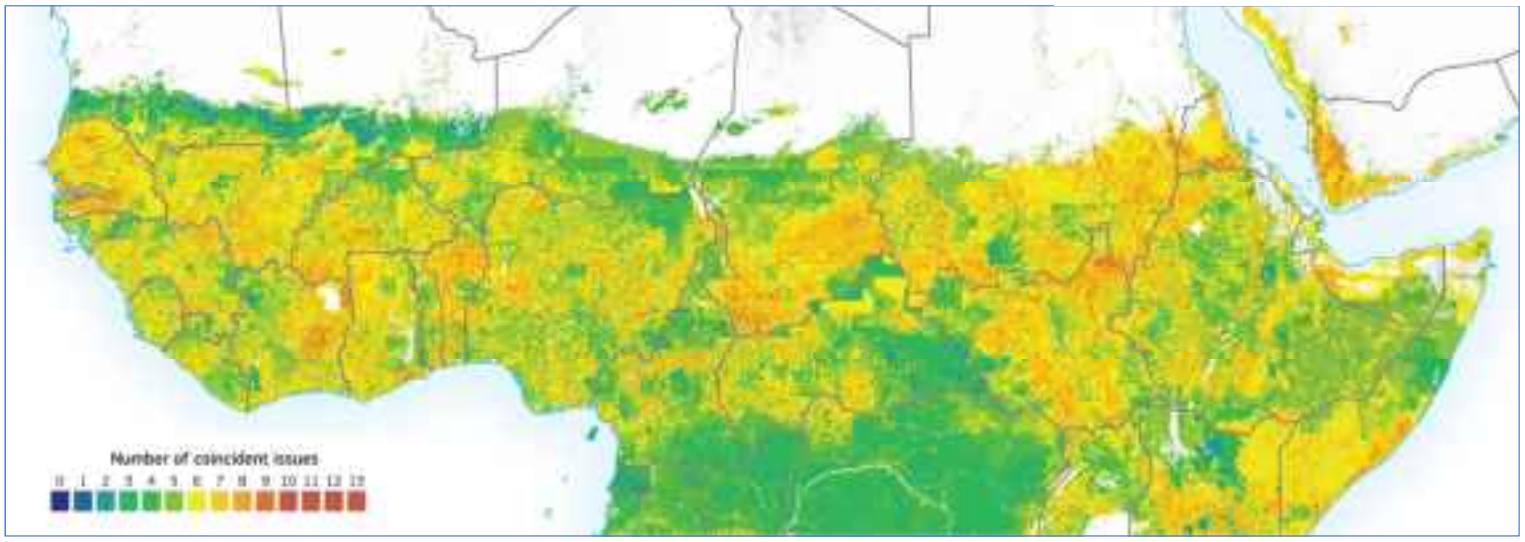
Source: JRC from World Atlas of Desertification, 3rd Edition, JRC/UNEP



SDG 15.3.1 Proportion of land degraded over total land area

Familiar patterns, old concerns

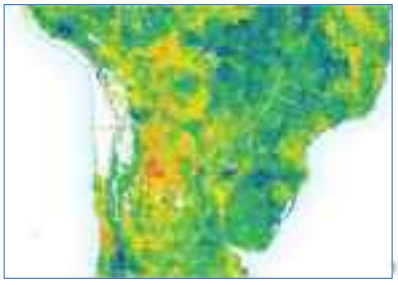
Source: JRC from World Atlas of Desertification, 3rd Edition, JRC/UNEP



The Sahel and Eastern Africa
Yield gaps, decreased productivity and chronic low-income

The Chaco in Argentina, Paraguay, and Bolivia
Transformation of forest to irrigated farmlands threatens vast areas

