

Copernicus data for implementing the Sustainable development Goals

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on behalf of
the Federal Agency for Cartography and Geodesy



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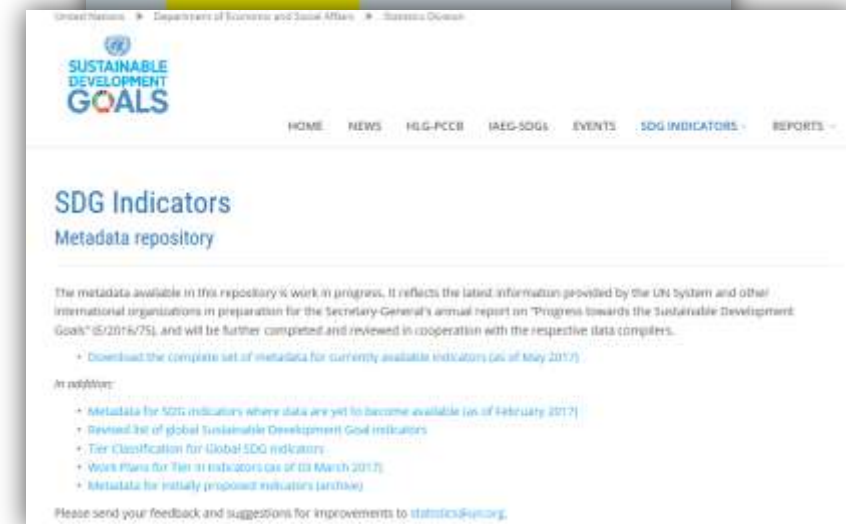
the German Environment Agency



Sustainable Development Goals (SDGs)

BACKGROUND

- In September 2015, the [Agenda-2030](#) for sustainable development, including the global sustainability goals, was adopted by the German government
- **SDGs** comprise of **17 goals**, **169 targets** and **232 indicators** (as of May 2018)
- 78 of these indicators have a geo-spatial dimension
- **German National sustainability strategy** is the national framework for the adaptation of the SDGs
- Updated every 4 years
- Comprises of 63 key indicators for monitoring the progress of the implementation of the sustainability strategy

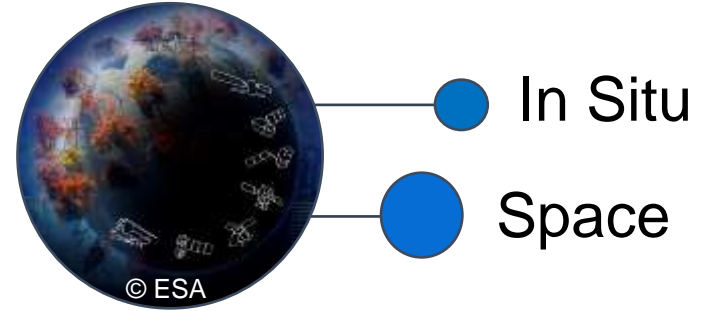


Source: German Government (2016) Deutsche Nachhaltigkeitsstrategie. Neuaufgabe 2016
<https://unstats.un.org/sdgs/metadata/>

Previously known as: Global Monitoring for Environment and Security (GMES)



Data



Basic principal

Open and free data for everyone

<http://www.copernicus.eu/>

Cop4SDGs

Project between **BKG** and **German Environment Agency**

Funded by: Ministry for Environment, Nature Conservation and Nuclear Safety

Period of funding: 07. 2018 – 10. 2020



THE GLOBAL GOALS
For Sustainable Development

OBJECTIVES

- to analyse the extent to which Copernicus datasets can contribute to the implementation of the Sustainable Development Goals (SDGs)
- to identify indicators for which data are missing and develop methods for reporting them
- to analyse the extent to which the developed methods can be used for other policies such as the adaptation of the Climate plan for 2050

Step 1: Research and investigation

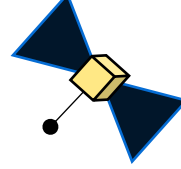
- Identification of SDG targets/Indicators which can be verified by Copernicus data
- Identification of gaps in data/methods
- Identification of indicators with existing methods that can be assisted by Copernicus data



