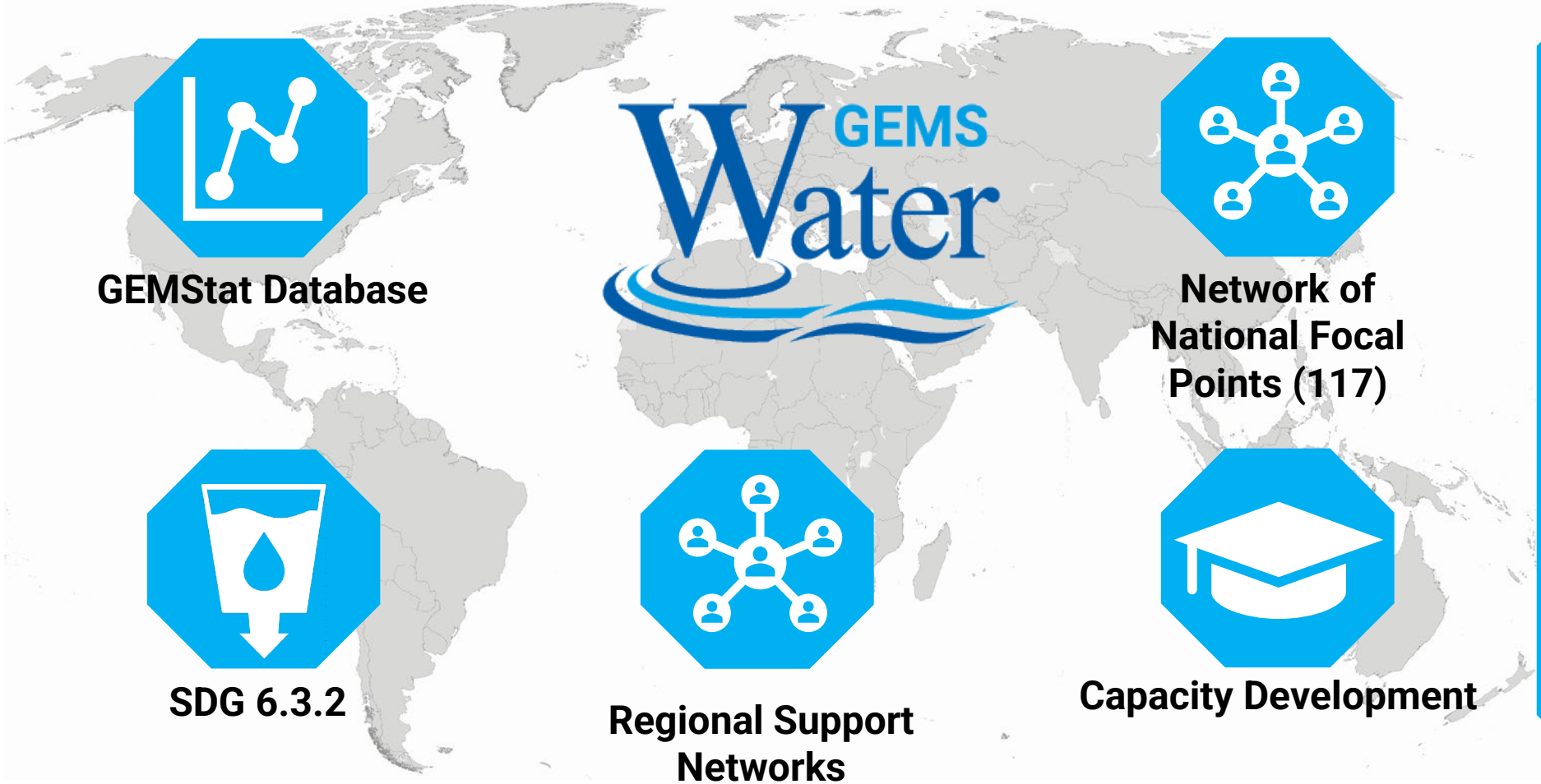
WWQA
World Water Quality Alliance

UNEP's Global Environment Monitoring System for Freshwater (GEMS/Water) Custodian for SDG 6.3.2

Kilian Christ – UNEP

WORLD METEOROLOGICAL ORGANIZATION
WMO HydroHub
UN environment programme 50 1972-2022
UNESCO
World Health Organization
Open Geospatial Consortium

Global Environment Monitoring System for Freshwater (GEMS/Water) Programme



GEMStat Database

Network of National Focal Points (117)

