

**UNEP GEMS/Water Capacity Development Centre Newsletter
July 2023 – December 2023.**

December 2023

Dear Friends and Partners in the UNEP GEMS/Water Community,

It is with a profound mixture of gratitude, and no small tinge of sadness, that I let you know that this is the last newsletter of the year from us, and indeed it is also the last newsletter (of this phase at least) from the UNEP GEMS/Water Capacity Development Centre. We will be closing the Centre at the end of December 2023 for some time, and there are no new planned student intakes in 2024 at the moment.

I hope you will agree that the exchange of knowledge, the fostering of partnerships, and the continuous pursuit of innovation have been the cornerstones of the CDC since 2015. Reflecting on the incredible projects we've undertaken together, the workshops we've hosted, and the countless interactions that have enriched our understanding of global water challenges, I am reminded of the immense power embedded in collaboration. The strength of our community lies not only in the technical expertise we bring to the table but also in the genuine camaraderie and shared vision for a sustainable and resilient future.

I hope you will join me in extending my deepest gratitude to all the dedicated staff at the Centre since 2015, who have gone above and beyond in developing new initiatives and materials, and providing an incredible level of dedicated support, often in the most challenging of conditions (like those by a global pandemic), and to the many partners, and of the course the participants who have made this role not just a job but a fulfilling vocation. Together, I believe we have made a lasting impact on the global landscape of water management, leaving behind a legacy that will continue to inspire future generations of water quality professionals.

Thank you for being part of this extraordinary journey. I look forward to witnessing the continued success and growth of the GEMS/Water Programme in whatever form that may be, and the continuation of our shared mission to improve global water quality.

With sincere gratitude,

Dr Tim Sullivan

UNEP GEMS/Water Capacity Development Centre

Staff and personnel changes since last issue.

We are excited to welcome a new member of our staff, who has joined us this autumn:



Timothy Sullivan
Centre Director:
training and advice in freshwater quality monitoring and assessment.



Deborah Chapman
UNEP GEMS/Water CDC Ambassador:
honorary position and advisory role.



Lucía Hermida González
Programme Coordinator:
developing and running our training courses, including the on-line CPDs, PG Diploma and MSc in Freshwater Quality Monitoring and Assessment.



David Fouser
Research Support Officer:
providing writing, communication, and coordination support to GEMS/Water CDC.



Derek Casey
Research Support Officer:
providing analytic and technical support to GEMS/Water CDC



Chinelo Nzekwe
PhD Candidate
under the supervision of Timothy Sullivan and Deborah Chapman

Derek Casey, formerly of University College Cork's Aquatic Services Unit, and who, with more than twenty years of scientific analytic and technical expertise, has very capably supported the CDC over the last few months.

A brief look back at what the UNEP GEMS/Water Capacity Centre has achieved over the last 8 years.

Given that Phase 2 of the UNEP GEMS/Water CDC at UCC is coming to an end in December 2023, we thought it would also be a good time to have a look back at what the CDC has achieved in the last 8 years. Not only the quantitative aspects ('the numbers' and 'metrics' aspects) but also the success stories (the 'narratives of change'). By doing so, we hope to give everyone a brief snapshot of the impact that the capacity development aspects of the GEMS/Water programme have had in the world of water quality monitoring

The GEMS/Water CDC at UCC: A brief history since 2015

If anyone wishes to look at the long history of the GEMS/Water Programme since the 1970s, you should start [here](#). Having the CDC at UCC since 2015 has marked a shift towards to broader capacity development through training and education. Housed **between the School of Biological, Earth and Environmental Sciences, and the Environmental Research Institute at UCC**, the CDC built a robust set of online postgraduate programmes, including a Postgraduate diploma and MSc programme, accredited continuous professional development courses open to current water sector professionals and a corresponding range of free-to-all, courses on UNEP's eLearning platform since 2015. And it has offered periodic short workshops, both remote and in situ. Further, the CDC's reach is truly global: it has now worked with individuals and agencies **from 111 countries around the world** over the course of its institutional life.