Step 2: Identification of case studies/key applications for Germany

- Segmentation of SDGs based on the relevance of Copernicus contribution / EO Contribution
- Story telling examples

EO datasets and the SDGs



- Can be supported by EO data as per UN [1]
- Can be supported by Copernicus services and products as per Copernicus [2]
- Targets and Indicators that EO data can contribute to either directly or indirectly as per CEOS and GEO [3]

Where are the gaps in reporting

DIISTATIS
Statistisches Bundesamt

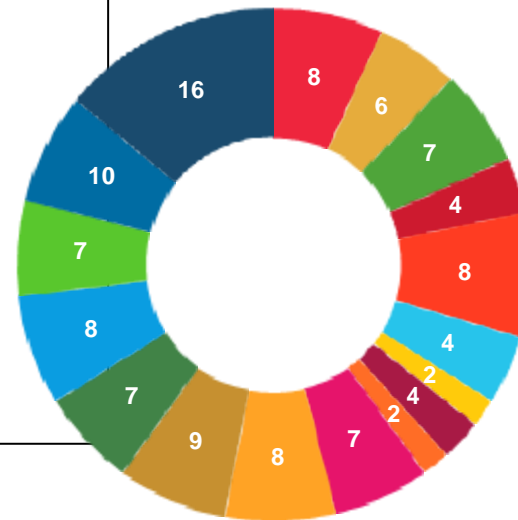
National Data for UN-SDGs

Available national indicators for the UN-Agenda 2030 for Sustainable Development

SUSTAINABLE DEVELOPMENT GOALS

June 2018

INDICATORS THAT WERE NOT REPORTED IN 2018



Target						Goal	Indicator		
Contribute to progress on the Target yet not the indicator per se							Direct measure or indirect support		
				1.4	1.5	1	1.4.2		
				2.3	2.c	2			
			3.3	3.9		3	3.9.1		
						4			
					5.a	5	5.a.1		
		6.4	6.6	6.b		6	6.4.2	6.6.1	
				7.a	7.b	7			
					8.4	8			
			9.1			9	9.1.1		
				10.6	10.7	10	10.a		
		11.4	11.5	11.6	11.7	11	11.b	11.c	
			12.2	12.4	12.8	12	12.a	12.b	12.a.1
				13.1	13.2	13	13.b		13.1.1
		14.1	14.2	14.3	14.6	14	14.a		14.3.1
			15.3	15.4	15.5	15			15.3.1
					15.8	16	15.4.1	15.4.2	
					16.8	17			
		17.6	17.7		17.16	17	17.17	17.18	17.6.1
									17.18.1