SDG 6.3.2

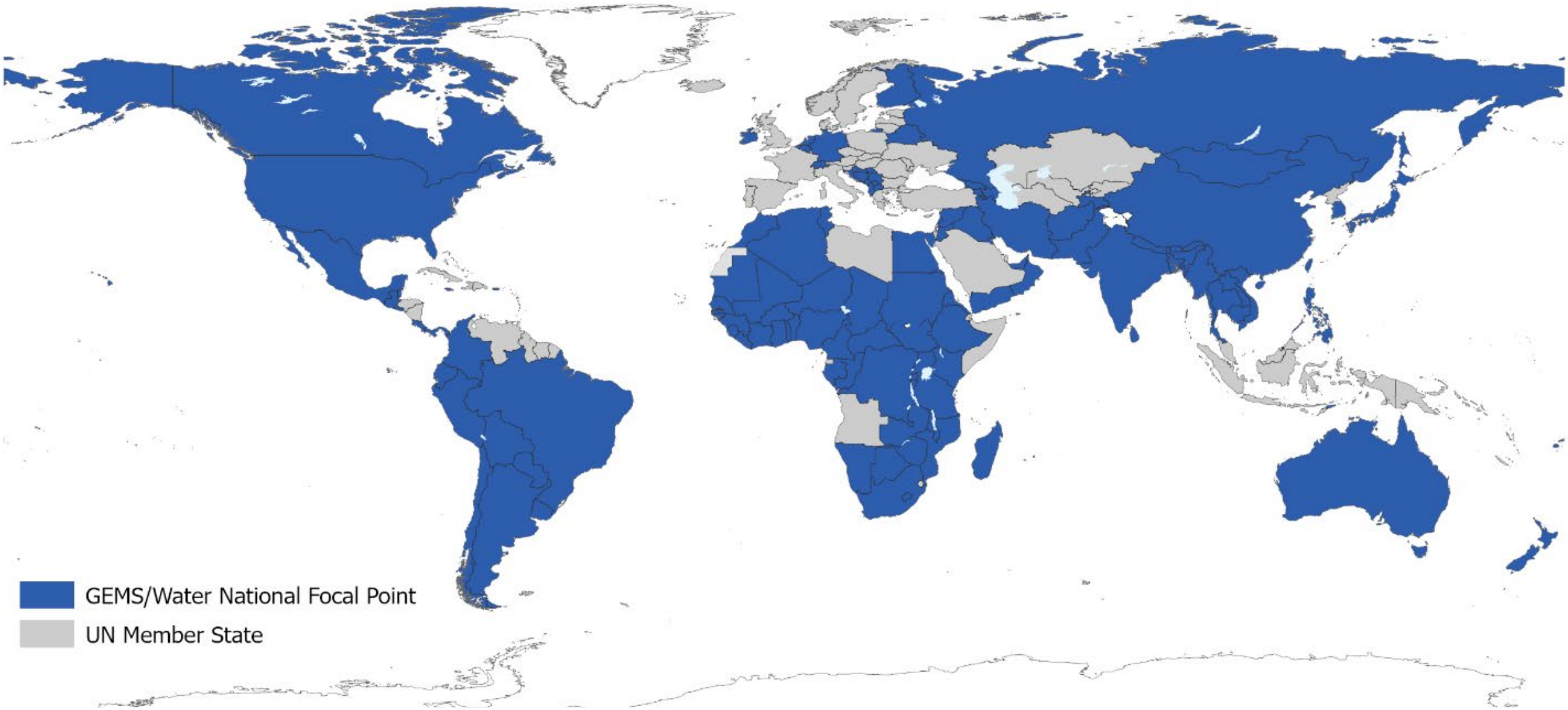
Regional Support Networks

Capacity Development

UNEP GEMS/Water:

- provides quality assured data to keep the state of the world's freshwater resources under review,
- develops capacity of member states, and
- provides information and services
- across the science-policy-public interface
- advocating the 2030 Agenda for Sustainable Development.

GEMS/Water Global Monitoring Network



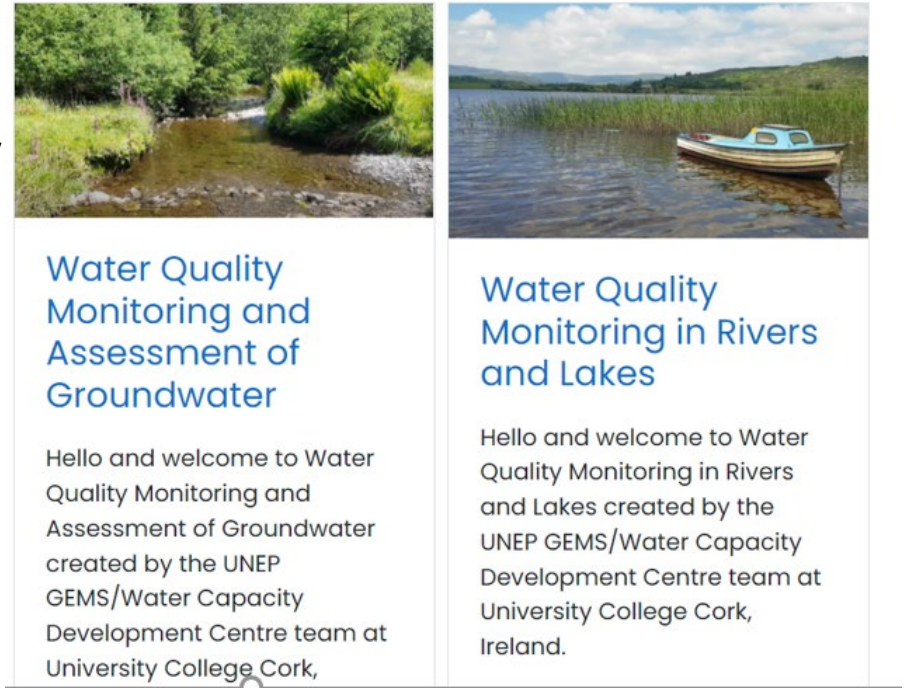
Capacity Development in Water Quality Monitoring

- Training Courses (online and in person) on all aspects of WQ monitoring and assessment
- University accredited courses
- Technical assistance in WQ monitoring

UCC
University College Cork, Ireland
Coláiste na hOllscoile Corcaigh

Six short courses delivered on-line in 2021:

- EV6012 Freshwater monitoring programme design.
- EV6013 Quality assurance for freshwater quality monitoring.
- EV6014 Data handling, assessment and presentation for freshwater quality monitoring.
- EV6015 Water quality monitoring and assessment in rivers, lakes and reservoirs.
- EV6016 Water quality monitoring and assessment of groundwater.
- EV6017 Alternative methods for freshwater quality monitoring.

