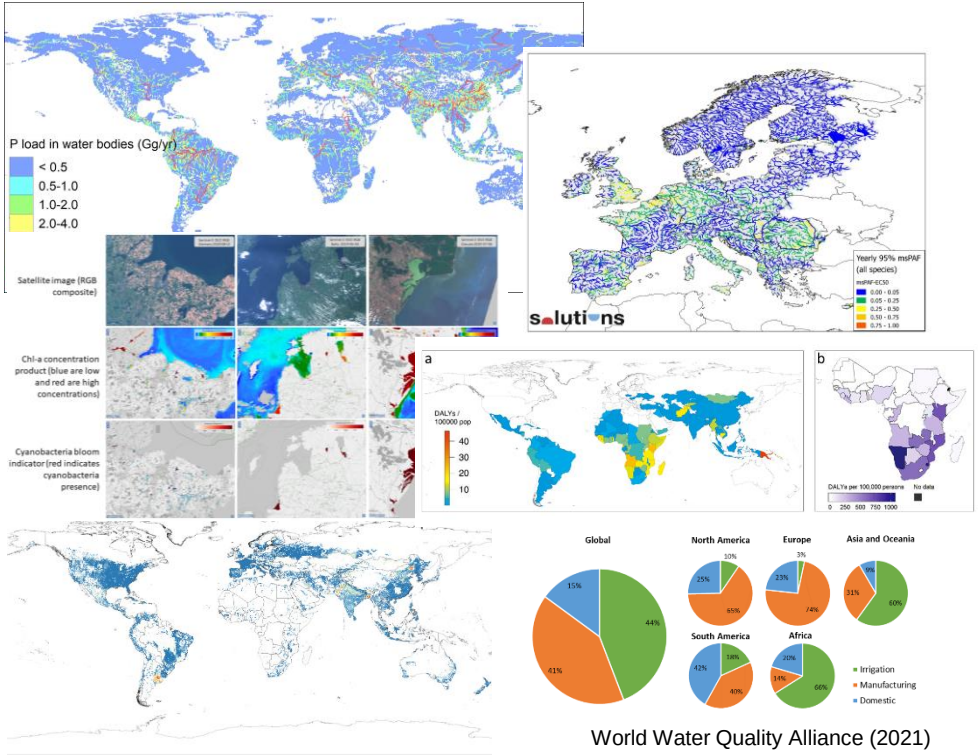


World Water Quality Alliance (2021)

The World Water Quality Assessment

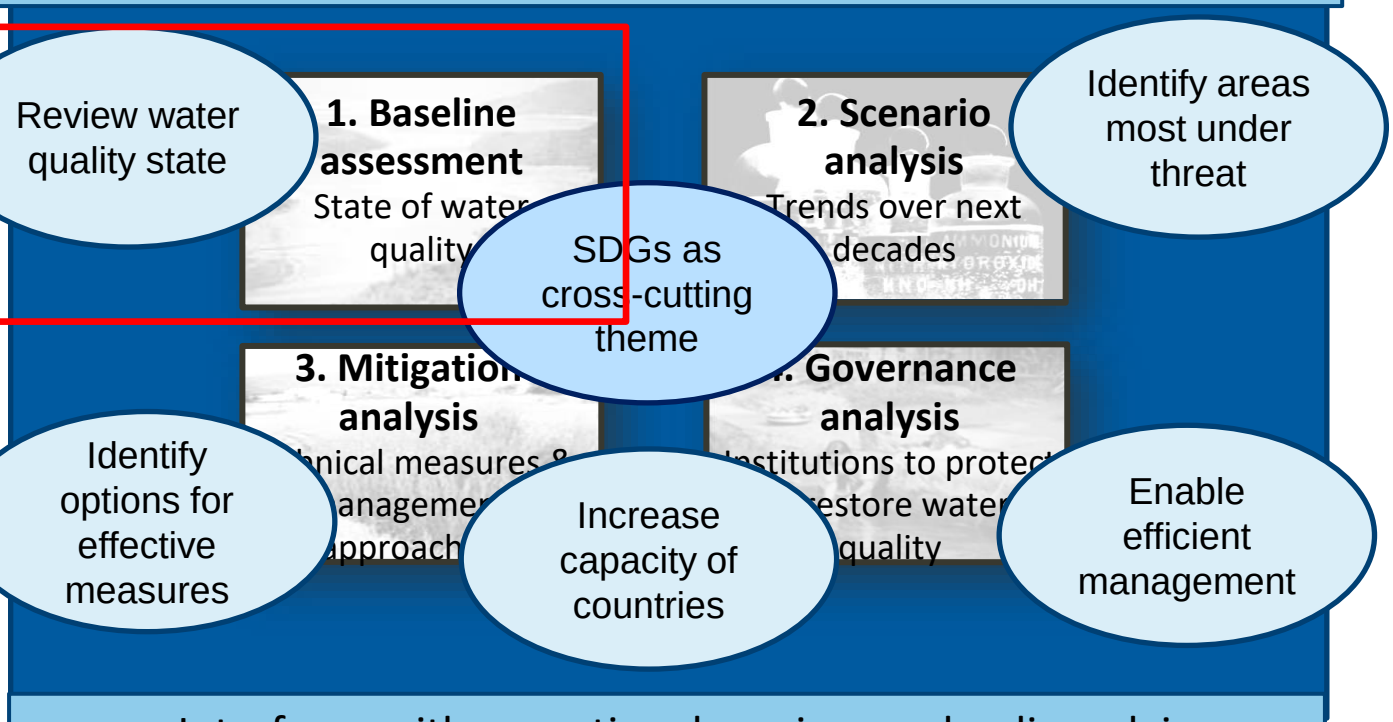
Workstream 'Baseline Assessment': Focus, Status and Agenda