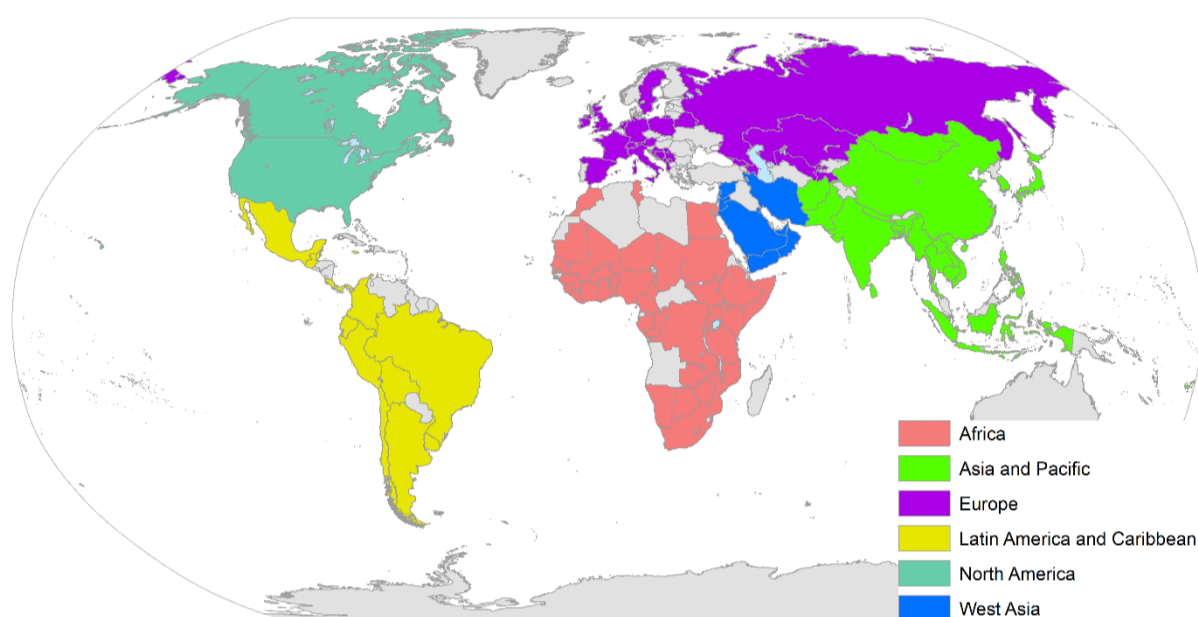


Fig. 1: Countries of individuals with whom the UNEP GEMS/Water CDC has interacted.

The numbers tell this part of this tale of success: since the first intake of Post-graduate Diploma students 2017, there have been **some 40 postgraduate alumni**: with 28 students completing the 3-year MSc Programme (Master Science awards) and 12 Post-graduate Diplomas issued (note that all MSc students first complete a PGDip). **A further six more MSc students** are on track to finish in the next year. These students of advanced study **have come from 24 countries**, with **10 from Jamaica, six from Zimbabwe, five from Uganda, four from Lesotho, and three each from Nigeria, Sierra Leone, and Ireland**. These students are overwhelmingly from developing countries: more than 92% are from countries classified by the UN Conference on Trade and Development as 'developing'. This clearly indicates the CDC's critical function in providing advanced training for individuals from countries where such training is in short supply.

Since their rollout in 2019, there have been **some 200 registrations for our 12-week Continuous professional development courses**, with certificates in various aspects of freshwater quality monitoring and assessment. Two topics have proven particularly popular here, Freshwater Monitoring Programme Design (EV6012) with 38 certificates awarded, and Data Handling, Assessment and Presentation for Freshwater Quality Monitoring (EV6014) with a some 42 certificates awarded. The former clearly reflects a global need to increase the scope of water quality monitoring, while the latter reflects a particular focus on data that the CDC has taken in recent years. Nevertheless, other topics have been of sustained interest: there have been 10 certificates issues in Quality Assurance for Freshwater Quality Monitoring (EV6013), 22 in Water Quality Monitoring and Assessment in Rivers/Lakes/Reservoirs (EV6015), 12 in Water Quality Monitoring and Assessment of Groundwater (EV6016), and 15 in Freshwater Quality Monitoring with Biota and Particulate Matter (EV6017). Overall, the students who have taken part have come **from 32 different countries**. Ireland itself has provided the single largest contingent over time, with 28 students; this is not particularly surprising given the CDC's location in Ireland and its social and physical proximity to the Irish water sector. Among other participant nations, **Sierra Leone has sent 13 individuals, Chile and Zimbabwe five each; Austria, Zambia, and Fiji three each; seven other nations sent two each**.

The most recent development has been the open access courses on UNEP's eLearning platform, and despite having only been in operation **since 2022, 39 students have earned a total of 50 certificates**.

Finally, the CDC has held nine workshops since **2016, meeting in Kenya twice, and once each Brazil, Thailand, Senegal, Jordan and Fiji, and with one workshop held fully remotely – a remarkable achievement given the impact of COVID-19 on the world and in-person meetings during Phase 1 and 2 of the CDC during this time**. These workshops, providing bespoke guidance to targeted cohorts, **have featured 155 participants**.

Stories of Success

With this track record, the UNEP GEMS/Water CDC has every reason to be proud of its achievements and is well-positioned to carry training and education in freshwater quality monitoring forward into the future. But, of course simple numbers and metrics can't tell the whole story, nor hope to capture the true human aspects of what has been achieved at the CDC since 2015. Therefore, we bring you some personal stories and profiles from our alumni, which I hope will illustrate the importance of what we have achieved and the true positive impact that capacity development can have on our communities and the world around us.

