



SDG 6 and global water quality monitoring



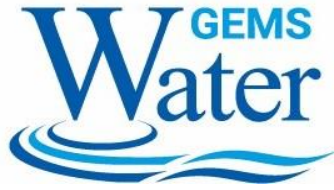
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GEMS/Water: The global freshwater quality monitoring programme

GEMS/Water was established in 1975 to encourage and support water quality monitoring for the generation and sharing of reliable water quality data for national, regional and global assessments to support effective water resources management

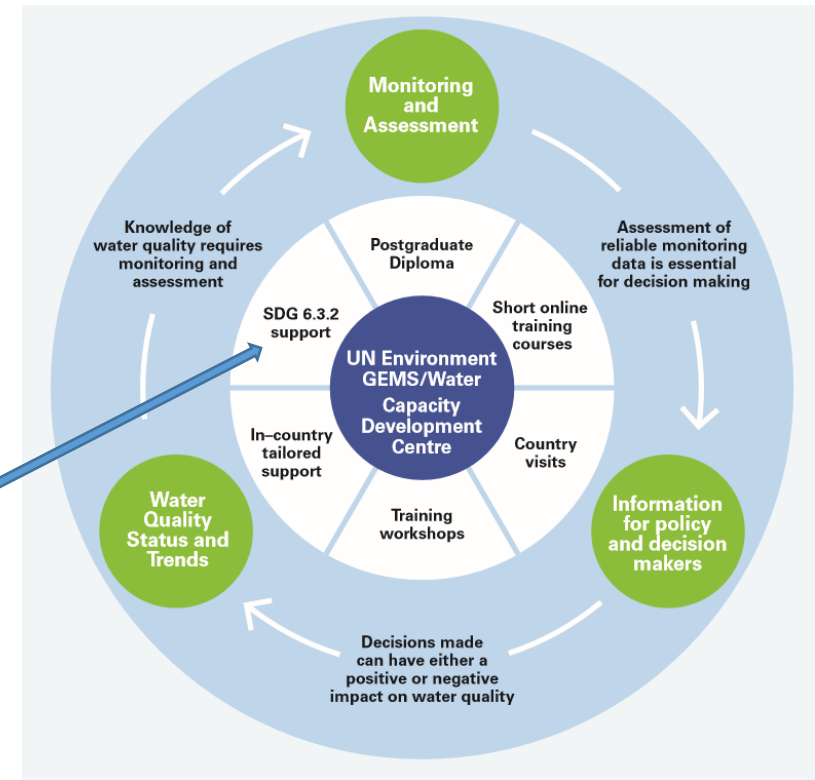


GEMS/Water co-ordination – UNEP, Nairobi, Kenya
GEMS/Water Capacity Development Centre – UCC, Cork, Ireland
GEMS/Water Data Centre, Federal Institute of Hydrology, Koblenz, Germany



The UNEP GEMS/Water Capacity Development Centre was established in 2015 in the Environmental Research Institute of University College Cork

Mission: To develop global capacity to monitor the quality of freshwater in support of environmental assessments at national, regional and global scales

