

# Monitoring Water Related Ecosystem Extent Using Earth Observation and Ground Truthing To Facilitate Basin Level Decision Making

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Consultative Meeting on the Implementation Framework for the  
Environmental Dimension of the 2030 Agenda in the Arab Region  
18 – 21 September 2017, Cairo, Egypt.

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# UN Environment & Freshwater

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**UN Environment** is the leading global environmental authority that sets the global environmental agenda, promotes the coherent implementation of the environmental dimension of sustainable development within the United Nations system and serves as an authoritative advocate for the global environment

**UN Environment Freshwater Unit** supports countries in conserving, restoring and sustainably managing their freshwater ecosystems, the biodiversity they contain and the products and services they provide for human well-being and prosperity.

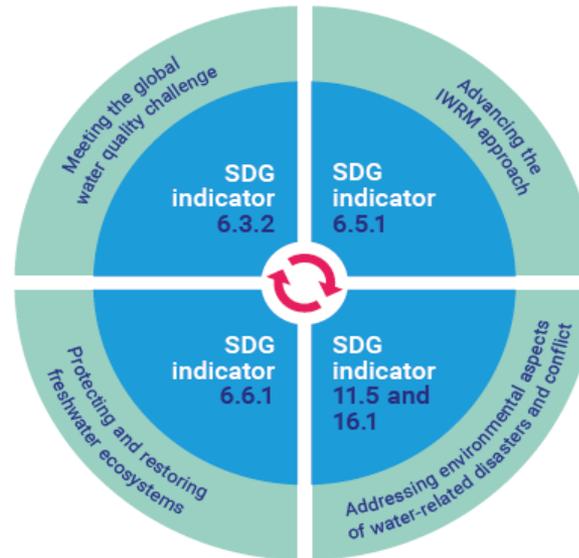
# UN Environment Freshwater Priorities

Meeting the global water quality challenge  
(SDG target 6.3)

Protecting and restoring freshwater ecosystems  
(SDG target 6.6)

Advancing the Integrated Water Resources Management approach  
(SDG target 6.5)

Promoting resilience and addressing the environmental aspects of water-related disasters and conflict  
(SDG targets 11.5 and 16.1)



Freshwater Strategy 2017-2021



[https://wedocs.unep.org/bitstream/handle/20.500.11822/19528/UNEP-full\\_report-170502.pdf?sequence=3&isAllowed=y](https://wedocs.unep.org/bitstream/handle/20.500.11822/19528/UNEP-full_report-170502.pdf?sequence=3&isAllowed=y)

# The Water Cycle in the Sustainable Development Goals

*Goal:* “Ensure availability and sustainable management of water and sanitation for all”

11.5  
Disasters

6.4  
Water use and scarcity

6.3  
Waste-water and water quality

6.5  
Water management

6.a and 6.b  
Cooperation and participation

6.2  
Sanitation and hygiene

6.6  
Eco-systems

6.1  
Drinking water

6 CLEAN WATER AND SANITATION



11 SUSTAINABLE CITIES AND COMMUNITIES



SUSTAINABLE DEVELOPMENT GOALS  
17 GOALS TO TRANSFORM OUR WORLD

# National Monitoring & Global Reporting

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- Data and analyses on the extent, quantity and quality of water within freshwater ecosystems improves decision making for sustainable use and management of water
- Data submitted to UN Environment for any of the three water indicators (6.3.2, 6.5.1 or 6.6.1) by **30<sup>th</sup> October 2017** will be included in the SDG-6 Synthesis Report
- Earth Observations data and analysis on water body extent may be included if countries validate the data

# Status of the data drive for 6.3.2 & 6.6.1

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- Request for indicator data sent to 193 Member States in April 2017
- Two indicators (6.6.1 & 6.3.2) use one data collection form
- Indicator training webinars rolled out in May and June 2017 with over 60 countries participating  
(available to watch: [sdg6monitoring.org](http://sdg6monitoring.org))
- 2 day in-country indicator training provided to 9 countries
- 34 countries have submitted data. UN Environment working with an additional 20 countries.
- Earth Observation data measuring change in extent of open water bodies, available for 193 countries, in September 2017

# Countries that have submitted data 6.3.2 & 6.6.1

- **Europe:** Netherlands, Liechtenstein, Slovenia, Macedonia, Montenegro, Austria, Estonia, Poland, Germany, Switzerland, Latvia, Finland,
- **Africa:** Tunisia, Benin, Zimbabwe, Tanzania, Madagascar, Morocco, Sudan, Botswana, Kenya, Rwanda, South-Africa, Namibia, Lesotho, Sierra Leone,
- **West Asia:** Lebanon, Jordan
- **Asia & Pacific:** Marshall Islands, Japan
- **Latin America:** Brasil, Andorra, El Salvador, Peru