[Jeremiah Asumbere](#) is a member of the first cohort of PG-Dip and MSc students. Jeremiah's research examined the potential threats to water quality in the Densu River and Weiji reservoir in his native country of **Ghana**, waters that play an essential role in supply Ghana's capital city Accra and its surrounding areas. They are under threat from both mining and agriculture and Jeremiah was particularly concerned to identify problems with pesticides and heavy metals, in addition to the more common physico-chemical parameters typically monitored in freshwater. Since completing his research in 2020, [he has expanded his work and now leads a team with the Ghana Environmental Protection Agency](#). He has developed a novel monitoring programme for the western and north-western areas of the county, with special focus on the dangers of artisanal small-scale mining (ASM). This once-prevalent practice often employs mercury and cyanide, and although it was banned in 2017, it has left behind a legacy of soil erosion, biodiversity loss, and contamination. And yet, Jeremiah, armed with expertise from GEMS, is spearheading the effort to identify and remedy water quality issues.

Another alum of advanced study with GEMS is [Mohamed Juanah from Sierra Leone](#). Mohamed’s research attempted to determine the impacts of land use on the Rokel River basin, a vital source of water. The basin features iron and gold mining, agriculture, and hydroelectric power generation, in addition to providing domestic water—sometimes untreated—the cities, towns, and villages in several provinces of the country. Mohamed’s work was a novel enterprise, comprising the first systematic collection of water quality data in the area. It provided a solid foundation for future monitoring and made possible Sierra Leone’s first-even reporting of water quality data for the Sustainable Development Goals.

[Jamaica’s Cordelia Samuels](#) completed her MSc with GEMS in 2020, carrying out research on discharges from wastewater stabilization ponds (WSP) and their effects on the South Negril River in western Jamaica. Her work suggested that the WSPs, built in 1997 and rehabilitated in 2010, were insufficient to meet current effluent standards and that various sources of pollution—including the peat-laden riverbed, nearby agricultural land, and illegal fishing—were all contributing to the deterioration of water quality in the South Negril River. Identifying these problems is, naturally, the first step to solving them, a step well-taken by Cordelia in her work with GEMS.

Another member of GEMS’s first cohort of PG-Dip and MSc students was [Olumide Omolade](#), who points to his experience with GEMS as sparking a deep interest in groundwater, an interest that has driven his academic and professional career. In his home country of **Nigeria**, groundwater is a particularly problematic issue, as people rely heavily on boreholes but water quality is threatened by saltwater intrusion from the sea. Olumide’s academic career has taken him through GEMS’s full programme of advanced study, and in addition to spending time studying in the Netherlands he is now pursuing a PhD at Nigeria’s Federal University of Petroleum Resources in Effurun. In his spare time, he is a lead coordinator for Water Corridor International, an NGO devoted to the sustainable management of water resources.

[Luz Marina Jakomin Rudez, from Argentina](#), has been a fixture at both GEMS and Argentina’s Ministry of Public Works. In her long career in water quality she has designed new monitoring programmes, taken part in GEMS laboratory performance evaluations, brought her country’s water monitoring into the GEMStat database, and worked her way through GEMS’s entire professional development catalogue; now, she is closing in on an MSc and is a dynamic force in the Argentinian water sector.

The list of GEMS/Water CDC PGDip and MSc students could continue, comprising a broad cohort of skilled, motivated individuals around the world: [Caitlin O’Keefe from the United States](#), [Nthati Toae](#) and [Ntiea Letsapo](#), both from **Lesotho**, [Megan Cox from Barbados](#), [Mathews Mulenga from Zambia](#), [Sessely Mavunga from Zimbabwe](#), and so, so many more.

MSc and CPD students in Freshwater Quality Monitoring and Assessment

Of course, not all our students are quite finished! Currently 6 students are completing their Master of Science (MSc) in Freshwater Quality Monitoring and Assessment with us. They have progressed from Year 2 have recently finished their first semester – and submitted their research proposals.