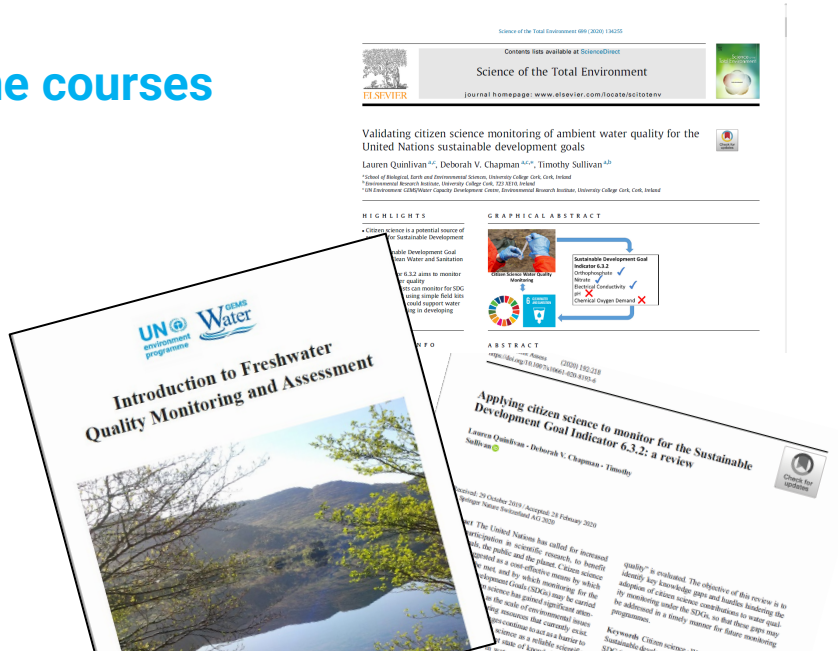


Open online short courses:

Four short courses converted to Open Access courses in 2021,
now available on the **UNEP eLearning Platform** (eLearning.unep.org)

Drafts of six handbooks now complete to accompany training and on-line courses

1. *Freshwater monitoring programme design*
2. *Water quality monitoring and assessment in rivers, lakes and reservoirs*
3. *Water quality monitoring and assessment of groundwater*
4. *Water quality monitoring with biota*
5. *Water Quality monitoring of particulate matter*
6. *Basic quality assurance for freshwater quality monitoring*



Global Water Quality Data Collection

GEMStat

- ~13K monitoring stations in 88 countries
- ~15M monitoring values, ~ 500 different parameters

