UN Environment GEMS/Water

Capacity Development Centre

Sustainable Development Goal Indicator 6.3.2
Technical Feedback Workshop

2 – 3 October 2018

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School of Biological, Earth and Environmental Sciences

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July 2019

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Supported by:

An Roinn Tithíochta, Pleanála agus Rialtais Áitiúil
Department of Housing, Planning and Local Government

Federal Ministry for the Environment, Nature Conservation and Nuclear Safety

bfg Bundesanstalt für Gewässerkunde

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1 Introduction

The 2030 Agenda for Sustainable Development is a call for action by all UN Member States, to promote peace and prosperity. Each of the 17 Sustainable Development Goals (SDGs) addresses a single aspect of sustainable development and builds on the previous success of the Millennium Development Goals (MDGs). The SDGs include a goal specifically for water and sanitation and the UN Water Synthesis Report on Water and Sanitation[1] assessed progress made towards SDG 6 and highlighted the importance of this goal in achieving many other SDGs. The report also emphasised that, based on current rates, the world is not on track to achieve SDG 6 targets by 2030 and that progress must be accelerated.

As part of Goal 6, indicator 6.3.2 aims to measure progress towards target 6.3 by assessing the effectiveness of measures to reduce pollution of freshwaters. It provides a measure of the quality of water in rivers, lakes and groundwaters, and how they change over time.

UN Environment is the custodian agency of indicator 6.3.2 with the Global Environment Monitoring System for Freshwater (GEMS/Water) acting as the implementing partner. GEMS/Water is responsible for methodological issues and oversees its implementation.

Goal 6
Ensure availability and sustainable management of water and sanitation for all
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
Indicator 6.3.2
Proportion of bodies of water with good ambient water quality

1.1 Report Objectives

This report summarises the findings of a workshop that formed an integral part of the indicator 6.3.2 technical feedback process. The workshop brought those who had implemented the methodology, together with representatives of the scientific and technical community. The workshop programme is included in Annex 1.

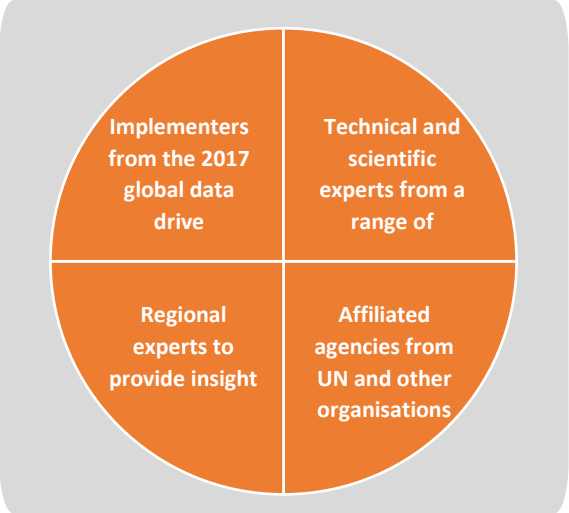

Figure 1.1 Composition of technical feedback group

The aim of the overall feedback process was to improve the methodology of indicator 6.3.2, and subsequently to:

- maximise global participation,
- enhance the national relevance of reporting indicator 6.3.2, and
- ensure that submissions are globally comparable

1.2 Workshop context

This report focusses on the workshop component of a broader feedback process that involved an online consultation phase prior to the workshop (Figure 1.2). The workshop was held in Dublin 2nd and 3rd October, hosted by Department of Housing, Planning and Local Government (DHPLG) of the Irish Government at Customs House. Workshop countries were selected from all world regions and from different levels of economic development. To provide a broader outlook the workshop participants included members of the wider technical and scientific community, regional experts and affiliated agencies from United Nations and other organisations. The participant list is included in Annex 2.

[1] United Nations (2018) *Sustainable Development Goal 6 Synthesis Report on Water and Sanitation*. New York. Available at: http://www.unwater.org/publication_categories/sdg-6-synthesis-report-2018-on-water-and-sanitation/.

Figure 1.2 Flow diagram of technical feedback process

2 Workshop Day 1

The first day of the workshop focussed on bringing participants to the same level of understanding on the complexities of the challenges faced; summarised the online feedback received so far; and provided implementers of the methodology an opportunity to share their experiences from the 2017 data drive.

Mr Cian O'Lionain of the DHPLG - the department of Irish government which generously hosted the workshop, welcomed and thanked participants and organisers for their continued efforts and highlighted the importance of the meeting in helping to achieve SDG 6 and the role it plays in reaching all 17 SDGs.

The head of GEMS/Water, Hartwig Kremer, thanked the Irish hosts and the German government for financially supporting the meeting. Thanks were extended to all participants and the broader feedback group. A summary of the GEMS/Water programme was provided, from its inception in 1978 to the current status and a summary of how the team are working to fulfil the mandate laid out in the UN Environment Programme's resolution 1/9 (UNEP/EA.1/Res. 9) and mentioned the relevance of the programme in the context of the more recent resolution of 3/10 (UNEP/EA.3/Res. 10).

Opening session of workshop

Deborah Chapman, Director of the GEMS/Water Capacity Development Centre based in University College Cork, Ireland, gave a brief overview of the work of the Centre and how this is essential to help meet the global capacity training deficit in water quality monitoring and assessment. How this dovetails with the work of the GEMS/Water and UN Environment was described. This work includes determining the current monitoring activities and limitations of water quality monitoring and assessment; training and education in the collection of high quality data using online and face-to-face methods; provision of advice and assistance and exploring the potential for citizen-based, and earth observation approaches to water quality assessment.

Philipp Saile the head of the GEMS/Water Data Centre based in the International Centre for Water Resources and Global Change of the Federal Institute of Hydrology, Koblenz, Germany provided an overview of the Centre and its role within the GEMS/Water programme. The work of the Centre was presented including the creation of a more user-friendly data collection and analysis system; the collection and quality assurance of new water quality data; provision of data and exploring new sources of water quality data.