Dietrich Borchardt, Ilona Bärlund, Christian Schmidt and the Assessment team

HELMHOLTZ CENTRE FOR ENVIRONMENTAL RESEARCH – UFZ

Towards a full World Water Quality Assessment

- Approach: DPSIR, pre-study, WWQA triangle
- Trademarks of success (legitimacy, credibility) & Trade-offs



- Interfaces with operational services and policy advice

UN-Water Analytical Brief (2016)

Towards a full World Water Quality Assessment

Snapshot Report
& Analytical Brief
UNEP/UN Water
2016

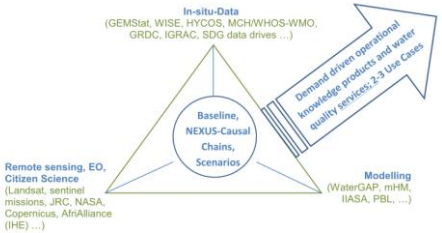
UNEP/EA.3/Res.10
Mandate World Water
Quality Assessment
Dec 2017

Inception Meeting
(Geneva)
World Water
Quality Alliance
Nov 2018

Start African Use Cases
(Volta, Victoria, Cape Town)
2019-2020

Start GlobeWQ
project
2019-2022

1st Annual Global Meeting
(Ispra)
Sept 2019



WWQA WGs incl. Baseline
Assessment

Baseline Assessment
Working group meetings:

Modelling (Delft)
Jan 2020

Remote Sensing (Leipzig)
Jan 2020

In-Situ Data (virtual Leipzig)
Apr 2020

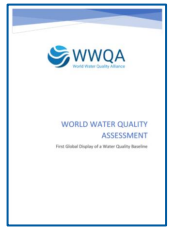
Joint (virtual Bochum)
Sept 2020

Inf Doc Annex
for "UNEA-5a"
Dec 2020

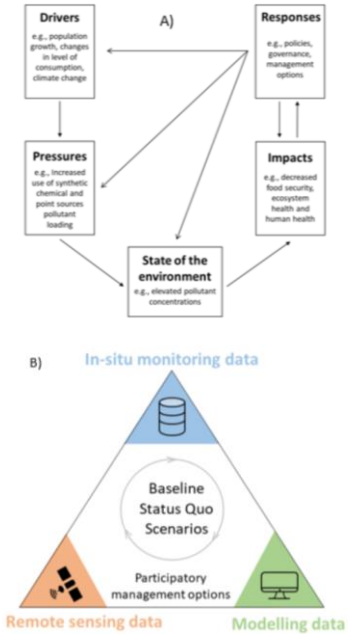
2nd Annual
Global Meeting
(virtual)
Jan 2021

UN environment

First Global Display of a Water Quality Baseline



Methods



Tools

11 models

Models	Simulated water quality parameters		Water body type[2]	Spatial aggregation of model outputs		Temporal aggregation of model outputs		Key references
	Parameter group	Parameters[1]		Resolution[3]	Coverage	Resolution[3]	Baseline year	
DRASTIC	Nutrients	NO_3^-	a	15 km	Africa	10-year	1990-2010	Ouedraogo *et al.* (2016)
GlobalAsGW	Geogenic contaminants	Arsenic	a	30 arcseconds	Global	NA (static)[4]	Pre-2019	Podgorski and Berg (2020)
GloWPa	Microorganisms	Cryptosporidium	b	0.5 degree	Global	Monthly	Around 2010	Vermeulen *et al.* (2019)
GREMIS	Others	Microplastics	b, d	Basin	Global	Annual	2000	van Wijnen *et al.* (2019)
IMAGE-GNM	Nutrients	TN, TP, Si	a, b, c	0.5 degree	Global and (sub-)national	Annual	1970-2015	Beusen *et al.* (2015), van Puijenbroek *et al.* (2019)
Insecticide model	Pesticides	Insecticides[5]	b	5 arcminutes	Global	NA (static)[4]	2000-2010	Ippolito *et al.* (2015)
MARINA-Global (multi-pollutant)	Nutrients	DIN, DON, DIP, DOP	b, d	Sub-basin	Global	Annual	2010	Strokal *et al.* (n.d., 2016, 2019), van Wijnen *et al.* (2017)
	Microorganisms	Cryptosporidium						
	Others	Microplastics, Triclosan						
MARINA (version 2.0)	Nutrients	DIN, DON, DIP, DOP	b, d	Sub-basin	China	Annual	2012	Wang *et al.* (2020a)
	Others	ICEP						
QUAL	Physical	Water temperature	b, c	0.5 degree	Global	Monthly	1980-2010	van Vliet *et al.* (2020)
	Organics	BOD						
	Salinity	TDS						
WaterGAP-WorldQual	Physical	Water temperature	b, c	5 arcminutes	Global	Monthly	1971-2010	Punzet *et al.* (2012)
	Nutrients	TP			Africa, Asia, Europe and Latin America		1990-2010	Voß *et al.* (2012), Reder *et al.* (2015), Fink *et al.* (2018)
	Organics	BOD						
	Salinity	TDS						
	Microorganisms	Faecal Coliform						
WFLOW-DWAQ	Others	Contaminants[6]	b, c	1 km	Europe	Annual	2017-2018	van Gils *et al.* (2020)