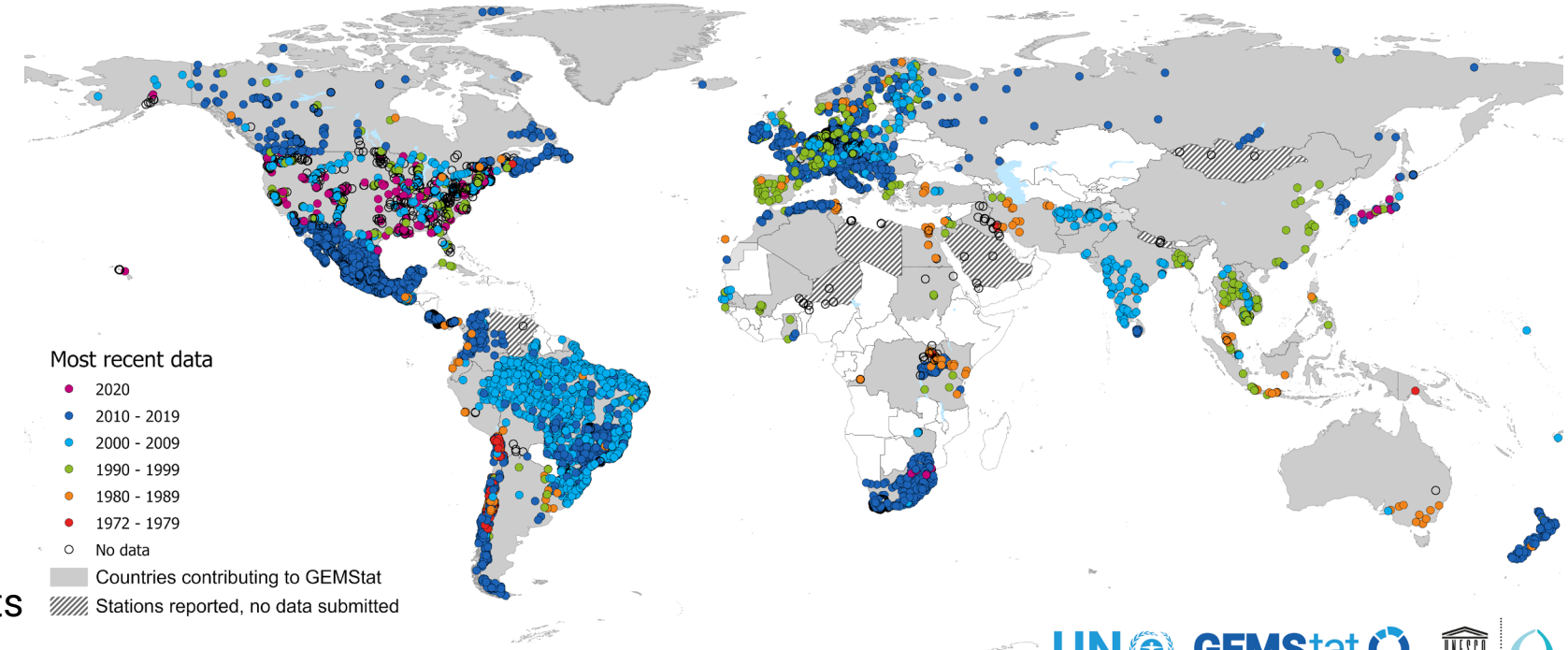
Challenges

Political & Institutional

- Willingness to share data
- Maintaining data provider contacts

Technical

- Lack of proper data management in many organizations => low data quality
- Lack of centralized data collection at institutional/sub-national/national levels
- No internationally agreed, harmonized (meta)data formats and controlled vocabularies for reporting => requires huge efforts in data harmonization



Disclaimer: The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations. Final boundary between the Republic of Sudan and the Republic of South Sudan has not yet been determined. Final status of the Abyei area is not yet determined.
Dotted line represents approximately the Line of Control in Jammu and Kashmir agreed upon by India and Pakistan. The final status of Jammu and Kashmir has not yet been agreed upon by the parties.

UN environment programme GEMStat

GEMS/Water Data Centre within the International Centre for Water Resources and Global Change
Koblenz, Germany, 31 October 2021

GEMS/Water Data Architecture

Data Providers:
117 National Focal Points
88 Countries have provided Data to GEMStat

- Online data requests
  - 406 in last 12 months
- User support and custom requests
- API integration
- Dashboards and interactive maps

Products and Visualisation

UN environment programme → Reporting

GEMStat Database

approved

1

DATA PROVIDER

revision

Quality Check

revision

Integrity Check

4

GEMS/Water Data Centre - Koblenz

Repository:
>15m samples
>12k stations
1906-2020
Mainly:
- Inorganic, Nutrients, Complex Organics

Stations
Methods
Parameter

2

3

Different Formats:
- SQL
- TXT
- DOCX
- XLSX

Water quality data

>12k Monitoring sites

Monitoring Site Information

>600 Parameters

Water Quality Data

Parameter specific Information

>15M Samples
1906-2020

Method specific Information

>900 Methods

Country Information → GAUL Dataset of FAO

Catchment Information → TFDD Dataset and HydroBasins

Waterbody Information → GEONAMES Dataset of US National Geospatial Intelligence Agency

GEMStat Data Submission Workflow

- Data Provider receives Templates for reporting metadata on monitoring locations, water quality parameters and analytical methods
- Data Provider compiles information on monitoring locations, water quality parameters and analytical methods, and establishes relation between their water quality data and these three entities.
- Data Provider submits registration template with above three entities and their water quality data.
- GEMS/Water Data Centre checks integrity of relationships between water quality data and entities, registers new entities where necessary within GEMStat database and checks quality of data submission.

GEMStat

GEMS/Water regulatory and guidance material on Water Quality

GEMStat data submission

- Excel templates
  - **GEMStat Catalogue**
    - inventory of monitoring locations, water quality parameters and analysis methods already registered in the GEMStat database
  - **GEMStat Registration**
    - registration of new monitoring locations and analysis methods that will be part of a data submission
  - **GEMStat Data Submission**
    - GEMS/Water Data Centre accepts any structured format for water quality data submissions

GEMStat

Global Environment Monitoring System (GEMS) Water Programme

GEMStat Catalogues

Column descriptions for inventories of registered monitoring stations, water quality parameters and analysis methods.

Station Inventory

Inventory of monitoring stations that have been registered by the data provider so far.
Please use the GEMS Station Code in column A to update data for a given monitoring location.

Category	Field Name	Requirements	Details
Station Identifier	**GEMS Station Code**	GEMS/Water station identifier code of already registered monitoring locations, as stored within the GEMStat database (as a reference for updating station metadata).	8 characters: first 3 characters - ISO-3166 alpha-3 country code, last 5 characters - sequential number
	Local Station Code	Monitoring location identifier, as registered by the Data Provider in in a previous data submission.	
	Station Name	Sufficiently descriptive name of monitoring location.	Suggested Format: Water body name - "at" Location specifier e.g. Aare River - at Brugg
	Latitude	Cartesian y-Coordinates according to the Coordinate Reference	