Summary of the indicator 6.3.2 methodology

A short summary of the key aspects of the indicator 6.3.2 methodology as applied during the 2017 data drive are bulleted below. The full written methodology is available at (http://www.sdg6monitoring.org/indicators/target-63/indicators632/).

- Reporting on indicator 6.3.2 requires a water-quality monitoring programme that collects **in situ** water-quality samples from freshwater bodies, including **rivers**, **lakes** and **groundwaters**.
- Samples are analysed, the data must be well managed and stored, and the data need to be assessed and then made available for reporting.
- The methodology uses a **water quality index** to assess water quality.
- The water quality index incorporates measurements for **pH**, **dissolved oxygen**, **electrical conductivity**, **nitrogen** and **phosphorus** (pH, conductivity/salinity and nitrate for groundwaters).
- Measured values are compared with **target values** that represent water quality that will not be harmful to either human or ecosystem health.
- ***Good ambient water quality*** means that the target values have been met at least 80 per cent of the time during the assessment period.
- ***Bodies of water*** may refer to sections of a river or a small river sub-basin, a lake or an aquifer.

Indicator 6.3.2 is reported at the national level, but also at the subnational level based on **river basins**.

Thomas Stratenwerth Head of Division, German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, provided a welcome address conveyed by Hartwig Kremer. Mr Stratenwerth thanked all participants for their efforts and welcomed the resolution on water pollution endorsed at UNEA 3 last year (UNEP/EA.3/Res. 10). He stressed the importance of ambient water quality data in achieving the SDG targets and the work of

GEMS/Water in achieving the upgrade of the 6.3.2 methodology from tier III to tier II. The importance of developing an indicator which meets both global and national requirements was recognised, and the milestone this workshop represented in enhancing the existing methodology. The need for input from the Technical Expert Group was appreciated.

Stuart Warner of the GEMS/Water Capacity Development Centre gave a brief overview of the feedback process to date, and outlined the objectives of the meeting and the future steps. Each participant was given the opportunity to introduce themselves and the organisation they represented. A summary of indicator 6.3.2 methodology was provided by Deborah Chapman and Philipp Saile. The summary included the key steps of the process and a description of the reporting process. This was followed by an overview of the main findings of the SDG indicator 6.3.2 report and a summary of the feedback received during the online phase.

2.1 Case Studies of Implementers' Experiences

Each country representative was invited to describe the experience from their country during the 2017 data drive. A three-slide PowerPoint template was supplied to each country representative to standardise responses and ensure comparability. Slide one asked for information on the indicator 6.3.2 score and the metadata reported during the 2017 data drive, slide two on the main challenges faced, and slide three on main suggestions for improvements.

Figure 2.1 Countries that presented detailed case studies at the Dublin workshop

2.1.1 Austria

Mr Ernst Überreiter of the Federal Ministry for Sustainability and Tourism, Department for National and International Water Policy presented on behalf of Austria.

The number of water bodies assessed in the 2017 data drive was 8,256 (98 per cent were rivers / 0.7 per cent were lakes / 1.3 per cent were groundwater bodies). A total of 18,641 monitoring values were used from 2,496 monitoring locations. The data used in the assessment were from 2013 to 2015, and the indicator score reported was 80.44 per cent. A breakdown by water body type revealed that 80 per cent of rivers, 92 per cent of lakes, and 95 per cent of groundwater bodies were of good water quality.

The main challenges faced during 2017 data drive were following the methodology, using existing national data without additional aggregation, and ensuring there were no contradictions with national and EU water body status assessments.

Mr Ernst Überreiter of Austria

The main suggestions for improvement before the next data drive included maintaining the pragmatic approach (comparability, accessibility); further clarification of the protection target (most sensitive - ecology/human); incorporating a measure of progress at the water body

level (improving/stable/degrading). Greater transparency on presentation of results was suggested, for example differentiation of results by rivers, lakes and groundwaters, as well as the possible inclusion of a colour coding scheme (blue / green / yellow / orange / red). Presentation of background information on the calculation of status values, such as number and size of water bodies, the number of monitoring locations and the number of monitoring values was also suggested. Lastly, in the case of Austria it was noted that river water bodies accounted for 98 per cent of the total number of waterbodies assessed, but they accounted for only 10 per cent of the data values used in the calculation. By calculating the indicator score as the proportion of water bodies only, a bias is introduced by the assessment of the river water bodies which are generally of poorer quality than the fewer groundwater bodies. Therefore it might be more useful to weight the water body types according to relevance in each country.

2.1.2 Egypt and the Arab Region

Mr Khaled AbuZeid of the Centre for Environment & Development for Arab Region & Europe (CEDARE) presented on behalf of Egypt and also provided insight on challenges faced by the Arab Region.

Mr Khaled AbuZeid of CEDARE based in Egypt

The indicator 6.3.2 score for Egypt is currently under review and has not officially been submitted. The unofficial score is 53.85 per cent. This is based on data from 88 groundwater, 25 river and one open water body monitoring locations. Based on these data the open and river water bodies were 100 per cent compliant, whereas groundwater bodies were 33 per cent compliant with target values. More generally, for the Arab Region, challenges included defining ambient water quality standards which were often confused with other standards such as drinking water or effluent standards. There were challenges with reporting the correct units and reporting data correctly. Monitoring activities are not sufficient to provide a full assessment of water quality in many countries and there is a reluctance to share and publicise data. There was variation in the type of parameters measured by different countries for indicator 6.3.2 reporting which reduces comparability, and there is sometimes a capacity gap in the chosen focal persons for SDG reporting. Further capacity development is needed in the region on the methodology and calculation method.

