

# YEMAYA



1 - (Source: K.Raasakka)



**WWQA**  
World Water Quality Alliance

# THE WORLD WATER QUALITY ALLIANCE NEWSLETTER

**JUNE 2023**

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*The World Water Quality Alliance is convened by the United Nations Environment Programme and supported by the Swiss Confederation. It is proud to present its monthly newsletter, YEMAYA, named after the ancient African goddess of the ocean and motherhood. She is associated with fertility, femininity, protection, healing, and childbirth. Her domains are symbolized as water creatures: the seas, rivers, and lakes. She is honored and revered in the African diaspora, particularly in Cuba, Haiti, Brazil, and the United States.*

*We, the World Water Quality Alliance Coordination Team, welcome articles about water quality. Tell us about your experiences. Describe the challenges you and your people face. Talk to our global community; talk to people from around the World. Send your articles to [wwqa-coordination@un.org](mailto:wwqa-coordination@un.org).*

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## IN THIS ISSUE

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- *The WWQA and Citizen Science*
    - *Globe WQ*
    - *Great Torrington Water Forum*
  - *The June Interview – Nynke Hofstra, Assistant Professor at Wageningen University, Chair of the Technical Advisory Committee of the WWQA*
    - *The Pathway to a World Water Quality Assessment*
      - *The WWQA BULLETIN BOARD*
- 

- *The World Water Quality Alliance Conference 2023*
    - *Social Media Pages*
-

## The WWQA and Citizen Science





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*Earthwatch, WWQA and GEMS/Water are collaborating with communities and partners (Local authorities and environmental organizations) across seven major river basins in Africa to deliver a series of citizen science projects. The overall goals are:*

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- Improved understanding and management of local freshwater ecosystems and;*
  - Using data to achieve delivery of SDG 6.3.2. indicator.*
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*Local scientists from each partner (ministry or agency) work with Earthwatch to determine which communities and sites to select and shape a monitoring approach complementary to existing monitoring methods. In this way, the coverage of water quality monitoring is increased. Furthermore, the efforts of the citizen scientists plug important knowledge gaps whilst also empowering their local communities.*

*By participating in the program, citizen scientists interact with key stakeholders and can influence policies to maintain water quality and ecosystem services on which they depend.*

*Recently trained citizen scientists have been monitoring water quality to identify pollution hotspots as well as areas of high water quality in communities along the Rokel River in Sierra Leone, the Lilongwe and Shire Rivers in Malawi, the Zambezi and Kafue Rivers in Zambia and the Mara River in Kenya and Tanzania.*

*Concise examples of these programs rolled out by the partners, agencies, Rivers, and communities are listed below:*

*In Sierra Leone, the partner National Water Resource Management Agency (NWRMA) is including the communities in developing and launching the 'Rokel River Basin Management Plan.' This is a significant step, being the first to be based on the direct participation of citizen scientists who will monitor its development over time.*

*In Zambia, the Water Resources Management Authority (WARMA) and its partner World Wildlife Fund for Nature Zambia (WWF), support citizen scientists in gathering water quality data to be integrated with WARMA data. This is significant for national reporting to SDG indicator 6.3.2.*

*The transnational project along the Mara River between Tanzania and Kenya borders is a collaboration of ministries, communities, and local water user associations training to become citizen scientists. The aim of this project is twofold- firstly, it is upscaling the presence of citizen scientists across different African countries whilst also contributing to the fulfillment of SDG 6.3.2 through data gathered through FWW methods.*



*Finally, partners in Malawi and the Water Resources Agency train and support community monitoring using the same methodology outlined, thereby reducing knowledge gaps. This has been so successful that the ministries and local partners are expanding this pivotal work to reach further communities.*

### **Methodology and learnings:**

*The monitoring methodology and database used in these projects follow a standard approach – the Freshwater Watch (FWW) method.*

*FWW is a global citizen science methodology and platform focused on water quality. Citizen scientists are trained by local partner staff trained by Earthwatch Europe, employing a ‘Train the Trainer’ approach. Training guides, data collection apps, and support for citizen scientists are available in various languages – integral for accessibility and broader reach.*

*Another vital element to the success of the projects is local knowledge, which is utilized to help choose the most suitable sites, identify long-term trends, and recognize exceptional conditions.*

### *Data and knowledge:*

*Data uploaded by citizen scientists is open source; this means it is available on the individual project website and the global Freshwater Watch database. This allows for many individuals interested in understanding more about their water quality and ecosystem health to be able to learn and has inspired many to become citizen scientists themselves! s*