Time / Location				Parameter / Method Code				
Local Station Code*	Sample Date*	Sample Time	Sample Depth	Local Parameter Code*	Analysis Method Code*	Value*	Value Flags	
XMP00052	2013-09-27	17:25:00	0.1	Alk-Tot	Alk-T-POT-Auto	0.01	L	
XMP00052	2013-09-27	17:25:00	0.1	Alk-Phen	Alk-T-POT-8.3	104		
XMP00052	2013-09-27	16:25:00	0.1	PV	PV-T-COL-KMnO4	10		
XMP00052	2013-09-27	16:25:00	0.1	Cl-Dis	Cl-ISE	16		
XMP00052	2013-09-27	17:25:00	0.5	Alk-Tot	Alk-T-POT-Auto	0.01	L	
XMP00052	2013-09-27	16:25:00	0.5	Alk-Phen	Alk-T-POT-8.3	104		
XMP00052	2013-09-27	15:25:00	0.5	PV	PV-T-COL-KMnO4	10		
XMP00052	2013-09-27	17:25:00	0.5	Cl-Dis	Cl-ISE	16		
XMP00052	2013-09-27	17:25:00	10.0	Alk-Tot	Alk-T-POT-Auto	0.01	L	
XMP00052	2013-09-27	17:25:00	10.0	Alk-Phen	Alk-T-POT-8.3	104		
XMP00052	2013-09-27	17:25:00	10.0	PV	PV-T-COL-KMnO4	10		
XMP00052	2013-09-27	17:25:00	10.0	Cl-Dis	Cl-ISE	0.5		

GEMStat Data Policy

Use of data:

- status evaluation,
- research purposes
- education and training initiatives.

3 data policy options

- **Open:**

Raw water quality data is publicly available and can be requested by everyone.

- **Limited:**

Raw water quality data is shared on written request for non-commercial research only. For every other purpose, only metadata and yearly aggregates on country level can be requested.

- **Restricted:**

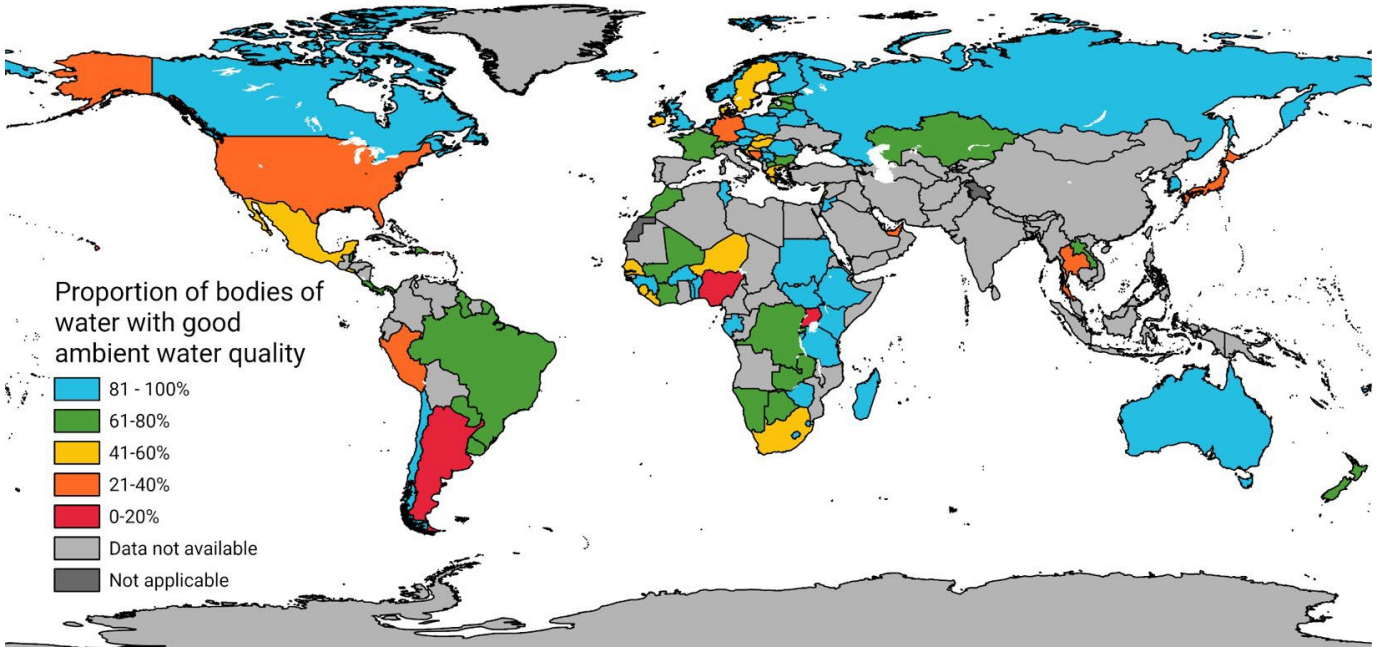
Raw data is not shared and its use by GEMS/Water is limited to UN-assessments and aggregated data products