Modified from © GEO 2017

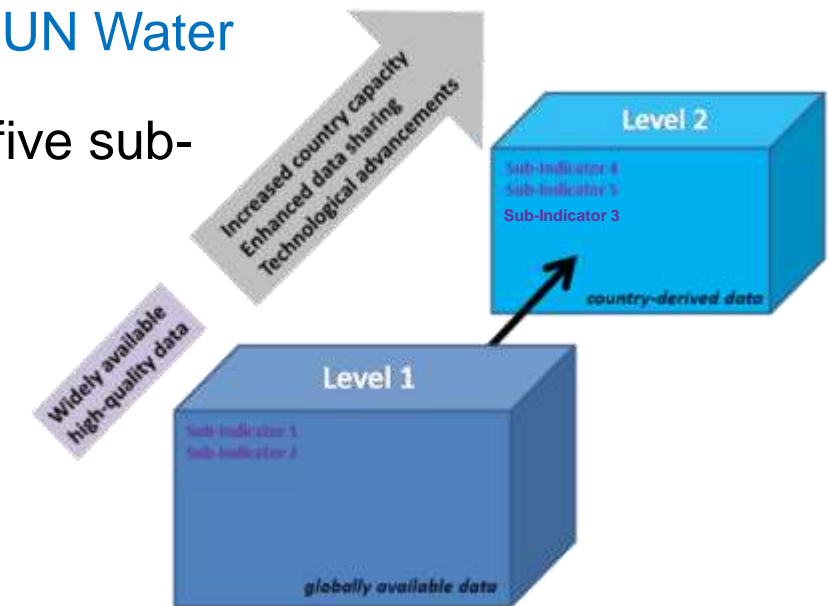
Cop4SDGs for Indicator 6.6.1

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

Facts about 6.6.1

- The custodian agency is **United Nations Environment (UNEP) & UN Water**
- The **official progressive monitoring approach** uses two levels → five sub-indicators
- Level 1 includes 2 sub-indicators:
 - Sub-indicator 1 – **spatial extent** of **water-related ecosystems**
 - Sub-indicator 2 – **water quality** of lakes and artificial water bodies
- **EO Data** is recommended for level 1



<http://www.unwater.org/publications/step-step-methodology-monitoring-ecosystems-6-6-1/>

Cop4SDGs for Indicator 6.6.1

Sub-indicator 1 includes two separate methodological approaches:

- Spatial extent of ‘open water’ – lakes, rivers, estuaries, and artificial waterbodies
- Spatial extent of vegetated wetlands

$$\text{Percentage Change in Spatial Extent} = \frac{\beta - \gamma}{\beta} \times 100$$

β = the average national spatial extent from 2001-2005

γ = the average national spatial extent of any other subsequent 5 year period

MONITORING METHODOLOGY FOR SDG INDICATOR 6.6.1

INTRODUCTION TO INDICATOR 6.6.1

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

Water-related ecosystems provide important social and economic benefits to societies, such as provision of drinking water and sanitation, recreational opportunities, maintenance of aquatic habitats to support biodiversity and fishery industries, water for key sectors such as energy and agriculture, and regulation of water flows. To ensure these important services to society are sustained, water-related ecosystems must be both protected and restored. Target 6.6 aims to do this, using the imminent date of 2020 in order to align with the Aichi Biodiversity Targets of the Convention on Biological Diversity, but will continue beyond that date to align with the rest of the SDG Targets set at 2030.

Indicator 6.6.1 is the only indicator under Target 6.6 and thus accurate and comprehensive reporting on this indicator is vital for guiding action towards rapid progress of the Target. This indicator tracks changes over time in the extent of water-related ecosystems. Indicator 6.6.1 enables countries to monitor progress towards achieving Target 6.6, in particular the protection and restoration of vegetated wetlands, open water, rivers and aquifers, all of which are known to play an important role in the delivery of water-related services. Due to the multi-faceted nature of Indicator 6.6.1, a progressive methodology is proposed which promotes country-derived data collection to be complemented by other globally available datasets such as earth observations. Used in conjunction with national knowledge and data, global earth observations which are validated by countries can enhance an understanding of how and why water related-ecosystems are changing.

This Indicator aims to collect and provide data on the spatial extent of water-related ecosystems and the quantity and quality of water within them. In combination, these components provide a comprehensive picture that enables informed decisions towards the protection and restoration of these ecosystems. The Indicator 6.6.1 data monitored on water-related ecosystems also enables decision-makers to prioritize ecosystem health, or the ability of ecosystems to maintain their structure and function over time in the face of external pressures. Some ecosystems are not included in Indicator 6.6.1 such as coral reefs which are covered in Goal 14; and mountains, forests, and drylands which are covered in Goal 15.

The following definitions describe Indicator 6.6.1 for the purposes of global monitoring:

Water-related ecosystems – includes five categories: 1) vegetated wetlands, 2) rivers and estuaries, 3) lakes, 4) aquifers, and 5) artificial waterbodies. For purposes of this methodology, the text refers only to these five ecosystem category terminologies. The majority of water-related ecosystem types monitored in Indicator 6.6.1 contain freshwater, with the exception of mangroves and estuaries which contain brackish waters and are included in Indicator 6.6.1. Ecosystems containing or within salt waters are not included as these are covered within other

1

<http://www.unwater.org/publications/step-step-methodology-monitoring-ecosystems-6-6-1/>

Cop4SDGs for Indicator 6.6.1

Dataset suggested by the custodian agency

→ Global Surface Water Explorer

Contains downloadable datasets regarding:

- Change
- Transitions
- Occurrence
- Maximum water extent ...