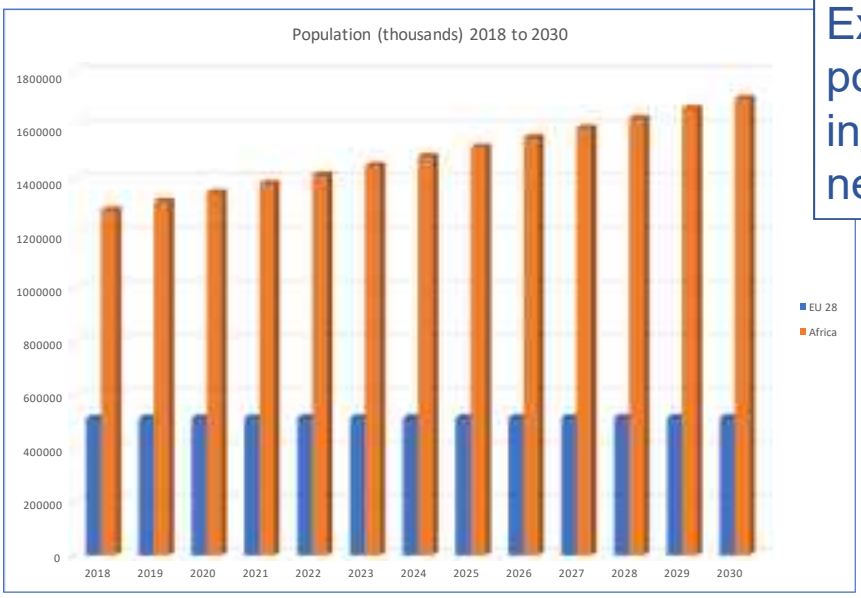
(and North America)
Urban expansion is consuming land resources and high-intensive agriculture requires large, continuous inputs of



A global view, but geographic focus when needed

Africa's population is increasing nearly 150 times faster than that of the EU

Population United Nations, World Population Prospects: The 2017 Revision
Cropland area Copernicus Global Land Service, 2018