Data policy set by the data providers on a per-submission level

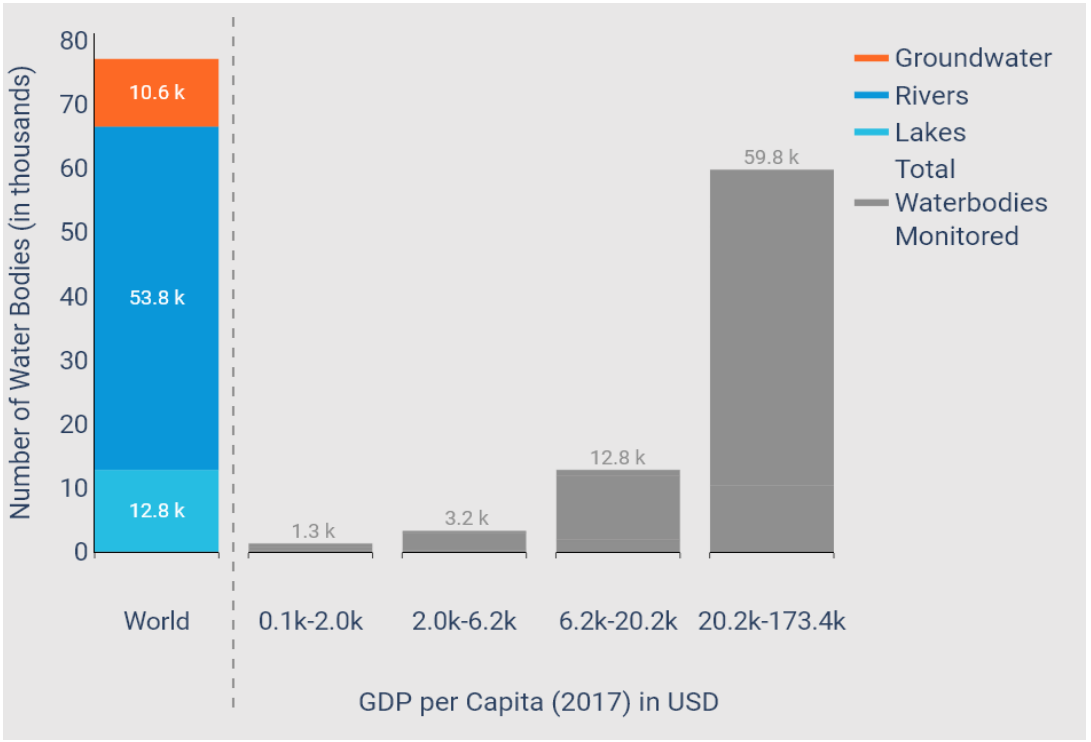
Data contained in the GEMStat database are the **property of the respective data providers**.

SDG Indicator 6.3.2 - 2020 data drive:

97 submissions, both good and poor water quality reported in all world regions



Poor countries used far less data to calculate their indicator



SDG 6.3.2 regulatory and guidance material on SDG 6.3.2

Reporting

Workflow

Description

Country Story: Australia

Flat, Dry and Salty.

Implementation of

SDG Indicator 6.3.2

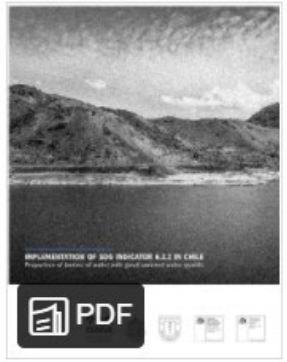
(Short version)

Country Story: Chile

Implementation of

SDG Indicator 6.3.2

(2019 long version)



Country Story: Sierra Leone and Capacity Development

Technical Support Documents

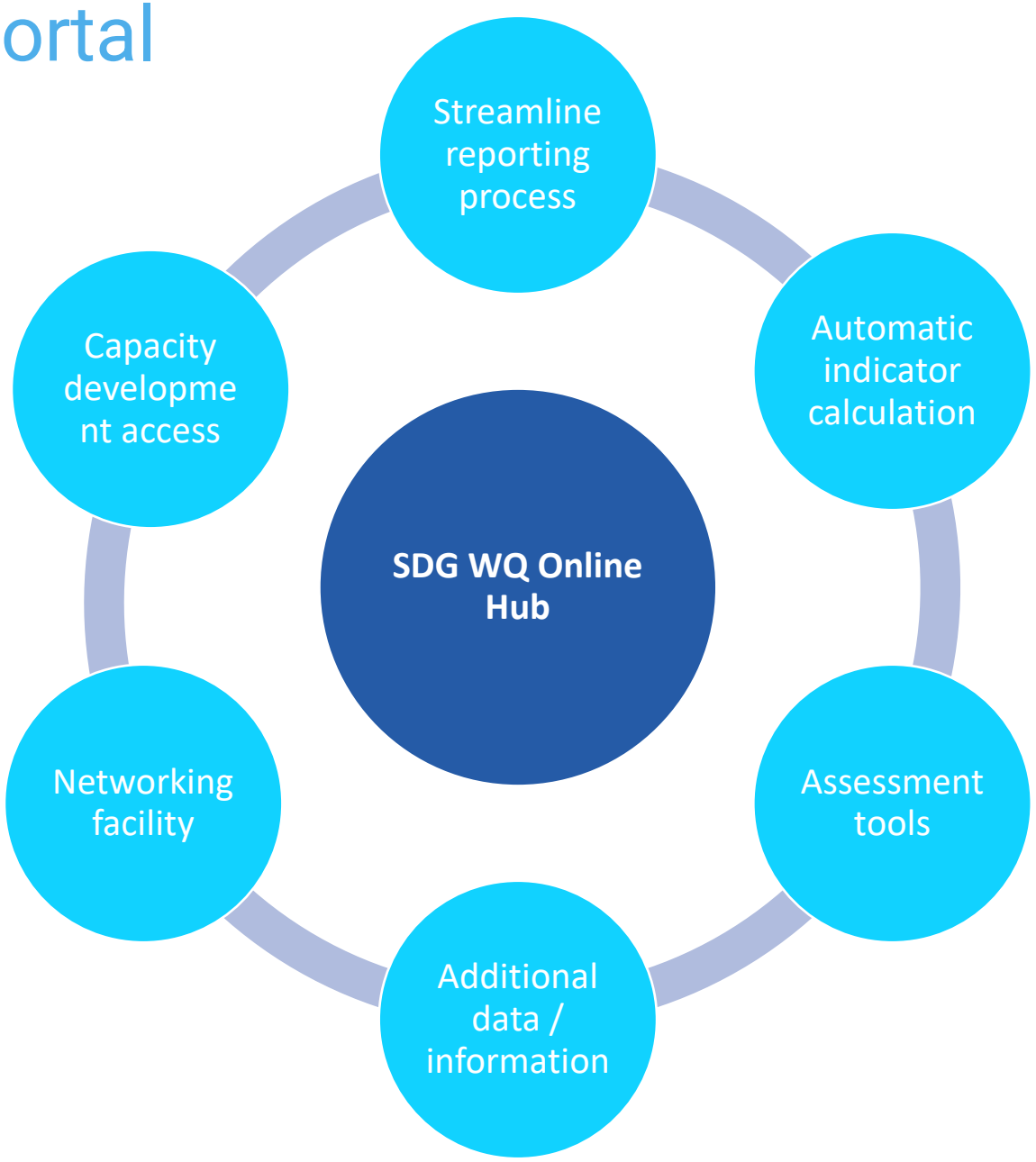
- Monitoring Programme Design Document
- Target Values
- Monitoring and reporting on groundwater
- Upcoming: Level 2 Reporting Guidance