# Countries that are expected to submit

## 6.3.2 & 6.6.1

- **Europe:** Bosnia and Herzegovina, Iceland, Israel, Malta, Serbia, Slovakia
- **Africa:** Algeria, Angola, Cameroon, Ethiopia, Egypt, Gabon, Ghana, Malawi, Nigeria, Senegal, Seychelles, Swaziland, Togo, Uganda, Zambia (+5 from CapNet support)
- **Asia & Pacific:** Malaysia, Mongolia, Saint Vincent and the Grenadines, Republic of Korea, Samoa, Singapore (+5 from Capnet support)
- **Latin America:** Antigua and Barbuda, Costa Rica, Ecuador, Grenada, Guyana, Jamaica, (+5 from Capnet support)
- **North America:** United States of America

# SDG Indicator 6.6.1

*Change in the extent of water-related ecosystems over time*



## **Sub-indicators:**

- Spatial Extent
- Quantity
- Quality

## **Freshwater Ecosystems:**

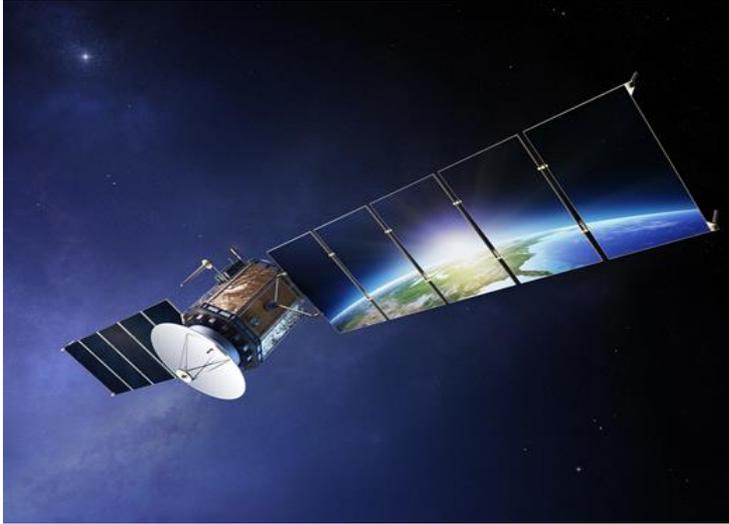
- **Open Water Bodies** (lakes, reservoirs, rivers, estuaries)
- **Vegetated Wetlands** (swamps, swamp forests, marshes, paddies, peatlands and mangroves)
- **Groundwater**

# Sources of Data (sdg6monitoring.org)

Inventory	Source
<b>RAMSAR Convention on Wetlands</b>	<a href="http://ramsar.org">http://ramsar.org</a>
<b>WET Index resources</b>	<a href="https://www.bipindicators.net/indicators/wetland-extent-trends-index">https://www.bipindicators.net/indicators/wetland-extent-trends-index</a>
<b>IUCN</b>	<a href="http://www.waterandnature.org">www.waterandnature.org</a>
<b>Aquastat</b>	<a href="http://www.fao.org/nr/water/aquastat/data/query/index.html?lang=en">http://www.fao.org/nr/water/aquastat/data/query/index.html?lang=en</a>
<b>Global wetlands</b>	<a href="http://www.globwetland.org/">http://www.globwetland.org/</a> and more recent <a href="http://www.globwetland-africa.org">www.globwetland-africa.org</a>
<b>Global Lakes and Wetlands Database</b>	<a href="http://www.worldwildlife.org/pages/global-lakes-and-wetlands-database">http://www.worldwildlife.org/pages/global-lakes-and-wetlands-database</a> Global surface water <a href="https://global-surface-water.appspot.com/">https://global-surface-water.appspot.com/</a> and CIFOR SWAMP (for tropics and subtropics) <a href="http://www.cifor.org/global-wetlands/">http://www.cifor.org/global-wetlands/</a> .
<b>Earth obs for wetlands</b>	<a href="http://swos-service.eu/">http://swos-service.eu/</a>
<b>World Water</b>	<a href="http://worldwater.org/water-data/">http://worldwater.org/water-data/</a>
<b>WMO Hydrological Observing System</b>	<a href="http://www.wmo.int/pages/prog/hwrrp/chy/whos/">http://www.wmo.int/pages/prog/hwrrp/chy/whos/</a>
<b>FAO Water</b>	<a href="http://www.fao.org/nr/water/infores_databases.html">http://www.fao.org/nr/water/infores_databases.html</a>
<b>World Bank - Water Home</b>	<a href="http://www.worldbank.org/en/topic/water">http://www.worldbank.org/en/topic/water</a>
<b>UNEP Live</b>	<a href="http://uneplive.unep.org/">http://uneplive.unep.org/</a> - the repository for SDG data
<b>UNEP – GEMStat/Water</b>	<a href="http://gemstat.org/">http://gemstat.org/</a> , <a href="http://www.unep.org/gemswater/">http://www.unep.org/gemswater/</a>
<b>Global runoff Rivers &amp; Lakes and Hydroweb (from LEGOS)</b>	<a href="http://www.bafg.de/GRDC/EN/Home/homepage_node.html">http://www.bafg.de/GRDC/EN/Home/homepage_node.html</a> <a href="http://www.legos.obs-mip.fr/en/soa/hydrologie/hydroweb/">http://www.legos.obs-mip.fr/en/soa/hydrologie/hydroweb/</a> ) inland surface water levels from satellite altimetry.
<b>River flows – there are many models that are being developed</b>	WaterGAP2/3; CLM; DBH; DLEM; H08; JULES-TUC; JULES-UOE; LPJmL; Mac-PDM.09; MATSIRO; MPI-HM; ORCHIDEE; PCR-GLOBWB; SiBUC; SWBM; VIC
<b>Global groundwater</b>	<a href="http://www.un-igrac.org/global-groundwater-information-system-ggis">http://www.un-igrac.org/global-groundwater-information-system-ggis</a>
<b>Global environmental flows</b>	<a href="http://waterdata.iwmi.org/Applications/Global_Assessment_Environmental_Water_Requirements_Scarcity/">http://waterdata.iwmi.org/Applications/Global_Assessment_Environmental_Water_Requirements_Scarcity/</a>