*Data rigor is an integral element of citizen science, so quality control checks are performed on all data at local and national levels, and feedback and continuous learning are provided to the participants during meetings or in writing.*

*WWQA is supporting these efforts through multiple Alliance workstreams, bringing the experience from social and natural scientists to the benefit of the national agencies and the local communities. This work also underpins the WWQA and UN GEMS objectives of improving national capacity for SDG 6 reporting. The opportunity to empower local communities to manage and monitor their aquatic environment has shared benefits to all, bringing together the interests of local, national, and international stakeholders. The FWW program continues to develop, addressing freshwater issues and providing a platform to share learnings between citizen scientists.*

*To find out more about Freshwater Watch, the citizen science, and data, please visit [www.freshwaterwatch.org](http://www.freshwaterwatch.org)*

*Article contribution from Earthwatch*

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2 - Pic 1 : Malawian trainer Clement and Citizen scientists (Picture credit: Earthwatch)



3 - Pic 2: Tanzanian partners and communities undertaking the Citizen Science community training 2023 (Picture credit: Earthwatch)

## GlobeWQ



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*You can retrieve real-time information about the weather anywhere in the world. Unfortunately, this is not yet possible for water quality. Water quality information mainly relies on data from on-site measurements, which often lack sufficient spatial coverage and temporal resolution to provide a reliable picture. Weather information is not solely obtained from weather stations; it is derived from multiple data sources, including weather satellites, ground-based rainfall radars, and weather models. The same applies to water quality. One of the key concepts used by WWQA to improve water quality information is called "triangulation," where data from on-site observations, satellites, and modeling are combined to enhance water quality information.*

*The [GlobeWQ Workstream](#) implements triangulation by developing a water quality information platform that integrates all three data sources. At a global scale, GlobeWQ has further developed and applied the WorldQual water quality model, providing information on fecal coliform bacteria concentration and biological oxygen demand for rivers worldwide. In addition to global information products, GlobeWQ has also developed regional platforms in collaboration with local users through a co-design process. There are operational demonstration cases for the Elbe basin in central Europe, Lake Sevan in Armenia, and Lake Victoria, Africa's largest lake.*

*The Lake Victoria use case is one of three African use cases that WWQA piloted to demonstrate the capabilities of current water quality information services. Lake Victoria contributes substantially to the economies and livelihoods of Kenya, Tanzania, and Uganda. Fisheries, in particular, are an important industry for the entire region. Despite its importance, the lake's water quality has come under pressure from oil spills, discharge of untreated wastewater, solid waste inputs, and runoff from fields, including manure and mineral fertilizers. High nutrient loadings are one of the main factors causing harmful algal blooms. One of the outcomes of stakeholder workshops organized by Africa Use Cases workstream was the need to improve the monitoring of algal blooms.*

*Data from satellite remote sensing are being used to provide timely and aerial information on algal growths across the lake surface. An essential source of on-site measurements on Lake Victoria is the [GEMStat database](#), which provides additional water quality parameters and longer time series. Water quality modeling shows that nutrient inputs from five tributary catchments contribute to more than 70% of the annual inputs to Lake Victoria.*

*Combining the information shows that Winam Gulf - an extension of Lake Victoria into western Kenya - is susceptible to algal blooms due to its limited water exchange with the main lake and nutrient inputs from the Nyando and Sondu catchments.*

*The data for Lake Victoria available in the GEMStat database has been integrated into the GlobeWQ platform, but there is a wealth of additional data from various national monitoring programs. During our workshops, concerns were raised regarding data sharing by data owners. To address this, an option for temporary data upload has been developed to make the GlobeWQ platform easily compatible with additional on-site data. Users can compare GlobeWQ data products, such as remote sensing data, with their measurements or download data from the GlobeWQ platform and use it alongside their data*



*without sharing it. While this is not an ideal solution, it helps add users' value and demonstrates the benefits of data sharing.*

*Acknowledgments:*

*Between 2019 and 2022, the WWQA GlobeWQ workstream has been funded by the German Federal Ministry of Education and Research as a "Pilot Project to create a Global Water Quality Analysis and Service Platform – GlobeWQ" under the measure "[Water as a Global Resource](#)" (GRoW).*

*For more information about the project, you can visit [www.globewq.info](http://www.globewq.info)*

*Article contribution from UFZ*

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## Great Torrington Water Forum



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### *Overview*

*Great Torrington is a small town (population 6500 approx.) in Southwest England. Most of Western Europe has a clean, safe drinking water supply at the turn of a tap and toilet(s) connected to a safe sewage collection & treatment system all inside the home. This is the accepted, expected norm. So apart*

from cost, is there anything to concern water users? Yes: a large area of the UK will be under water stress by 2030, and 2050 demand will exceed supply by 5–16%.