Suggestions for the next data drive included developing relations with regional focal points that are already involved with national focal persons. Delivery of further training and support for reporting in national languages of the region. Also, the provision of relevant guidance to use as a benchmark when national standards do not exist.

2.1.3 Fiji

Mr Sher Singh of the Water Authority of Fiji presented the case for his country. The number of assessed water bodies was 77, using 2,349 monitoring values from 58 monitoring stations. The data covered the years 2014 to 2016, and the overall indicator score reported was 100 per cent.

The main challenges faced during the 2017 data drive included the lack of national ambient water quality standards, difficulties collating data from different sources, and understanding some of the terminology used in the methodology.

The main suggestions for improvement before the next data drive included assistance on setting proper target values (ambient water quality standards), a longer timeframe between receiving the request and the reporting deadline, and greater training and support especially for the data submission to make it easier to communicate with other Ministries within Fiji.

Mr Sher Singh of Fiji

2.1.4 Ireland

Mr Peter Webster formerly of the Environment Protection Agency presented on behalf of Ireland. Over 3,000 water bodies were assessed using over 10,000 monitoring values from over 3,000 monitoring stations. The data used in the assessment were from between 2010 and 2015 and the reported indicator score was 61.69 per cent.

The greatest challenge to overcome was reworking the data used for Water Framework Directive (WFD) reporting into a format that could be used for indicator 6.3.2. This was a huge undertaking including the analysis of 63 different datasets. The timing coincided with a review of the water body and reporting units used for WFD reporting, which added another complication. This WFD

review resulted in the reduction in the total number of River Basin Districts (RBDs) and reclassification of water bodies based on typography and other variables. This process would need to be streamlined before the next SDG data drive.

2.1.5 Jamaica

Ms Schmoi McLean of the Statistical Institute of Jamaica presented for her country. The number of assessed water bodies was 101, using 1,481 monitoring values from 177 monitoring stations. The assessment period was between 2014 and 2016 and the calculated indicator score was 92.08 per cent.

Ms Schmoi McLean of Jamaica

The main challenges faced included the organisation of key data providers and receiving data in time to meet the deadline. Also, it was challenging to agree to a country-specific methodology and to clean the large volume of data to check for errors, duplications, calculation of the correct parameters, etc. Lastly there were a number of technical and technological difficulties experienced.

In readiness for the next data drive, more time to engage key stakeholders and data providers would be useful; provision of a clearer methodology that is understood by all; and support to implement the methodology needs to be readily available. Lastly, improved technical and technological support is needed to assist with monitoring.

2.1.6 Lesotho

Ms Matsolo Migwi of the Department of Water Affairs (DWA) presented on behalf of Lesotho. A total of six water bodies were assessed using data from 29 monitoring stations. The data were from between 2016 and 2017, and the final indicator score reported was 16.67 per cent.

The main challenges faced were the setting of appropriate target values, defining the spatial reporting units that would be representative of the situation within the country, and the lack of data on groundwater quality.

The main suggestions for improvement before next data drive include separating the reporting methodology for surface and groundwater bodies, provision of more guidance on the minimum area of reporting units as to achieve the comparability within the basin, and lastly training and support in certain aspects of the methodology such as how to set meaningful targets.

2.1.7 Liberia

Mr Abdul Koroma, National Water Sanitation and Hygiene Promotion Committee, Ministry of Public Works presented on behalf of Liberia.

Liberia was unable to report for indicator 6.3.2 in 2017 due to a lack of existing or historical water quality data. Additionally there are currently no active monitoring programmes ongoing.

There are several challenges that need to be overcome. Hydrological information (water quantity) is available from a World Bank sponsored project that monitors 16 water bodies. There is a stark lack of resources to support water quality data collection and also there are unclear institutional mandates which define the Ministries responsible for collecting water quality data.

Suggestions included: there is a need to establish a mechanism to collect data; mobilise resources and investigate potential of external collaboration to assist data drive.

Mr Abdul Koroma of Liberia

2.1.8 Peru

Ms Carmen L. Yupanqui Zaa, the Director of the Water Resource Quality and Evaluation Division of National Authority of Water (ANA) presented on behalf of Peru. For the 2017 data drive ten water bodies were assessed using 371 monitoring values from 19 monitoring stations. The data used in the assessment were from between 2015 and 2017. The indicator score reported was 47.2 per cent.

The main challenges faced were including the total nitrogen and total phosphorus National Environmental Water Quality Standards (Conservation of the aquatic environment) - these were used in the assessment of lakes and lagoons for the indicator report. Also an ongoing project in cooperation with NASA to use satellite monitoring of lakes was not ready in time to be incorporated into reporting. Lastly a working group with Peruvian National Institute of Statistics & Informatics (INEI), aimed to improve the format sheet for reporting SDG 6 results was established.

The main suggestions for improvement include the expansion of monitoring activities and the inclusion of additional parameters in routine monitoring; establishing working groups to recommend regional target values; complete discussion workshops on the target values; conduct research satellite-derived water assessment and lastly to form multi-sectoral working groups for mutual cooperation to provide data for indicator 6.3.2, in order to strengthen the report.

2.1.9 South Africa

Mike Silberbauer of the Resource Quality Information Services, Department of Water and Sanitation (DWS) presented on behalf of South Africa. A total of 454 water bodies were assessed using over 78,000 monitoring values from 551 monitoring stations. The assessment period was from 2014 to 2016 and the reported indicator score was 46.92 per cent.

The main challenges faced included overcoming the difficulties of reporting within the short time period between the initial notification and the reporting deadline. Data were extracted from the water quality database, but with more time more careful checks could have been applied to check for monitoring patterns for the sites used to ensure the data were appropriate for water quality assessment. Also dissolved oxygen measurements were not routinely taken as part of the river monitoring programme although dissolved oxygen data were available for a small number of dams (reservoirs). One of the main difficulties in monitoring water quality in South Africa is the size of the country – for example the furthest site is 900 km by road to the closest regional office.