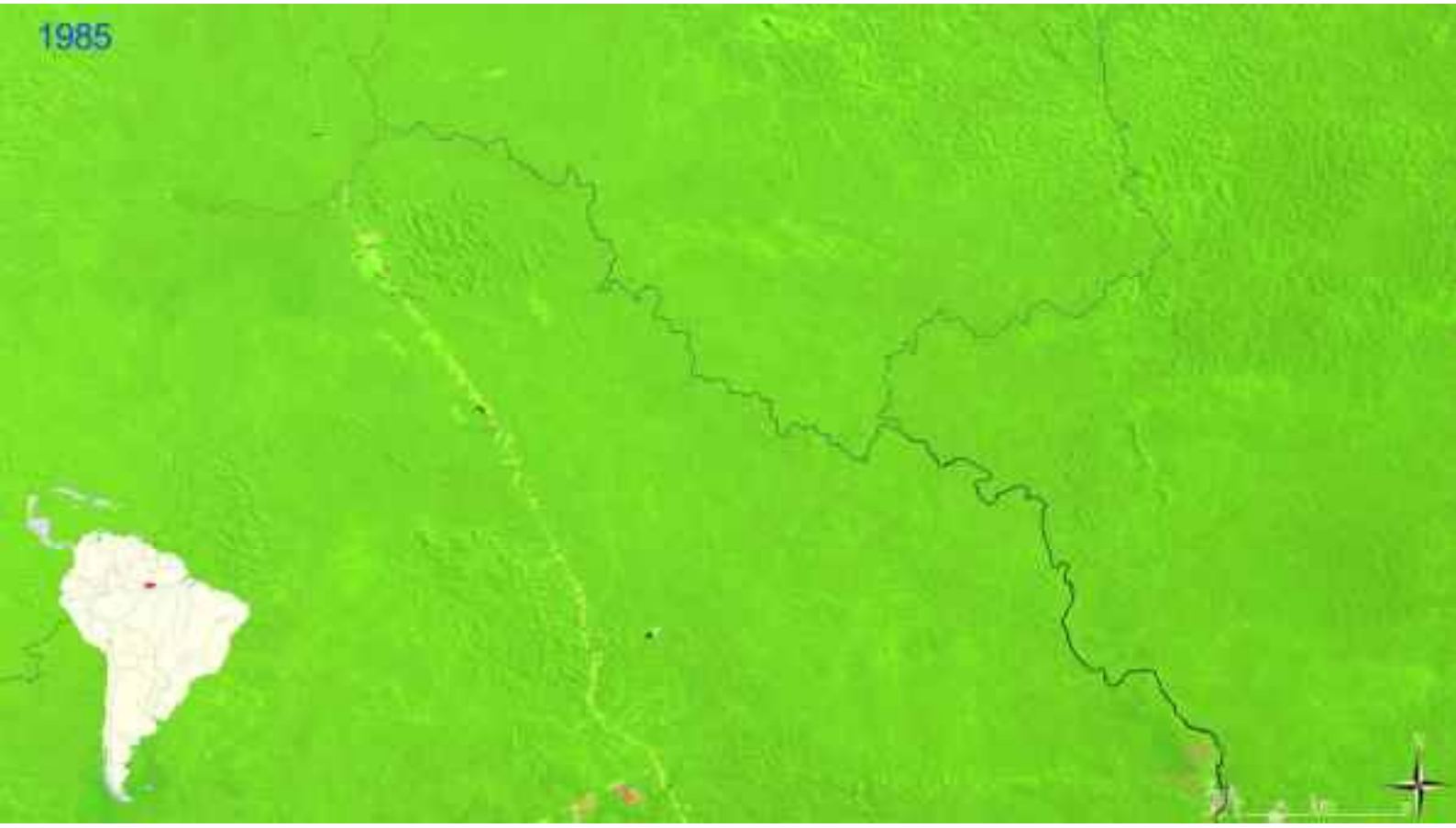


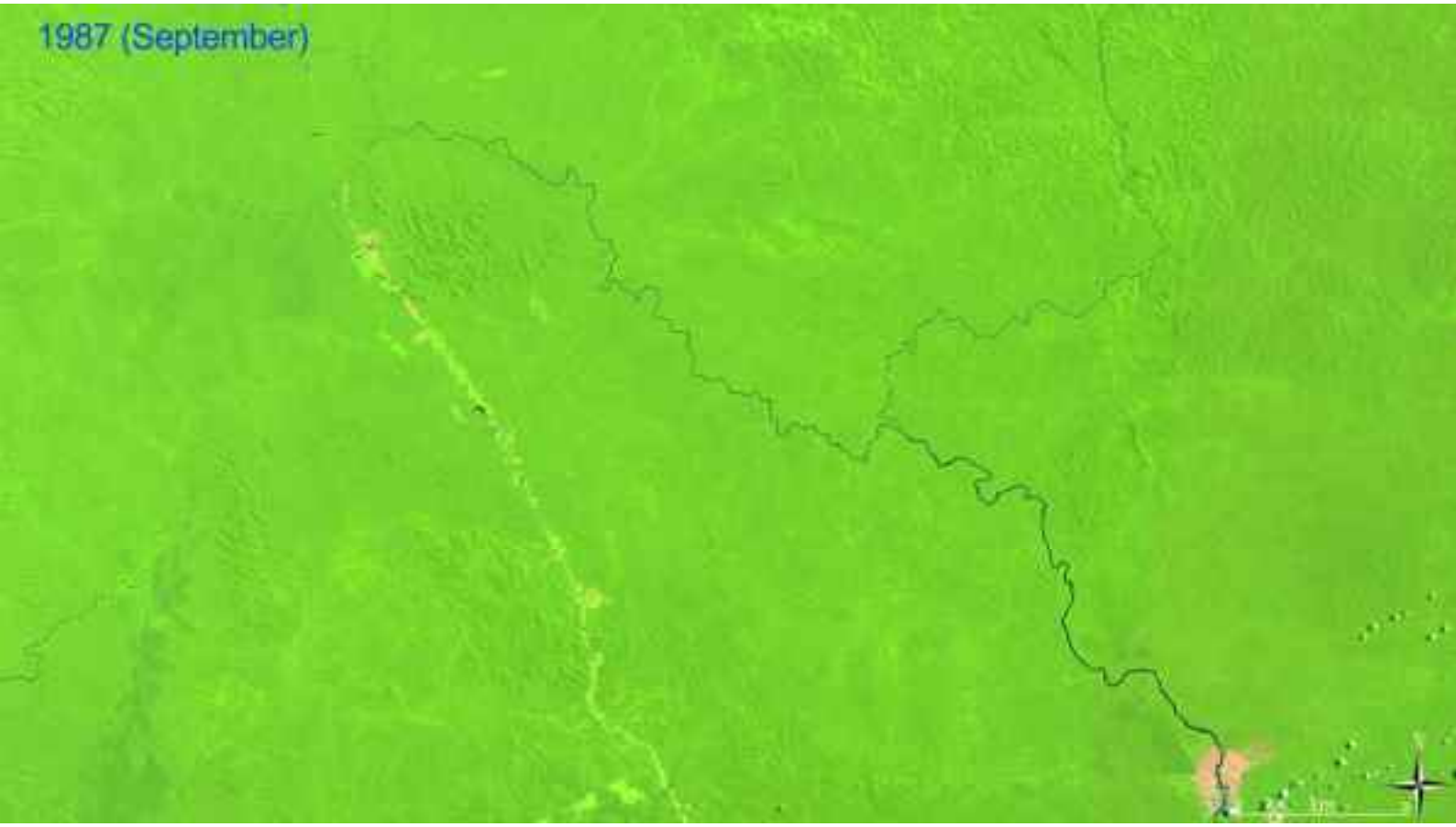
Expected population increase over the next 12 years:

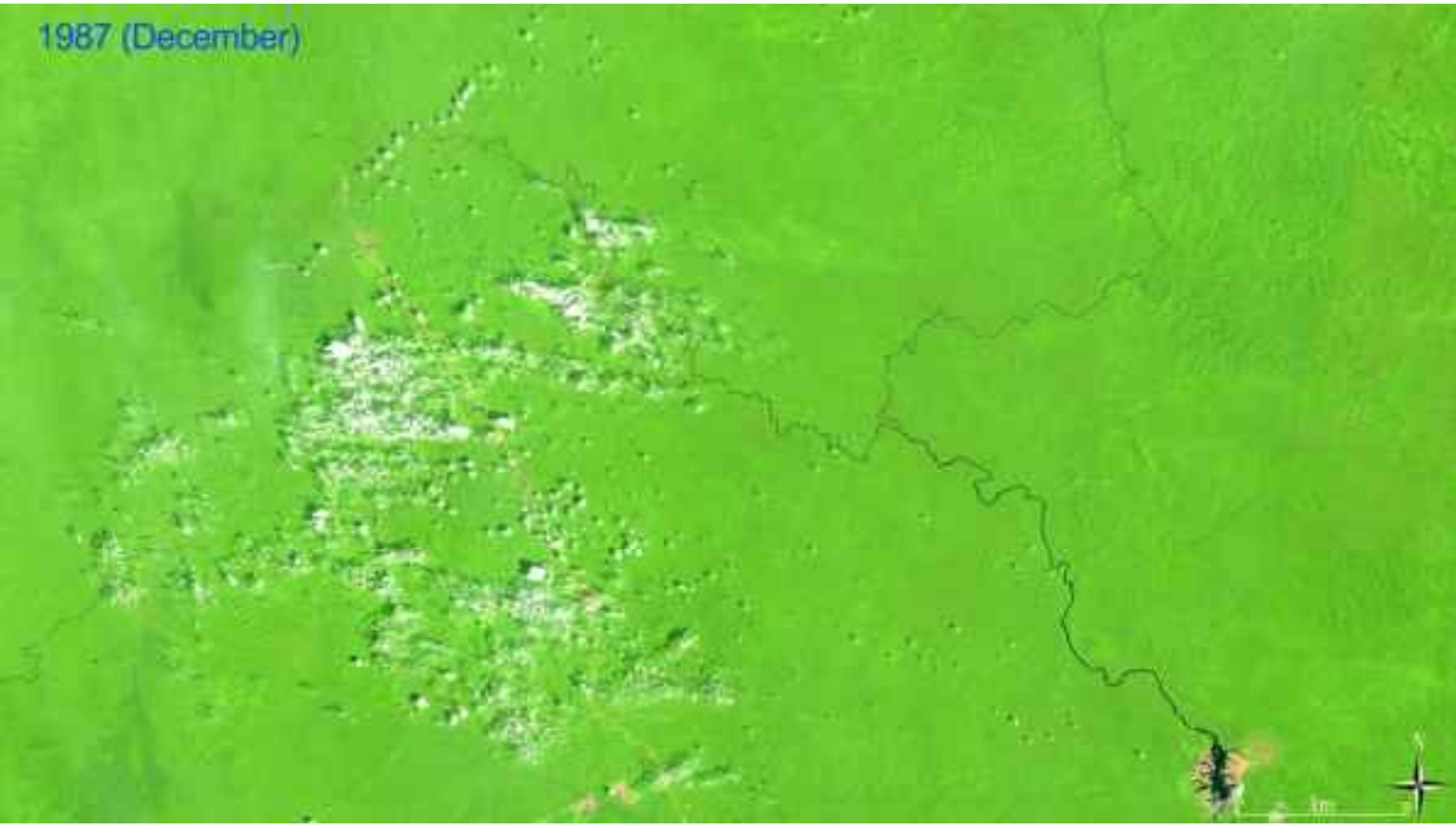
EU28
2.8 million
Africa
415.6 million

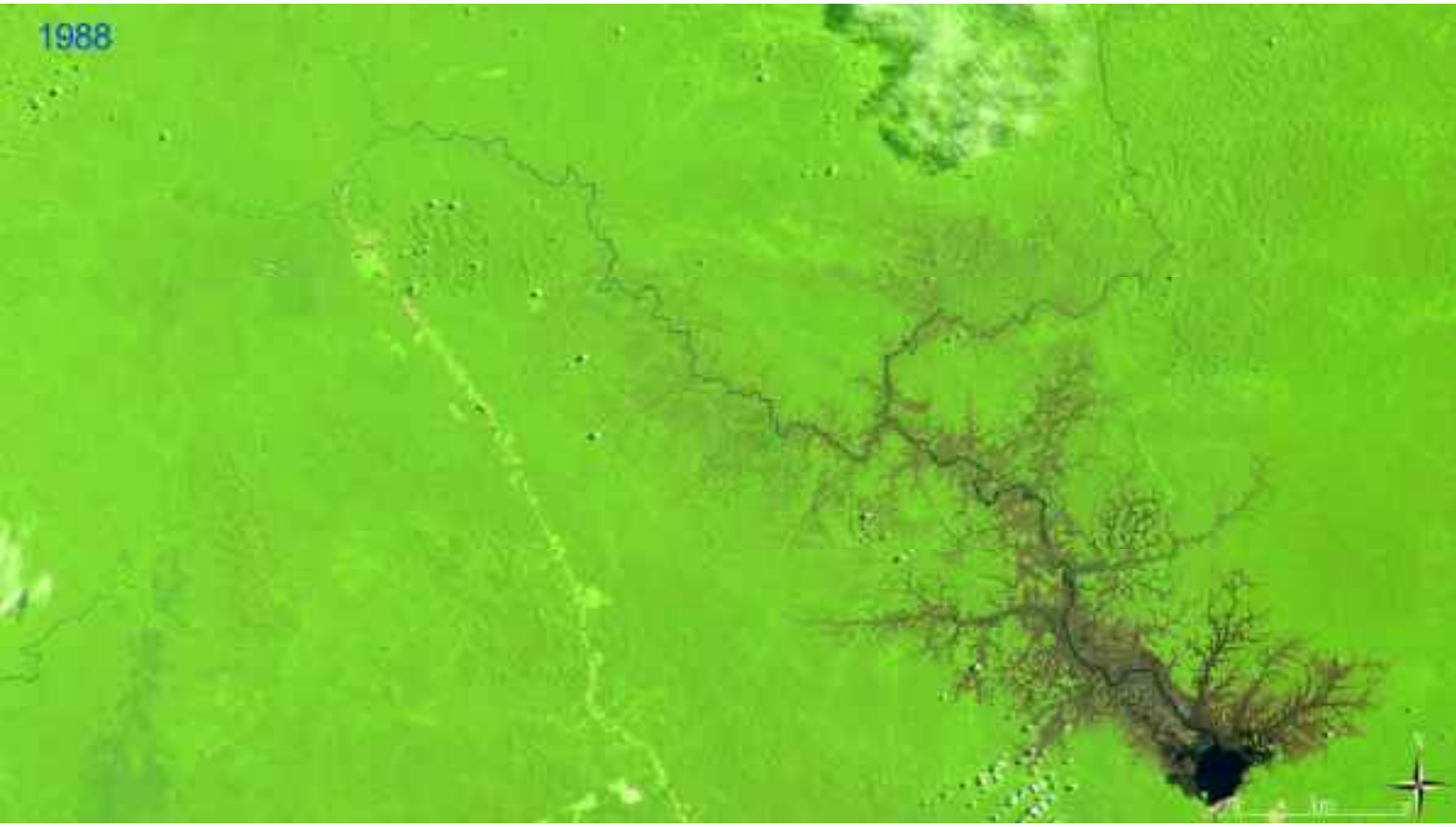
0.23 ha cropland/person 2018

0.17 ha cropland/person 2030

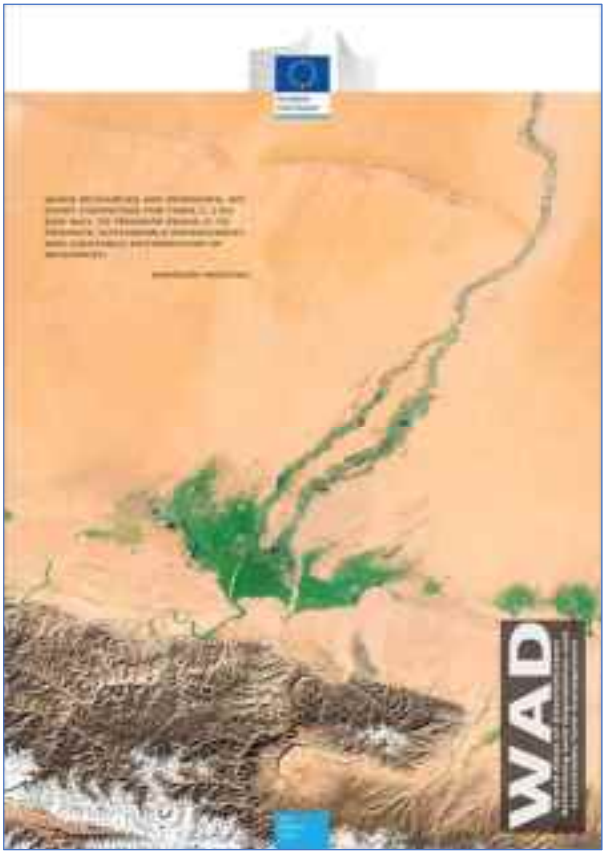



1987 (September)


1987 (December)


1988


1989



Matching places with expectation:
The World Atlas of Desertification

- Provides a global framework
- Can be used for facts, forecasts, scenarios