### Formation

As part of the EU-funded FiWare4Water project, the Centre for Water Systems (CWS) at the University of Exeter and Southwest Water (SWW) worked with the community of Great Torrington to create a Local Water Forum in early 2021.

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4 - (Picture credit: Great Torrington Water Forum)

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The initial online meetings established a list of issues that concerned the members. The Forum’s mission from the list was to raise awareness of local and global water issues – to create a ‘water smart society’.

### Activities

We raise the issues using a local publication, The Crier, and on social media:

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- Facebook: [www.facebook.com/GreatTorringtonWaterForum](http://www.facebook.com/GreatTorringtonWaterForum)
  - Instagram: [www.instagram.com/gt\\_waterforum](http://www.instagram.com/gt_waterforum)
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And directly by attending ‘One Torrington,’ a quarterly meeting organized by the Town Council, attended by local businesses, community groups, and some local politicians.

*In our articles, we have tried to: Introduce the Water Crisis*

*Focusing on themes to help introduce and explain terms like carbon footprint, net zero, circularity, and climate change.*

*Break down the topics: Exploring critical issues around fast fashion, transport, food, and the environment, providing residents with valuable hints & tips to help nudge behavioral change.*

*Provide practical advice: Giving practical tips and thought-provoking advice on how residents can reduce their carbon footprint and save money through everyday actions, water harvesting, and greywater reuse.*

*We follow the 'Quintuple Helix' by engaging with local businesses, local Councils, SWW, and local arts organizations. We continually comment on water neutrality for new build and residential developments to our local councils. We have continued the work with SWW to help advise community members struggling to pay for their water on getting aid.*

*Working with the Great Torrington Community Development Trust, we have raised the finance for and installed 3 large water butts to service their gardens in the Town center.*

*Our focus has been primarily on water quantity, but we also cover water quality, our local river being polluted with farm runoff. To this end, we have reached the West Country River Trust to merge-common interests and help with the Citizen Scientists program.*



5 - Images of 3 large water butts Installed to service gardens in the Town center. (Picture credit: Great Torrington Water Forum)





6 - (Picture credit: Great Torrington Water Forum)



7 - (Picture credit: Great Torrington Water Forum)

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### ***The Future***

*Our focus in the future will remain the same. However, we are looking to expand to cover all of North Devon in line with the other environmental organizations in the area. The message will change from saving water to not wasting it, bringing us more in line with those less fortunate than ourselves and allowing us to raise awareness of Global issues.*

*We will engage more with the local schools; we can make a more significant impact at this level. The opportunity to meet and work with them has been limited owing to the aftereffects of COVID and industrial action by the teachers.*

*We will continue to pressure SWW to reduce leakage and sewage overflows and for more digitization of the water system.*

*We are also considering running a GT Water Weekend similar to the GT Water Day we ran a year ago with more input from the local theatre and community groups.*

*Article contribution from Great Torrington Water Forum*

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## **The June Interview- Nynke Hofstra, Assistant Professor at Wageningen University, Chair of the Technical Advisory Committee of the WWQA**

**What inspired you to pursue a career in water modeling and its impact on water quality?**

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*Like many career steps, this came my way. I tried experimental work (air quality sampling) during my MSc programme in Environmental Sciences at Wageningen University, and that wasn't for me. I have also always been more natural science-oriented while appreciating the importance of more social science and implementation-oriented work. I like modeling and programming; it's like solving little puzzles, and I like its logic. I enjoyed the courses on modeling and programming in my MSc programme. I did a Ph.D. in developing a climate database at Oxford University. While doing that, I gained much experience in programming, working in teams, and handling enormous datasets. However, merely working with data and creating one dataset from another was also dull. I wanted to do something more applied. I was lucky to choose my research field when I moved back to Wageningen for my assistant professor job. I saw a massive gap in understanding climate change's impacts on waterborne diseases. To work on that, I collaborated closely with Wageningen's large-scale water quality modeling community, which mainly focused on nutrients back then. I created a model of the microbiological water quality along with my team. We examine health risks and climate change effects at various spatial scales and resolutions. In addition to working with stakeholders, I have developed tools that help stakeholders better understand the effects of planning changes on microbial water quality and health concerns. Seeing how we gradually bridge the scientific gaps in this area while benefiting society.*