https://communities.unep.org/display/sdg632/Documents+and+Materials

SDG Water Quality Online Portal

Goals:

- Reduce the workload/reporting burden on country contacts
- Help turn data into information
- Fill data gaps, and bring together disparate data sources for a common assessment
- Develop of CoP and connect those working in the field. Both nationally and internationally
- Central point to access available Cap. Dev. activities



Framework for Freshwater Ecosystem Management

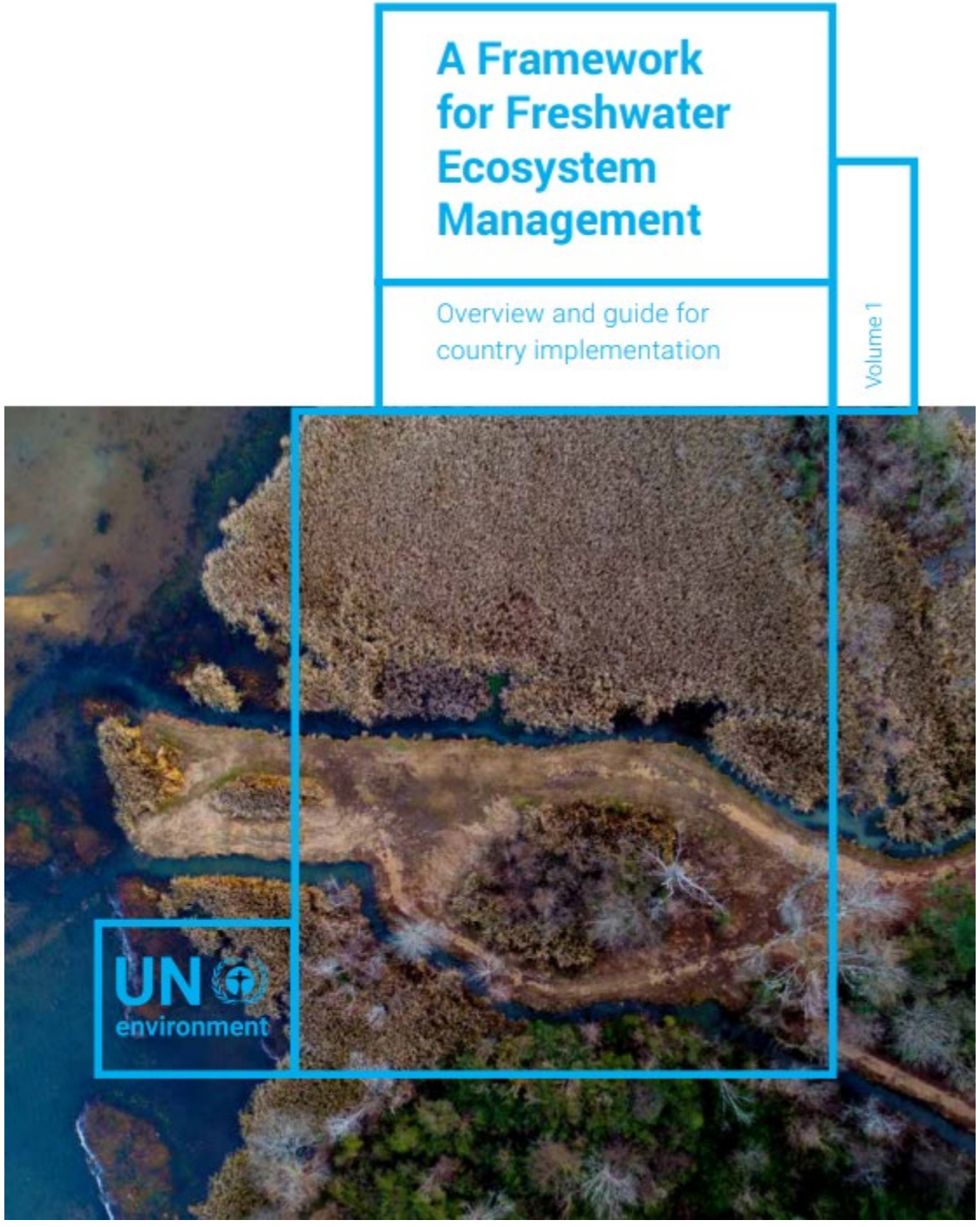
Volume 1: 'Overview and guide for country implementation'