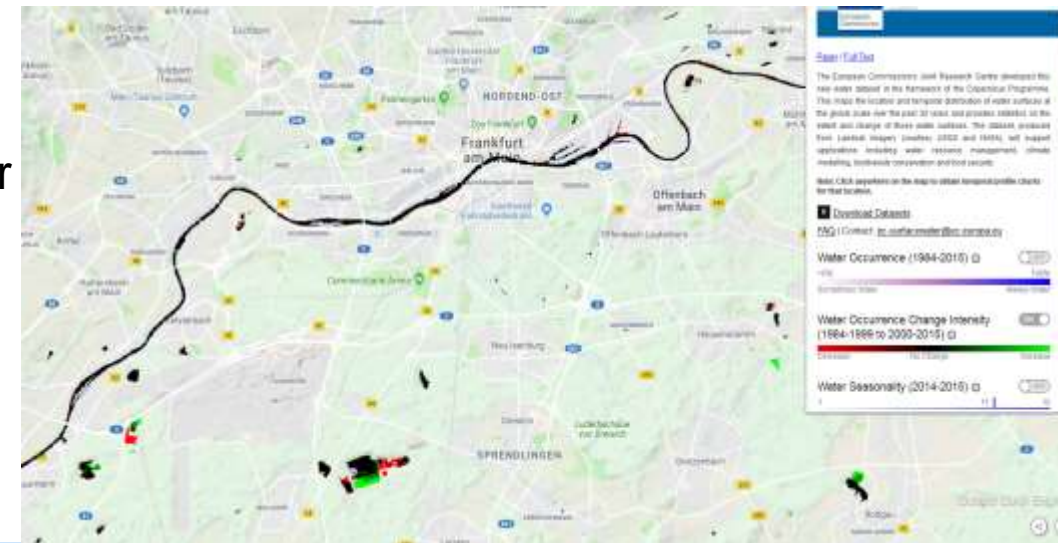
→ Change dataset contains information regarding changes in water bodies between **1984-2015**

→ extent of water bodies per year → **not known!**

→ GSWE does not provide data regarding wetlands



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



Cop4SDGs for Indicator 6.6.1

What do we need to measure this indicator?