4 remote sensing products

Remote sensing products/datasets		Water quality parameters[1]	Spatial resolution[2] & coverage	Temporal resolution & coverage	Key Documentation
Diversity II		TSS, turbidity, cDOM, T_{DN}, Chl-a, cyanobacteria and floating vegetation	300 m 350 lakes worldwide	monthly 04/2002–03/2012	Odermatt *et al.* (2018) http://www.diversity2.info/products/documents/
CGLS (Copernicus Global Land Service)	Optical	T_{SD}	300 m 4265 lakes worldwide	10-day 2009-2011 and 2016-present	https://land.copernicus.eu/global/products/lwq
	Thermal	T_{SW}	1000 m 1000 lakes worldwide	10-day 04/2002-03/2012 and 2016- present	https://land.copernicus.eu/global/products/lswt
UNESCO-IHP IIWQ World Water Quality Portal and ESA Hydrology-TEP SD6 Reporting Portal		Turbidity, SDD, T_{DN}, TSS, Chl-a, trophic state index, harmful algae bloom (HAB) indicator	90 m for global inland and coastal waters 10-500 m (mostly 30 m) for use cases	Single snapshot between 2013-2017 for global inland and coastal waters Daily to seasonal for 2010 onwards for use cases	http://sdg6-hydrology-tep.eu/ www.worldwaterquality.org

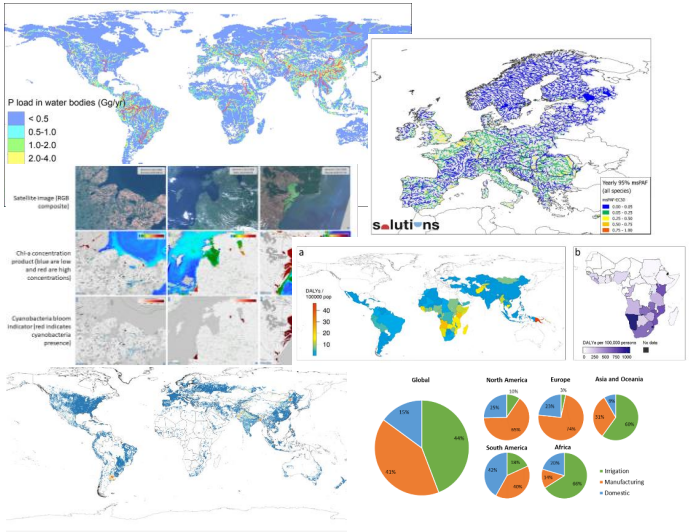
1 in-situ WQ database
(used for model validation and testing)

Outcome

Water quality impacts on ecosystem health, human health and food security
+
Introducing Use Cases and Digital Platforms

Engine: Writing Task Force and 37 co-authors

First Global Display of a Water Quality Baseline



Key findings

- Results can be used to identify water quality hotspots and help to identify some of the key drivers
- Provide context in support of the evaluation of reaching the SDG 6 target 6.3
- Specific findings for water quality impacts on ecosystem health, human health and food security
- Water quality hotspots frequently overlap for many of the pollutants under consideration and are located in densely populated areas

This Assessment is still at a preliminary stage, many major challenges identified …

World Water Quality Assessement – Workstream Baseline Assessment
Planned next steps in 2021

1. Collect feedback on the First Global Display of a Water Quality Baseline from a) the author team, b) the participants of virtual Bochum not contributing to the Annex and c) WWQA at large
2. Collect possible feedback from “UNEA-5a”
3. Strengthening links (e.g. groundwater) and possible extension of the network (e.g. in-situ data holders beyond GEMS)
4. Improvement of the triangulation approach (together with proposed workstreams on GlobeWQ and Use Cases) and exchange with the scenario process (together with the proposed new workstream on scenario assessment)
5. Update of the Baseline Assessment (in-situ meeting planned for Sept 2021)
6. Submission of the updated Baseline Assessment for UNEA-5b