Volume 2: 'Technical guide for classification and target-setting'

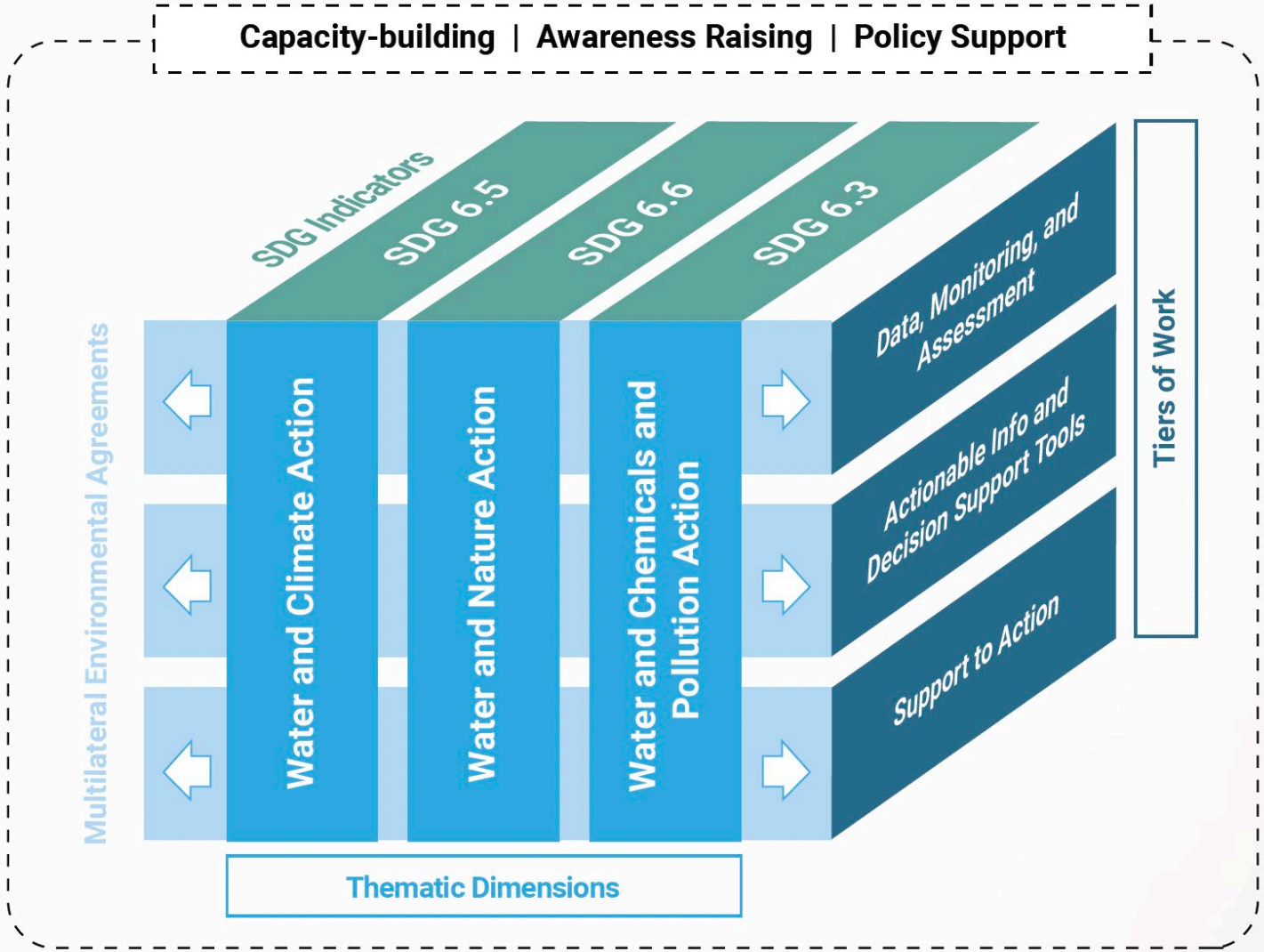
Volume 3: various case studies from around the world

Volume 4, 'Scientific Background"

https://www.unep.org/resources/publication/framework-freshwater-ecosystem-management



Freshwater and the triple planetary crisis: The opportunities



UN environment programme 50 1972-2022

Freshwater Strategic Priorities 2022–2025

to implement UNEP's Medium-term Strategy

March 2022

WWQA
World Water Quality Alliance

Thank you!

WEATHER CLIMATE WATER

WORLD METEOROLOGICAL ORGANIZATION

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World Health Organization

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