Before the next reporting period, a quality check is underway on a site-by-site basis of the data used in the 2017 reporting to verify the reported data. The technical committee established by GEMS/Water is a useful medium to provide feedback to the 6.3.2 indicator team, and should be maintained up to and beyond the next data drive to ensure the established communication lines are kept open.

2.1.10 Sweden

Måns Denward of the Swedish Agency for Marine and Water Management (SwAM) presented on behalf of Sweden. The number of water bodies assessed during the 2017 data drive were 25,825. The data covered the period between 2010 and 2015 and the overall indicator score was 45.13 per cent.

Defining the number of monitoring locations and the number of monitoring values was not possible within the time constraints of the reporting period. This was due to the demanding reporting requirements of the European WFD that left few resources available for SDG reporting. This main challenge could be overcome by greater coordination between SDG indicator team and the European Environment Agency which is the organisation responsible for the WFD. This would avoid performing the same task that ultimately aims to achieve the same purpose. This could be aided by coordination between Water Information System Europe (WISE) and GEMStat (the water quality database of GEMS/Water) in a way that allows GEMStat to access relevant water data for all European counties.

Mr Mans Denward of Sweden

2.1.11 Tanzania

Mr Chisute Heri of the Ministry of Water and Irrigation of Tanzania unfortunately was not able to attend the Dublin meeting in person, but supplied a presentation by email.

A total of 299 monitoring values were used from 19 monitoring stations in Lake Victoria. The data were from between 2014 and 2016 and the calculated indicator score was zero. This was because only a single water body was assessed (Lake Victoria) and the assessment concluded the quality was not of good status.

Challenges that needed to be overcome included collating sufficient data from monitoring programmes which were not designed for this purpose. Also, communicating and accessing data from the two departments that are responsible for water quality and water quantity measurement was difficult.

Before the next data drive it would be important that least developed countries are provided with further capacity development in the methodology application and the underlying steps necessary for implementation. Also, the provision of simple field kits to help undertake the analyses would be useful.

2.1.12 Uganda

Ms Lillian Idrakua of the Ministry for Water and Environment presented on behalf of Uganda. The data used in reporting for indicator 6.3.2 did not include all of the data available and there were other sources that could have been used given more time. A review of the baseline data is needed but it is unlikely that 100 per cent of water bodies in Uganda have good ambient water quality as defined by the methodology.

There is a great variation in the natural water quality between Lake Victoria, Lake Kyoga, Lake Albert and Lake

Edward and a direct comparison between them is not possible.

The challenges faced included data scarcity, inadequate funding for routine ambient water quality monitoring, over aggregation of data, implementing monitoring programmes to assess the whole water body sufficiently, setting meaningful target values in the regional context and the coordination of stakeholders needed to report just on a single indicator.

The main suggestions included mobilising financial resources to collect at least four sets of complete data and further efforts to identify relevant National Focal Point in institutions for each indicator. A reduction in the number of requests from UN agencies to Ministries, and establishing national desk offices under each UN agency to help in collating data from respective national institutions.

Ms Lillian Idrakua of Uganda

2.1.13 Zambia

Mr Frank Nyoni, of the Water Resource Management Authority (WaRMA) presented on behalf of Zambia. For the 2017 data drive, eight water bodies were assessed using 575 monitoring values from 21 monitoring locations. The assessment period used data from between 2015 and 2017 and the reported indicator score was 75 per cent.

The main challenges faced during 2017 data drive included limited time series data in monitoring locations, overcoming bureaucratic processes leading to a delay in reporting and a limited commitment from stakeholders.

For Zambia it is important to sustain a budget for routine water quality monitoring, finalise work to set ambient water quality standards, and to pursue a more robust engagement with stakeholders.

Mr Frank Nyoni of Zambia

3 Workshop Day 2

Based on the feedback gathered during the 2017 data drive, seven key challenges were identified. Addressing these challenges was the focus of day two. Each can be addressed by revision of the methodology and by greater support for the reporting process. They do not directly relate to governance, policy or enabling environment which are beyond the scope of methodological revision.

Participants were divided into four groups and given the task of proposing solutions to each challenge. Participants were given a refresher presentation of each challenge before the group work and GEMS/Water team members facilitated discussion. Due to time constraints some challenges were considered by just two groups in parallel rather than all four.

This section presents and summarises the discussion on the seven key challenges which were:

1. **Target values** – an analysis of the target-based assessment approach used in indicator 6.3.2.
2. **Reporting units** – an examination of the spatial, sub-national reporting units used to report.
3. **Parameters** – an assessment of the value of using the prescribed core parameters.
4. **Reporting framework alignment** – an investigation into methodological flexibility that could allow for greater alignment with existing regional reporting frameworks.
5. **Groundwaters** – a look at the issues surrounding the under representation of groundwaters in indicator 6.3.2.
6. **Additional data sources** – an examination of the potential to include data sources such as satellite-based earth observation, citizen science, private sector and modelled data into 6.3.2 reporting.
7. **Progressive monitoring concept** – an analysis of options of how to incorporate additional data and approaches to monitoring beyond the basic core reporting.

Each of these challenges are described below.