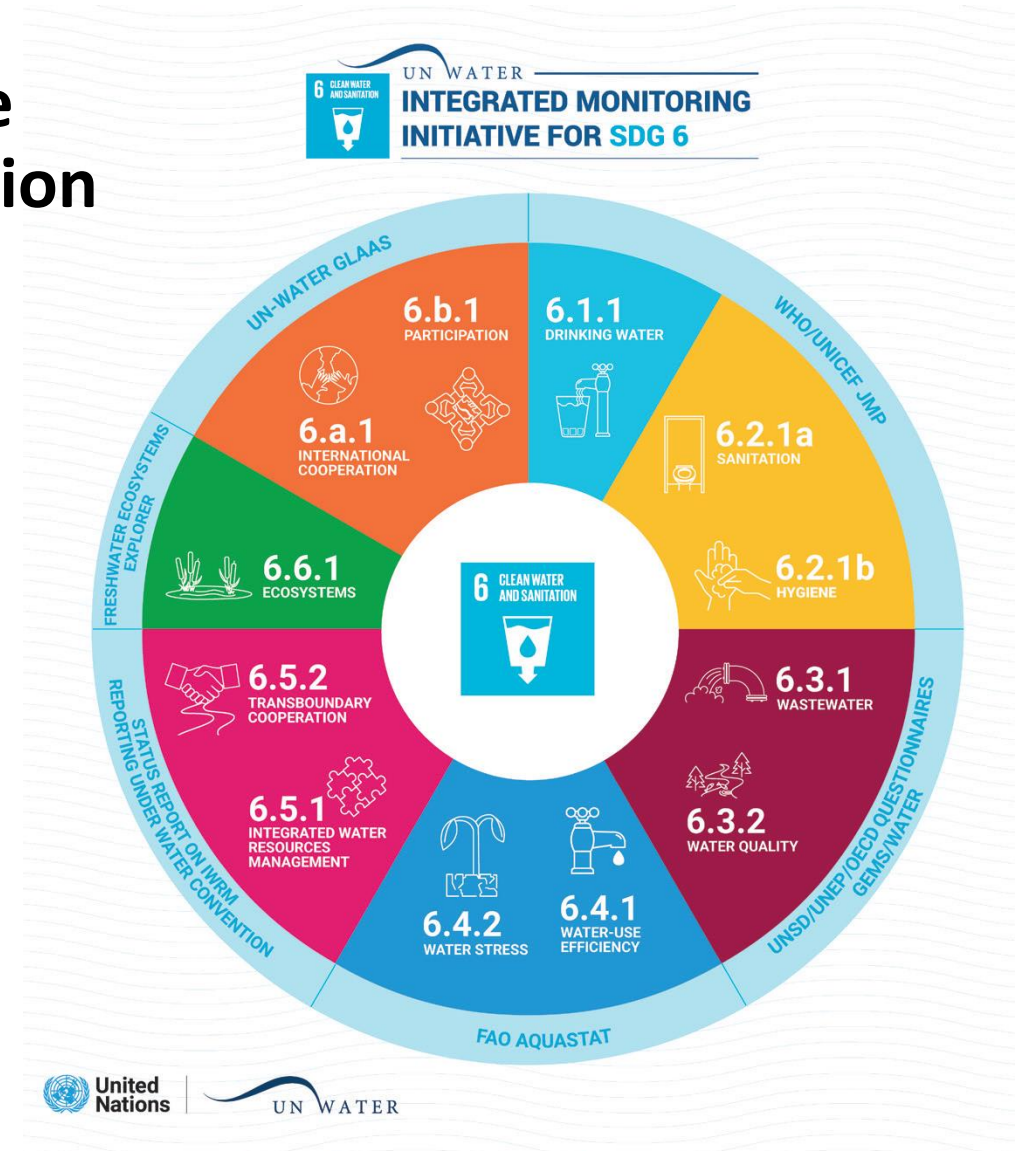




Ensure availability and sustainable management of water and sanitation for all

Eight targets and 11 indicators

Target 6.3: “**By 2030, improve water quality** by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally”





Challenges for the methodology:

- Feasible for all nations worldwide
- Minimal additional monitoring burden for countries
- Meaningful and comparable data

The national indicator value is the proportion of water bodies assessed that achieve 80% compliance with the national target values over the period of assessment (every three years).

Parameter group	Parameter	River	Lake	Groundwater	Reason for inclusion
Oxygen	Dissolved oxygen	•	•		Measures oxygen depletion
	Biological oxygen demand, chemical oxygen demand	•			Measures organic pollution
Salinity	Electrical conductivity Salinity, total dissolved solids	•	•	•	Measures salinization and helps characterize the water body
Nitrogen*	Total oxidized nitrogen Total nitrogen, nitrite, ammoniacal nitrogen	•	•		Measures nutrient pollution
	Nitrate**			•	Consumption threatens human health
Phosphorus*	Orthophosphate Total phosphorus	•	•		Measures nutrient pollution
Acidification	pH	•	•	•	Measures acidification and helps characterize the water body

* Countries should include the fractions of nitrogen and phosphorus which are most relevant in the national context.

** Nitrate is suggested for groundwater due to the associated human health risks.



In situ measurements



Laboratory analysis of water samples



National governments need to collect the data, calculate the indicator and report the indicator value to UNEP for quality checking and onward transmission to the UN Statistical Division