- Operates at scales from global to local
- Adopted by UNCCD in the context of SDG 15.3
- Is an ongoing process – framework is fixed, list of variables is not
- Solution oriented - local impacts, local decisions

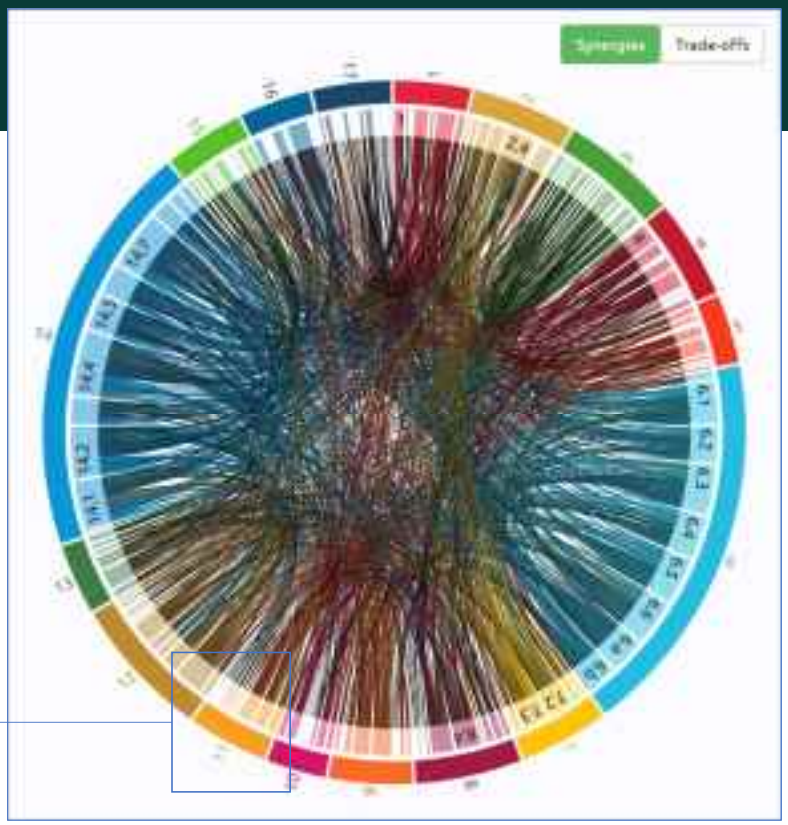
Freely available soon
http://wad.jrc.ec.europa.eu

Identify interlinkages

Maximise synergies and minimize trade-offs in the policy cycle... for selected goals/targets

SDG 11 Make cities and human settlements inclusive, safe, resilient and sustainable:Less than a third of us lived in cities in 1950, today more than half do and by 2050 it will be around 2 thirds of us...

Source (photo: "Ginza area at dusk from Tokyo Tower" by Chris 73, interlinkages, JRC



Thank you and stay in touch!

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