3.1 Target values challenge

Applying the target-based approach to water quality assessment was one of the most challenging aspects for implementers during 2017. This approach assesses water quality by comparing measured water quality values against target values. The targets for good ambient water quality should ensure that the aquatic ecosystem is healthy, and that there is no unacceptable risk to human health arising from intended use of the water without prior treatment. Target values can be of three types depending on the parameter being measured: *upper* – the value should not be exceeded; *lower* – the measured values

should be above the target value; or a *range – measured values should fall between two values*

All four groups were given the opportunity to discuss the challenges surrounding the target value-based method of assessment. The comments and suggestions are bulleted below:

- *GEMS/Water could compile and provide reference information on target values in all countries where they are available.*
- *GEMS/Water could create an international network of experts that countries could turn to, to help define target values.*
- *The target-based method is appropriate, whilst the relative approach used independently is not so useful.*
- *Regional approach to setting target values should be encouraged.*
- *More guidance on target setting is needed.*
- *The relative change assessment is important, and maybe this could be applied in parallel for targeted water bodies rather than applying for all water bodies.*
- *Could UN Environment be mandated to set guidelines that could be used by countries?*
- *A greater amount of training in the principles of water quality assessment is needed in many countries.*
- *If a relative approach is applied, it is critical that the limitations of such an approach are understood. A significant amount of data are needed and for a robust trend to be confirmed. How much is needed?*
- *A project aimed at collecting existing scientific and project data with support from GEMS/Water would be a good approach to help set appropriate site-specific target values.*
- *Relative assessment is a good idea, because it is more positive to report improving water quality, but global comparability is lost.*

3.2 Reporting Units Challenge

The term "reporting units" refers to the spatial units used to disaggregate a country's indicator score from the national score. All SDG indicators are reported at the national level, i.e. one value per country, but for Goal 6 indicators, defining reporting units which are derived from hydrological units is both intuitive and practical.

The indicator 6.3.2 methodology requests Member States to calculate the proportion of water bodies (river, lake and groundwater) that attain good status within a river basin reporting unit. This is only necessary if countries have more than one river basin. As a product of this level of data collection, the national indicator 6.3.2 value can be disaggregated by river basin, and water body type which is useful for the management of water resources.

Two groups looked at the issues relating to spatial reporting units.

- *It is best to use those spatial units which are established already, but if starting from scratch then HydroBASINS[2] should be used.*
- *Any reporting units provided by UN Environment should be provided on a "recommended only", basis rather than prescribed.*
- *Using river basin-based units for arid countries does not make sense conceptually for those used to working with groundwaters and aquifers.*
- *Support is needed to help define suitable reporting units.*
- *Monitoring programme design should be tailored to fit the reporting units.*
- *Countries will use what they have in place and not want to define new units.*
- *Artificial waterbodies that do not align to hydrological river basins do not fit into this system - for example there are thousands of kilometres of canals in Egypt.*
- *There should be an option for arid countries to use aquifer-based reporting units, especially where there is no surface water body. It does not make conceptual sense otherwise.*
- *Reporting at the national scale only provides only part of the picture.*

3.3 Parameters Challenge

The indicator 6.3.2 methodology uses a water quality index that synthesises data from the analysis of basic, core water-quality parameters. The water quality index incorporates measurements for pH, dissolved oxygen, electrical conductivity, nitrogen and phosphorus for surface waters and pH, conductivity (or salinity) and nitrate for groundwaters. The latest methodology accepted for Tier upgrade, introduced the concept of "parameter groups". This concept broadened the choice from the core parameters used in the 2017 data drive and provided greater flexibility. These groups, and the list of optional parameters are listed by water body type in Table 3.1 below.

Table 3.1 List of parameter groups and applicable parameters that can be used in assessment of indicator 6.3.2

Parameter group	Parameter options	River	Lake	Ground-water
Oxygen	Dissolved oxygen	•	•	
	Biological oxygen demand, chemical oxygen demand	•	•	

[2] https://www.hydrosheds.org/page/hydrobasins

Salinity	Electrical conductivity *Salinity, total dissolved solids*	•	•	•
Nitrogen*	Total oxidized nitrogen *Total nitrogen, nitrite, ammoniacal nitrogen*	•	•	
	Nitrate**	•	•	•
Phosphorus*	Orthophosphate *Total phosphorous*	•	•	
Acidification	pH	•	•	•
*Countries should include the fractions of nitrogen and phosphorus that are most relevant nationally				
**Nitrate is suggested for groundwater due to its associated human health risks				

Two groups discussed the challenges surrounding the choice of parameters used in the methodology. The suggestions are bulleted below:

- *Rather than simple Level 1 and Level 2, could a concept of a "Level 1+" list of parameters be developed which includes parameters which are known to be nationally relevant.*
- *The limitations of assessing water quality using the core five (or three for groundwaters) need to be accepted.*
- *To complement routine monitoring of the core parameters, periodic intensive sampling of a broader range of parameters might be useful.*
- *The collection of chloride data should be included for groundwaters in addition to the electrical conductivity, nitrate and pH.*
- *A geogenic parameter list should be included in Level 2. The list could include parameters that are naturally occurring but can cause human health issues, such as arsenic and fluoride.*
- *Ammonia should be monitored separately from TON (total oxidised nitrogen) for surface waters, but nitrate is sufficient for groundwaters.*

3.4 Reporting framework alignment challenge

Certain regions have water quality reporting frameworks in place, such as the EU WFD, the African Ministers' Council on Water (AMCOW) Africa Water Sector and Sanitation Monitoring and Reporting online system, and the State of Arab Water Report (SoAWR). It is critical that the SDG reporting framework is cognisant of these existing frameworks and that it is possible to align with these existing frameworks. Many of the issues surrounding reporting framework alignment cannot be resolved by revision of the methodology, but there are certain aspects that should be considered.

During the workshop two groups looked at the issues surrounding reporting framework alignment.

- *A subset of WFD SoE (State of the Environment) reporting could be used for SDG reporting.*
- *There is a need for much greater coordination between SDG and WFD reporting frameworks at many levels, including:*
  - *EU Commission level and in-country*
  - *The parameters measured*
  - *The timeframe of reporting*
  - *RBD (River Basin Districts) of WFD could be used directly for SDG reporting.*
  - *A great will to coordinate but strategic discussions are needed.*

3.5 Groundwaters Challenge

The relative importance of groundwaters and surface waters differs globally, but groundwaters play a crucial role in fulfilling freshwater requirements in most parts of the world. Due to the issues surrounding the complexity and challenges facing the assessment of groundwaters, fewer countries reported on groundwaters compared to surface waters.