Level 1

Reported by all countries where possible

- core parameters only combined into water quality index

Level 2

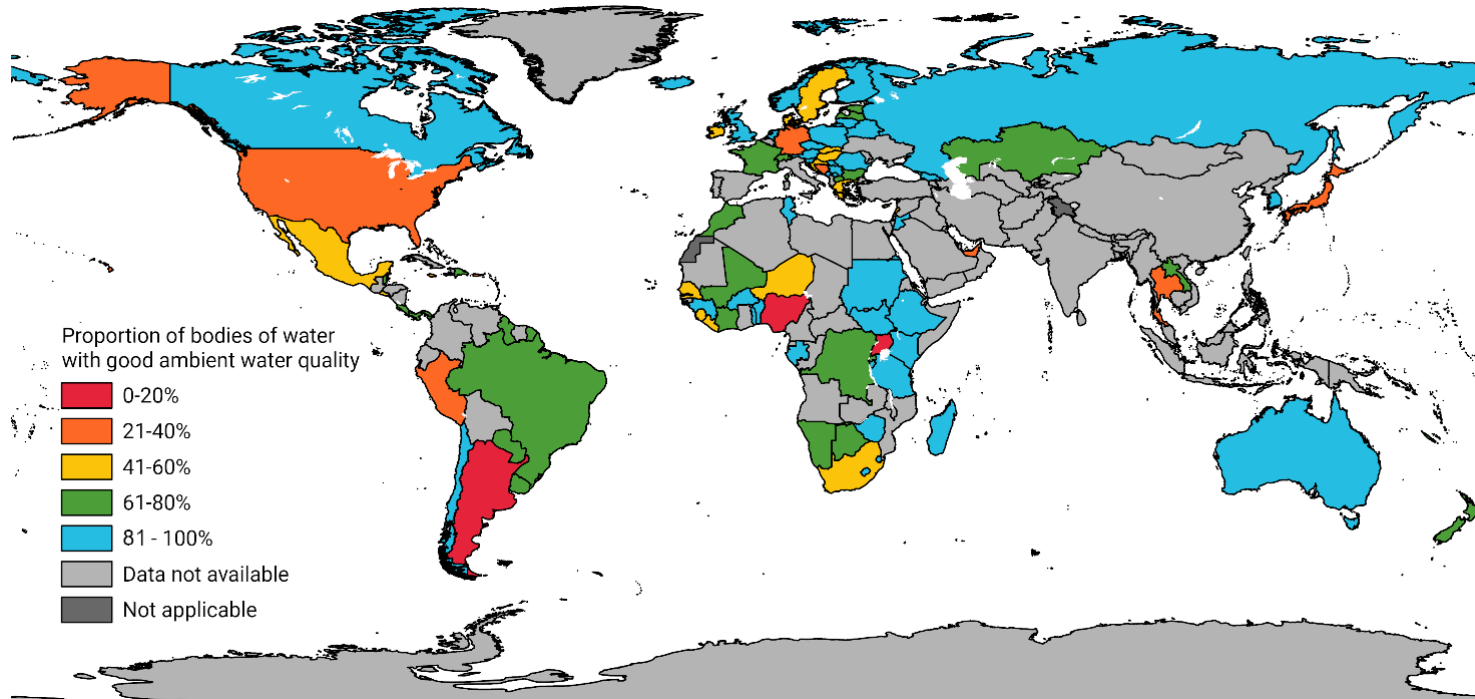
Optional, based on country's water quality monitoring capacity

- additional parameters
- additional approaches





Data submissions from 2017 and 2020 from 96 countries

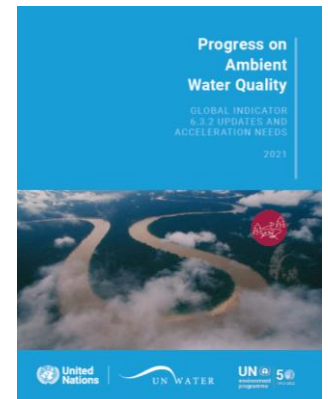


3 billion people could be at risk because the health status of their freshwater ecosystems is unknown

Source: Adapted from UN-Water (2021)

Of the 89 countries with data available, only 50 have information about groundwater

Over
100
Countries engaged





- *Lack of technical and institutional capacity in many countries*
- Many countries do not have **target values** for ambient water quality
- *Lack of knowledge and appreciation amongst policy makers* about the importance of monitoring and managing ambient water quality
- ***Perceived lack of need for targeted in situ water quality data collection at national scale***
- Additional resource requirements and reporting burden on national level agencies and organizations
- ***How to integrate alternative monitoring approaches into a global index,*** (remote sensing, *in situ* sensors, citizen science, models)



Potential benefits

- Global coverage
- Temporal frequency
- ?

Challenges

- Issues of scale - application to all water bodies not yet feasible
- Limited assessment of water quality – limited parameters and currently mostly lakes
- Are countries technically able to use and validate remote sensing data?
- How to integrate remote sensing data into the global index - aim to compliment rather than replace in situ water quality assessment?

Thank you for your attention
Any questions?



For further information:

Contact me: d.chapman@ucc.ie

See <https://www.ucc.ie/en/gemscdc/>
<https://communities.unep.org/display/sdg632/Documents+and+Materials>



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