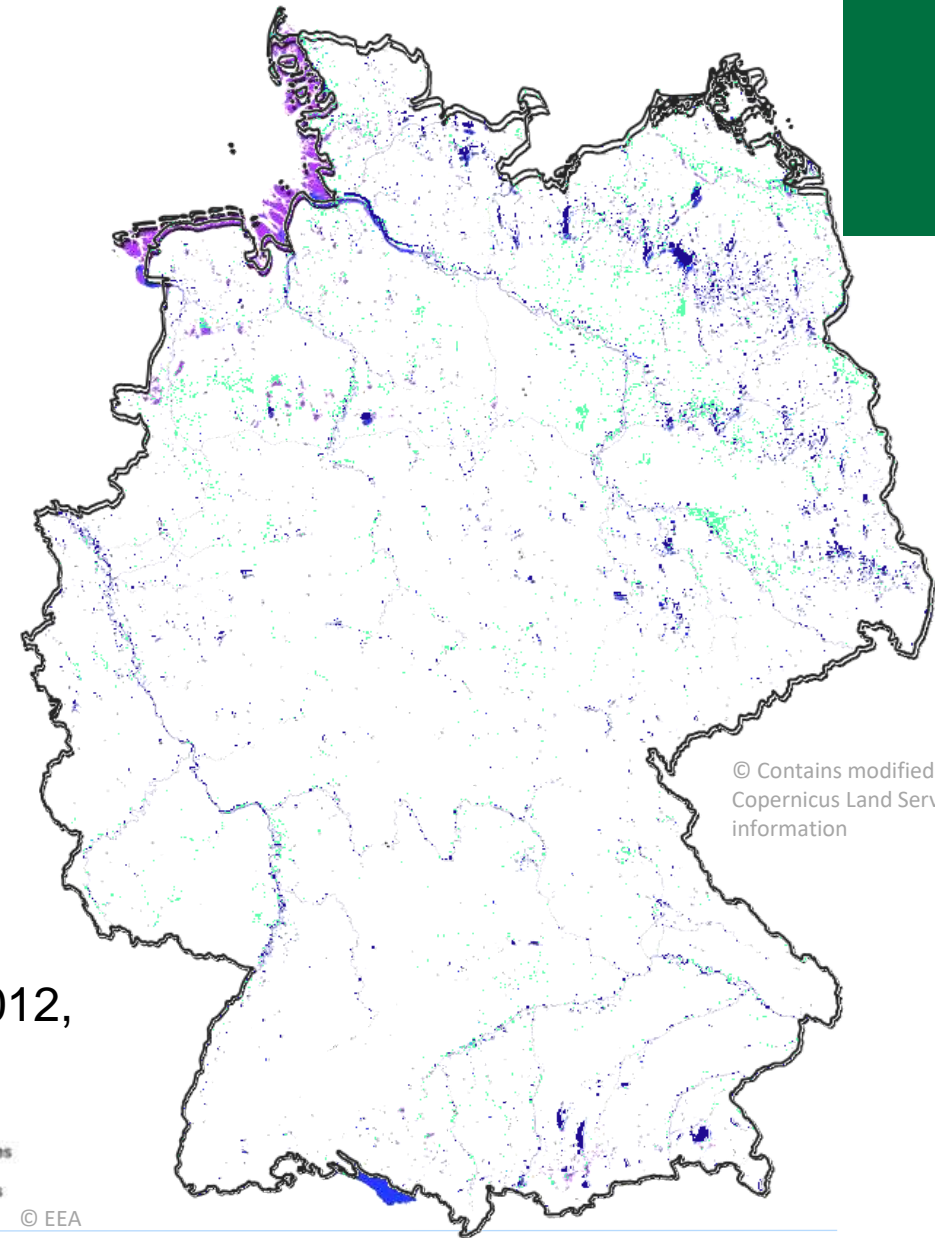
- **Spatial extent** of 'open water' – lakes, rivers, estuaries, and artificial waterbodies
- **Spatial extent** of **vegetated wetlands**

Data from the Copernicus programme that can be used:

- **High resolution layer (Water and Wetness):** permanent and temporary water and wetland data from 2015 with 20 m spatial resolutions



- **Corine Land Cover data:** Water and wetlands data with spatial resolutions of 25 ha available for the year 1990, 2000, 2006, 2012, 2018



Cop4SDGs for Indicator 6.6.1

Using data from the [Corine Land cover \(CLC\)](#) and [High Resolution layer \(HRL\) Water and Wetness](#) datasets →

$$\text{Percentage Change in Spatial Extent} = \frac{\beta - \gamma}{\beta} \times 100$$