Two groups looked at the issues and the complexities surrounding groundwaters and their significance in indicator 6.3.2 reporting.

- *Arsenic and microbial parameters are relevant, but currently not included – they should be prescribed where relevant.*
- *There is a bias towards monitoring drinking water wells, which do not necessarily reflect the condition of groundwater as a whole.*
- *The capacity to understand groundwater flow systems is needed in order to design groundwater monitoring programmes and to interpret data generated correctly – this is missing in many countries and strong capacity development strategies are needed.*
- *A strategy to "reach out" to water utilities should be pursued to acquire existing data, and to cooperate in the supply of continuous water quality data.*
- *A pool of experts is needed. This pool could focus on specific projects such as delineating aquifer systems, or designing suitable monitoring programmes.*

3.6 Additional Data Sources Challenge

In many countries conventional approaches to monitoring water quality are not generating sufficient data to report fully on SDG indicator 6.3.2. The feasibility of including additional data sources to those generated from conventional Ministry or Water Authority monitoring programmes is an option to increase data availability. Optional data sources include citizen-derived data, data from the private sector, data from satellite-based Earth observation and also data from biological approaches to monitoring.

Countries were not asked to include data from additional sources during the 2017 data drive, but it was clear that this will need to be addressed in future data drives. Each potential data source has its own specific challenges that would need to be overcome in order to be included.

All four groups were given the opportunity to discuss the challenges concerning using additional data sources for indicator 6.3.2 reporting. Due to time constraints and the expertise division amongst the participants, not every group was able to spend an equal amount of time of each potential data source. The suggestions are subdivided by theme and bulleted below.

3.6.1 Citizen-derived data

- *There are questions over the reliability of citizen science data.*
- *Citizen approaches could be useful to raise the awareness of water quality issues by engaging citizens.*
- *There are still questions that need to be answered regarding the use of citizen data because of quality assurance issues.*
- *The accuracy and precision of citizen data can be offset by volume of data generated.*
- *Alternative mechanisms to fund citizen projects are needed.*
- *Government buy-in is needed to develop citizen monitoring approaches – how can least developed countries be incentivised to adopt these approaches?*
- *The quality assurance issue of citizen-based data is well understood, the costs are inexpensive and help to empower citizens, and citizens feel they can contribute in a meaningful way.*
    - *We are at a special moment in time to link citizen science with the SDGs*
    - *Citizen approaches are an emerging technology and there still health and safety considerations that need to be accounted for.*
    - *In looking to use citizen approaches the sustainability of projects needs to be considered.*

3.6.2 Earth observation data

- *Pressure analysis using remote sensing approaches could be useful.*
- *Earth observation data should be utilised for Level 2 reporting only.*
- *The validation of Earth observation data is a current limitation of using it for 632 reporting.*
- *Earth observation has a role to play in identifying hotspots that could be investigated more thoroughly using in-situ monitoring.*
- *Earth observation data should be employed in Level 2 only because it is an emerging technology.*
- *Earth observation approaches to water quality assessment are complementary to in-situ monitoring at the moment and cannot replace them. There is a danger of the approach being oversold, the uncertainty is considerable, and in-situ validation is essential. Much research is being undertaken in the area.*
- *Earth observation approaches are better for Level 2 monitoring – the feasibility has been tested in projects like UNESCO's and others, and it is clear that capacity development is needed.*

3.6.3 Private sector data

- *There is huge potential to utilise private sector data sources*
- *There is a lot of potential for private sector data – potential to use cloud storage facilities.*

3.6.4 Biological approaches

- *The training needed to employ biological approaches is significant, and should be Level 2 only.*

3.6.5 Additional comments

- *Could the "water stewardship concept" be promoted to encourage the private sector to collect and share data from the catchment of their source water intakes for SDG reporting?*
- *Modelling approaches and GIS (geographical information systems) could be used to help identify potential hotspots, where in-situ monitoring could be targeted.*

3.7 Progressive Monitoring Concept Challenge

This topic addressed how to incorporate monitoring data and assessment approaches that are beyond Level 1 monitoring. Level 1 is limited to the five core parameters for surface waters and three for groundwaters, in order to simplify the reporting workflow and to reduce the reporting burden on countries. It is fully accepted that Level 1 cannot fully represent all pressures on water quality, and the progressive steps of Level 2 monitoring are designed to try and ensure the balance between global and national relevance is met. Level 1 provides the globally comparable framework upon which more targeted, nationally relevant, monitoring programmes can be built. The progressive monitoring steps of Level 2 outlined in the methodology, encompass:

- Including additional data sources, such as satellite-derived Earth Observation, citizen-derived, private sector.
- Applying alternative assessment approaches of water quality, such as biological monitoring.
- Including data from the analysis of additional parameters, such as microbiological, heavy

metals, toxic compounds, pharmaceuticals, plastics, etc.
- Using more complex classification or assessment methods, such as the proximity to target method rather than the simple binary pass or fail.

In the interests of time, all participants discussed the challenges regarding the progressive monitoring concept together in one large group rather than being divided into smaller working groups. The main points made during the session are listed below.