# The role of Earth Observations in measuring water body extent

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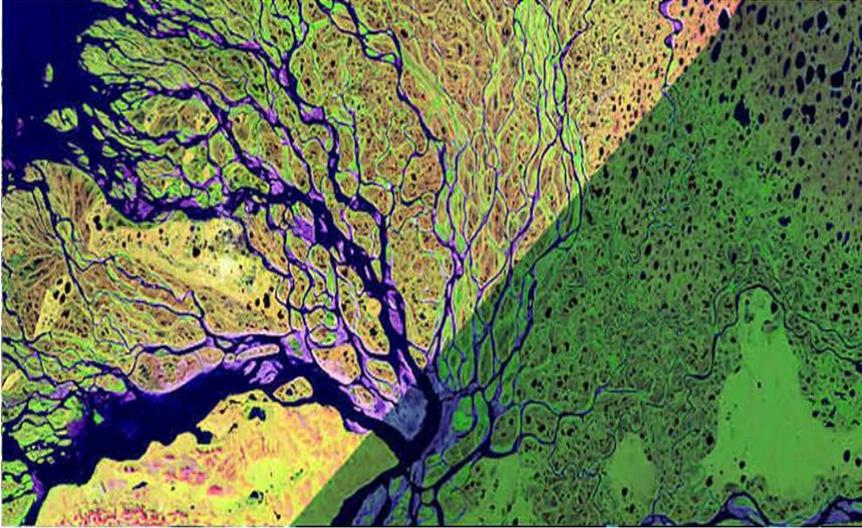
By September 2017, the Joint Research Center (JRC) and Google Earth Engine will generate national trend analysis for 193 UN Member States, using 1984-2015 data series and provide this to UN Environment.

Country analysis will include:

- a. total extent of surface water
- b. percentage net change in extent of water
- c. total amount of new water bodies
- d. total amount of lost water bodies

# The role of Earth Observations in measuring indicator 6.6.1

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UN Environment and NASA are collaborating to test the relevance of EO data for indicator 6.6.1 and parts of 6.3.2

## **Benefits of EO data:**

- a. high accuracy
- b. captures lots of water bodies
- c. data collection cost low

## **Challenges of EO data:**

- Measurements of wetlands available by end of 2018
- Flow data still required from ground measurements
- Country ownership critical

# **UN Environment / NASA initiative to generate 6.6.1 data**

**Data obtained through this Earth Observations pilot exercise in no way intends to replace country reporting on SDGs and in particular indicator 6.6.1**

The data collected will be provided to countries for their use to strengthen data-driven decision-making and the data will also be used by UN Environment for the SDG 6 reporting process and will be represented at regional and international symposia.

# Upcoming Discussions

- **The Group on Earth Observations (GEO) - XIV Plenary, October 23-27 2017 in Washington, D.C.**
- **The United Nations Global Geospatial Information Management (UN-GGIM) meeting, November 9-10, 2017, in Mexico City**

# Thank you

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