β = the average national spatial extent from 2001-2005

γ = the average national spatial extent of any other subsequent five year period

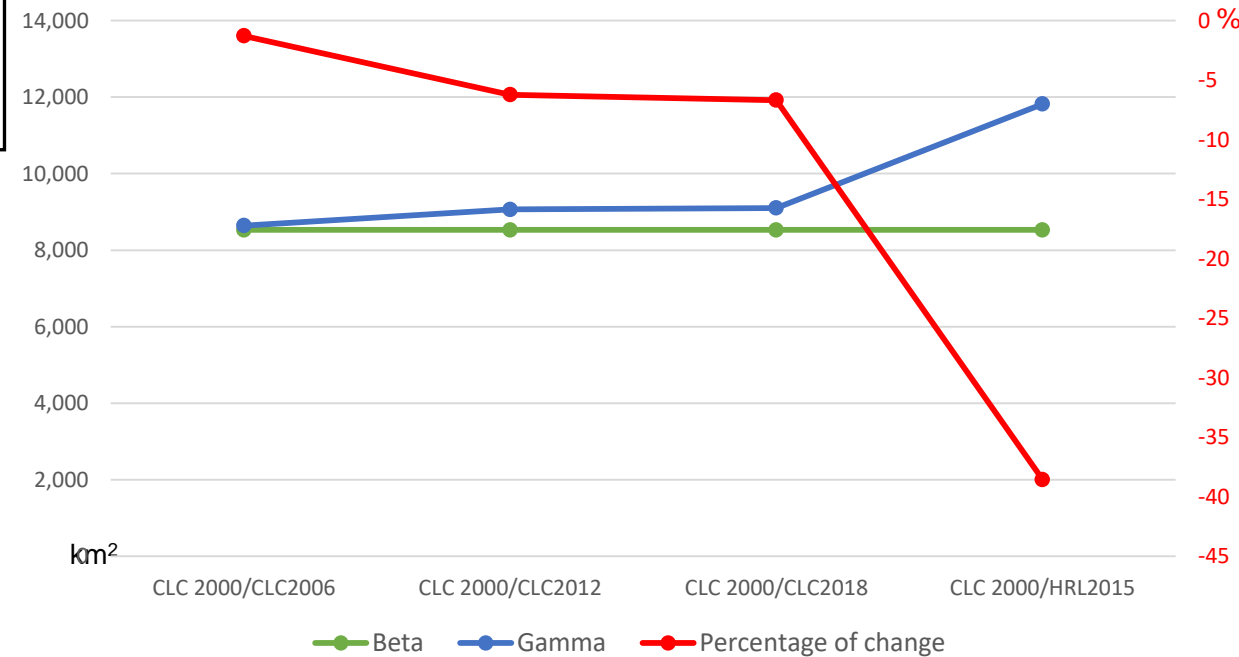
<http://www.unwater.org/publications/step-step-methodology-monitoring-ecosystems-6-6-1/>

A **negative** change indicates an **increase** in spatial extent

- CLC 2000 & CLC 2006 → **1.28 % increase**
- CLC 2000 & CLC 2018* → **6.7 % increase**
- CLC 2000 & HRL 2015 → **38 % increase**

* Corine land Cover 2018 datasets have not been validated

Percentage of change in water ecosystems in Germany



now what...

- communicate our observations and results
- **Corine Land cover data** and the **Water and wetness High Resolution Layer** may be used to calculate **sub-indicator 1** of indicator 6.6.1 → not a global solution!
- **Cop4SDGs** actively analyses the use of **Copernicus data** and products to help implement the **SDGs in Germany**
- **14 indicators** have been identified for further analysis within Cop4SDGs

→ 5 are in Tier I



EARTH OBSERVATIONS FOR THE
SUSTAINABLE DEVELOPMENT GOALS

<http://eo4sdg.org/using-copernicus-and-other-eo-data-for-implementing-the-sdgs/>

Thank you for your attention

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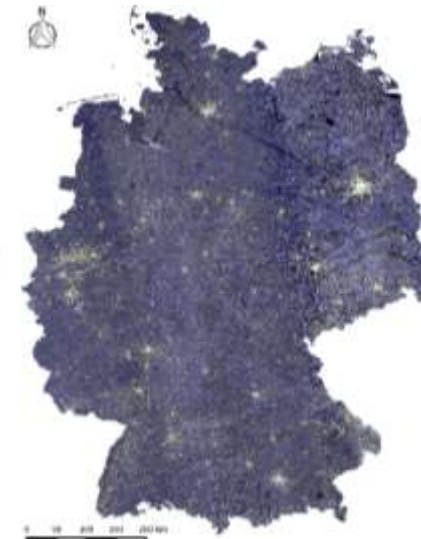
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True colour Sentinel-2 Mosaic



NIR False colour
Sentinel-2 Mosaic



Sentinel-1 mosaic from
VV-VH composites



Corine Land Cover 10ha

© BKG; Contains modified Copernicus Sentinel data

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