- *The binary assessment method (a measured value either meets or does not meet a target with no consideration if a target is missed, by how much it misses) is a concern. A category system should be applied such as 1-3 or 1-5 categories.*
- *The simplicity of the methodology is a strength, and provides a longevity and robustness to the indicator. Efforts to create an indicator which is too complex should be approached cautiously to avoid losing the sustainability of the current approach.*
- *There is a need to be aware of the politicisation of the term "good" and how it is used. There may be instances of grade inflation.*
- *If a "one out, all out" approach is used to combine the extra data sources used in Level 2 to Level 1, this added complexity makes it difficult to show progress over time. The more you measure the worse the assessment becomes – always!*
- *Some measure of the volumetric size of the water body should be included to normalise the score – for example the significance of one large aquifer would be lost amongst hundreds of small surface water bodies in the calculation of the indicator score.*

4 Summary of Workshop Findings

Several common issues that arose from the implementers' case studies supported previous feedback received. The presentations from the country implementers are synthesised in Table 4.1 to Table 4.3 below. Table 4.1 shows the indicator scores for each country along with the metadata used in the calculations. The associated metadata provides a measure of the range in monitoring activities applied in each country during the 2017 data drive.

Table 4.1 Summary of data used to calculate SDG indicator 6.3.2 during 2017 data drive by the countries present at the workshop

Country	Number of water bodies*	Number of monitoring stations	Number of monitoring values	Assessment period	Indicator score
Austria	8,256	2,496	18,641	2013 – 2015	80.44
Egypt	13	117	-	2015	53.85
Fiji	77	58	2,349	2014 – 2016	100.00
Ireland	3,083	3,678	10,707	2010 – 2015	61.69
Jamaica	101	177	1,481	2014 – 2016	92.08
Lesotho	6	29	19	2016 – 2017	16.67
Liberia	16	-	-	-	-
Peru	10	19	371	2015 – 2017	47.20
South Africa	454	551	78,304	2014 – 2016	46.92
Sweden	25,825	-	-	2010 – 2015	45.13
Tanzania	1	20	299	2014 – 2016	0.00
Uganda	8	8	8	2010 – 2015	100.00
Zambia	8	21	575	2015 – 2017	75.00

4.1 Challenges Faced During 2017

Four countries reported that **applying the methodology** as written was challenging as shown in Table 4.2. The underlying reasons differed between countries, ranging from the burden of reporting on human resources, to misunderstanding the written document. The burden of reporting was more evident in, but not limited to, countries which have existing onerous reporting commitments such as the European countries reporting for the WFD. One of the greatest challenges is overcoming the extra reporting burden and identifying ways to reuse existing efforts. Additionally, countries reporting to the European WFD had large volumes of data which they found **challenging to incorporate** into the 6.3.2 reporting template. Also, certain countries had additional data that could not be incorporated within the time frame, or they had alternative data that they felt were useful, but were not requested during the data drive. **Defining target values** was reported as a challenge most frequently during presentations. The setting of appropriate target values for ambient water quality was challenging for numerous reasons. Six presenters highlighted the **limited monitoring activities** and resources available to generate ambient water quality data in their country. Four presenters highlighted that the **capacity to assess water quality data** was a key deficit in their country. Whilst six mentioned that **accessing and collating** all available data that had potential use for reporting was challenging.

Table 4.2 Summary of main challenges faced

Country	Methodology application	Challenge to use all existing data	Definition of target values	Limited monitoring capacity	Data assessment capacity	Data access / collation / sharing	Understanding / interpreting methodology
Austria	●	●					
Egypt			●	●	●	●	
Fiji			●			●	●
Ireland	●	●					
Jamaica		●			●	●	●
Lesotho	●		●				
Liberia			●	●	●	●	
Peru		●	●				
South Africa				●		●	
Sweden	●	●					
Tanzania				●	●	●	
Uganda			●	●			
Zambia			●	●			
COUNT	**4**	**5**	**7**	**6**	**4**	**6**	**2**

4.2 Suggestions for the Future

The suggestions from the presenters covered a range of topic areas. One key message was that reporting would benefit from **regionalising support and training material**. This could take the form of *regional support networks* that could work collectively to identify and tackle common challenges, and also by ensuring that support material is available in local languages. It was clear that most of the presenters, who all had experience of the 2017 data drive felt that **additional training and capacity development** was required during future data drives. The type of support mentioned included: more detailed and clearer resource documents; provision of field kits; financial support for monitoring programmes; and calculation of the indicator from data repositories on behalf of countries. Central to this support would be the clarification and support on target setting procedures. Lastly, several presenters felt the **timeframe** between receiving the request and the reporting deadline was insufficient to mobilise the necessary resources and organise personnel and internal structures to report fully.

Table 4.3 Summary of suggestions for improvements to be included in the next data drive

Country	Clarification / support on target setting	Develop regional support strategy	Develop training to address regional issues, and in more languages	More time	Further capacity development / training	Financial support / external partnership	Align with WFD
Austria	●						●
Egypt	●	●	●				
Fiji	●			●	●		
Ireland		●					●
Jamaica			●	●	●		
Lesotho	●	●	●		●		
Liberia	●				●	●	
Peru		●			●		
South Africa		●		●			
Sweden				●			●
Tanzania		●			●	●	
Uganda		●			●	●	
Zambia							
COUNT	**5**	**7**	**3**	**4**	**7**	**3**	**3**

4.3 Conclusions

This technical feedback workshop provided great insight that can be used to improve the methodology for the next data drive starting in 2020. It provided the opportunity to hear the first-hand experiences from those tasked with reporting for their country and simultaneously opened the

process up to gain expert views and opinions from the technical and scientific practitioners. The findings of the workshop will feed into the companion Technical Feedback Process Report that will look more deeply at the challenges highlighted and the approaches that can be taken to overcome them.

This feedback process should be ongoing to provide constant feedback as global participation grows and more countries attempt to report for the first time. This will ensure the methodology is continuously refined and the experiences of those implementing the methodology are captured and serve as a resource.