Our third-year MSc students completed the module EV6010 (*Dissertation in Freshwater Quality Monitoring and Assessment*) and presented their MSc dissertations in August. A wide range of topics and study areas were covered in the research projects:

[VINCENT CHATENDEUKA](#). *To assess the effects of Gwanda Town’s downstream and upstream activities on Mtshabezi River water quality (Zimbabwe).*

[DANIELA MARGARITA FREDES MUÑOZ](#). *Assessing the impact of the COVID-19 pandemic in water quality in four Chilean basins.*

[LUZ MARINA JAKOMIN RUDEZ](#). *Evaluation of the monitoring programme of Cabra Corral Reservoir (Salta, Argentina) to be applied to its improvement and for replication on other reservoirs of the country.*

[SHANA VERONICA KELLY](#). *Spatiotemporal trend analysis of Hope Bay River and Swift River ambient water quality conditions in Portland, Jamaica.*

[TRACEY KUDZANAI MUBAMBI](#). *Prevalence and antimicrobial resistance of Escherichia coli in groundwater: A case study of 8 boreholes in two informal settlements in Harare (Zimbabwe).*

[LUCY ELIZABETH ROMERO ORTEGA](#). *Evaluation and redesign of the Pilcomayo River monitoring programme (Bolivia).*

UNEP GEMS/Water CDC activities this period

Attendance at the Innovation workshop in Petten, Netherlands

The United Nations Institute for Training and Research (UNITAR) Division for Prosperity, in collaboration with UNEP and the World Meteorological Organization (WMO), co-organized the [Innovation Workshop in Water Quality Monitoring and Assessment](#), held in Petten, the Netherlands, from the 27th to the 29th of September. 65 participants attended the event, which was conducted in a hackathon-style format and aimed to pull collective intelligence to innovate on water quality monitoring and assessment challenges. The workshop focused on four key challenges:

- [Data to Action: Transforming data into actionable insights for water stewardship](#)
- [Empowering citizen scientists to improve water quality from monitoring to action](#)
- [Melding Aquawatch and Global Indigenous Knowledge](#)
- [Routine Monitoring of Antimicrobial Resistance in Water](#)

CDC Director Dr Tim Sullivan attended and provided extensive input into the innovation workshop, More here



WWQA meeting Nairobi

CDC Director Dr Tim Sullivan and GEMS/Water ambassador Dr Deborah Chapman travelled to Nairobi to attend the WWQA annual meeting in September 2023. The meeting’s core aims were to promote dialogue, engagement, and exchange among a multidisciplinary audience ranging from scientists to local communities and youth organizations. There was a particular focus on how to highlight how water quality data can be gathered and used to promote practical local action and how, as a result, all members of society can maintain a permanent dialogue with decision-making at a supra-national level to advance water quality issues.

Attendees included scientists, water specialists, researchers and UN officials—like Tim and Debbie! A broad spectrum of other stakeholders were also well-represented via Local Water Forums, including local officials, youth advocates, business figures, researchers and everyday citizens. These diverse participants united to address water quality concerns and present current work under the various WWQA workstreams, with a special emphasis on how to generate data and connect it to action by engaging local organizations.

Read more about the meeting and its purposes [here](#).

Tim Also attended a combined meeting of the Technical and Advisory Councils of the WWQA on Sunday the 17th September, the purpose of which was to...



Forthcoming *Frontiers in Water* Journal Issue

Drs Chris Gordon of University of Ghana, Tim Sullivan, and Deborah Chapman are currently guest editing a collection for the journal *Frontiers in Water*. The issue highlights the importance of ambient water quality and the fundamental problem of a lack of knowledge on many aspects of this topic globally. In particular, insufficient awareness of the importance of ambient water quality at all levels of society has resulted in inadequate efforts toward maintaining or even monitoring it.

This issue focuses on current developments and shortcomings in this topic. Monitoring and ultimately maintaining ambient water quality requires sufficient and appropriate data for the necessary spatial and temporal scales to effectively inform policy and management decisions. Obtaining basic data is feasible for all countries—even if it is not yet collected—but monitoring newly emerging pollutants, such as pharmaceutical compounds, is currently only possible to a limited extent, even in wealthy countries. Affordable monitoring tools and approaches are needed that can be applied at local, national and regional scales and advances are currently being made in a wide range of areas: low-cost sensors, automated sampling and analysis, biological monitoring, remote sensing, engaging citizens, the use of artificial intelligence, and statistical and modelling techniques to optimize data collection and use. But, given the scope of the problem, much more is needed.

The issue seeks contributions illustrating the diversity of approaches that can be used to generate ambient water quality data and to effectively analyse and deploy that data. Find out more [here](#).

A look back at the UNEP GEMS/Water CDC in pictures since 2015!

Given that this phase of GEMS/Water is coming to an end, we thought we would end by having a brief look back at some of the pictures and highlights from the from the time that the CDC came to UCC in September 2015.



With this we come to the end of our December 2023 newsletter. We would like to send warm regards to you and your families, and wish you health and happiness throughout the coming year. Keep an eye on our [Twitter](#) feed and [website](#) for the latest updates and further information.
 The GEMS/Water CDC team



*Season's Greetings
 and Best Wishes for
 2024 from the
 UNEP
 GEMS/Water CDC
 team at University
 College Cork*



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