The continued improvement of the methodology based on feedback is fundamental to indicator 6.3.2 implementation and without which, it will be difficult to:

Workshop participants on steps of Customs House, Dublin, Ireland

- maximise global participation,
- enhance the national relevance of reporting indicator 6.3.2, and

ensure that submissions are globally comparable

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5 Acknowledgements

This workshop was funded from a small-scale funding agreement (SSFA) between UN Environment and University College Cork, financed by German Federal Ministry for Economic Cooperation and Development (BMZ), the Dutch Ministry of Infrastructure and Water Management, the Swedish International Development Cooperation Agency (SIDA) and the Swiss Agency for Development and Cooperation (SDC). This supported the GEMS/Water Capacity Development Centre's contribution to SDG indicator 6.3.2 implementation. Additional financial resources were provided from the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety. The Irish Department of Housing, Planning and Local Government hosted the workshop in Customs House. The workshop participants and the wider technical feedback group provided extensive comments and feedback during the process.

Annexes

Annex 1: Workshop Programme

SDG indicator 6.3.2 Technical Feedback Group meeting

2 - 3 October 2018

Customs House, Dublin, Ireland

Tuesday 2 October		Facilitator
08.30 – 09.00	Registration	All participants
09.00 – 09.15	Official welcome	Irish Govt. Representatives
09.15 – 09.30	Brief introduction to GEMS/Water	GEMS/Water
09.30 – 10.00	Brief overview of process and objectives of the meeting	GEMS/Water
10.00 – 10.30	Introduction of participants	All participants
10.30 – 11.00	Refreshments	
11.00 – 11.30	Summary of the Tier II 6.3.2 methodology	GEMS/Water
11.30 – 12.00	6.3.2 indicator report findings	GEMS/Water
12.00 – 12.30	Summary of online consultation feedback	GEMS/Water
12.30 – 13.00	Discussion session	All participants
13.00 – 14.00	Lunch	
14.00 – 15.15	Case studies of implementers' experiences from 2017 data drive	Country implementers
15.15 - 15.30	Summary of discussion of implementers' feedback	GEMS/Water
15.30 – 16.00	Refreshments	
16.00 – 16.45	General methodology discussion – key points	All participants
16.45 – 17.00	Day 1 close and summary	GEMS/Water
17.30 – 18.30	Reception in Customs House	
19.00 – 21.00	Dinner	

Wednesday 3 October			Facilitator
09.00 – 09.15	Welcome and organisation for day 2		GEMS/Water
09.15 – 10.30	Discussion topic 1		All participants
10.30 – 11.00	Refreshments		
11.00 – 12.00	Discussion topic 2	Discussion topic 3	All participants
12.00 – 13.00	Discussion topic 4	Discussion topic 5	All participants
13.00 – 14.00	Lunch		
14.00 – 14.30	Plenary of breakout discussions		Group rapporteurs
14.30 – 15.30	Discussion - Additional data sources		All participants
15.30 – 16.00	Refreshments		
16.00 – 16.30	Discussion - Progressive monitoring concept		All participants
16.30 – 16.45	Summary and next steps		GEMS/Water
16.45 – 17.00	Official close of meeting		Irish Govt. Representatives
19.00 – 21.00	Dinner		

Annex 2: List of workshop participants

SDG Indicator 6.3.2 Technical Feedback Meeting Participant List – Customs House Dublin.
October 2nd and 3rd

Country	Participant Name	Organisation
Liberia	**Abdul Koroma**	National Water Sanitation and Hygiene Promotion Committee
Ireland	**Aidan Fitzpatrick**	Irish Aid
Ireland	**Aoife Nagle**	GEMS/Water CDC
Ireland	**Brendan Tuohy**	Former Department of Communications, Marine and Natural Resources
Ireland	**Bruce Mistear**	International Association of Hydrogeologists
Peru	**Carmen L. Yupanqui Zaa**	Autoridad Nacional del Agua
Ireland	**Cian O'Lionain**	Department of Housing, Planning and Local Government
Ireland	**David Walker**	Department of Housing, Planning and Local Government
Ireland	**Deborah Chapman**	GEMS/Water CDC
Switzerland	**Douglas Cripe**	GEOGlows/Aquawatch
Austria	**Ernst Überreiter**	Federal Ministry for Sustainability and Tourism, National and International Water Policy
Zambia	**Frank Nyoni**	Water Resources Management Authority
Ireland	**Greg Beechinor**	GEMS/Water CDC
Denmark	**Hartwig Kremer**	GEMS/Water GPCU
Germany	**Ilona Bärlund**	Helmholtz Centre for Environmental Research-UFZ
Ireland	**Jamie Keating**	Google Earth Engine
Ireland	**Katelyn Grant**	GEMS/Water CDC
The Netherlands	**Ken Irvine**	IHE-Delft
Egypt	**Khaled AbuZeid**	CEDARE
Ireland	**Les Carberry**	Department of Communications, Climate Action and Environment
Uganda	**Lilian Idrakua**	Ministry of Water and Environment
UK	**Luigi Ceccaroni**	EarthWatch/FreshwaterWatch
Sweden	**Måns Denward**	Swedish Agency for Marine and Water Manangement (SwAM)
Lesotho	**Matsolo Migwi**	Department of Water Affairs (DWA)
South Africa	**Mike Silberbauer**	Department of Water and Sanitation (DWS)
UK	**Orlaith Delargy**	CDP (Carbon Disclosure Project)
Ireland	**Peter Webster**	Former EPA
Germany	**Philipp Saile**	GEMS/Water Data Centre
Germany	**Ralf Klingbeil**	BGR (Federal Institute for Geosciences and Natural Resources)
Germany	**Sabrina Julie Kirschke**	United Nations University
France	**Sarantuyaa Zandaryaa**	UNESCO
Jamaica	**Schmoi McLean**	Statistical Institute of Jamaica
Fiji	**Sher Singh**	Water Authority of Fiji
Ireland	**Stuart Warner**	GEMS/Water CDC
Germany	**Tamara Avellán**	United Nations University