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8 - Image provided by Nynke Hofstra, Assistant Professor at Wageningen University, Chair of the Technical Advisory Committee of the WWQA

**Water quality modeling sounds like a very technical topic. Yet its findings are indispensable for helping to develop policies that prevent the degradation of our water quality. How do you and others in the field communicate the findings to policymakers and more generalist audiences? Any specific challenges or lessons learned?**

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*As I indicated earlier, I collaborate with stakeholders in developing tools that provide them with more information about microbial water quality. Using one of these tools, planners can view the pathogen emission from their sanitation system now I (<https://tools.waterpathogens.org/maps>). They can also create scenarios to see what would happen if they changed their sanitation systems, such as by removing open defecation or switching from dry toilets with pit latrines to wet toilets with a septic tank. The tool can run at different spatial resolutions. At higher spatial resolution, the tool is most relevant for the actual planners, such as the city planners in Kampala. The tool will show you can improve your sanitation system, but emissions will be significant if you don't reduce open defecation. And also, replacing onsite systems, like pit latrines, with sewers without including thorough wastewater treatment*

*will increase rather than reduce emissions. In a new project, we will expand this tool by adding livestock, another vital source of pathogens, evaluating concentrations in addition to emissions, and looking at health risks. Additionally, we will incorporate climate scenarios. Collaborating with stakeholders directly and listening to their requirements is a fruitful way of communicating scientific messages.*

*While the smaller-scale work can influence decisions directly on the ground, the large-scale and global modeling work is also precious. This work shows the urgency of water quality problems across the globe.*

*The modeling enables spatially continuous understanding of problems, also in areas without observational data, and identification of hotspot areas with poor water quality where more research is required. The modeling also enables scenario analysis to understand how socioeconomic development and climate change can influence water quality in the future. And by identifying the primary sources of pollution, areas for intervention strategies can be evaluated. By jointly assessing data for multiple pollutants, overarching problems can be found, and the influence of interventions on water quality overall studied. This larger scale modeling work feeds, together with smaller scale work and observational data, into, among others, assessments, such as the IPCC assessment on climate change, the GEO, and the World Water Quality Assessment.*

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**Can you tell us about a current project or endeavor where water modelling made a difference in flagging the issues of degrading water quality and raising the standard of water quality? What role does the World Water Quality Alliance's Technical Advisory Committee (TAC) play in addressing water quality-related issues?**

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*The TAC's role needs to be better defined, but we advise on technical issues within the World Water Quality Alliance. A focus currently is the World Water Quality Assessment. In 2017, the United Nations Environment Assembly (UNEA) Resolution 3/10 on "Addressing water pollution to protect and restore water-related ecosystems" (UNEP/EA.3/Res.10) requested UNEP to develop a global water quality assessment in collaboration with UN-Water and relevant stakeholders by UNEA-5. For UNEA-5 in 2021-22, a first baseline assessment was provided. Still, this baseline assessment lacks a thorough synthesis of overall water quality, including all available literature and data on the water quality drivers, state, impacts, and responses, including an understanding of future changes. The development of the baseline assessment also lacked a thoroughly developed process, with supported writing teams, peer review procedures, involvement of governments in the review process, etcetera, due to lack of time and funds. The "Pathway towards a WWQ assessment," which should soon be available online, includes the baseline assessment and information on research and other activities involving the WWQA. This website will demonstrate what an assessment might look like, with progressive disclosure that includes informational articles for laypeople and in-depth articles for those interested in the specifics. Still, it is not yet an actual assessment.*

*TAC is currently very much involved in developing the procedures required to produce an assessment.*

*This includes developing the review procedures for contributions to the "Pathway towards a WWQ assessment" and compiling the procedures to develop the assessment. There are many steps involved in*



*creating an assessment, including creating the timeline, considering various assessment work teams, the report's outline, the duties of a prospective supporting secretariat, and much more. It's important to note that financing is necessary for assessment development. The WWQ Assessment is expected to be completed by the end of 2027, and the materials we attempt to compile should aid the WWQA secretariat in securing funds in the upcoming year for the assessment procedure to begin in 2024.*

*In addition to the assessment, we are discussing the cluster themes proposed by the WWQA secretariat and discussion topics during the annual WWQA meeting in Nairobi in September. In case of any questions or comments on technical issues relevant to the WWQA, please feel free to get in touch!*

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## The Pathway to a World Water Quality Assessment



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*Without good quality water, the health and well-being of people and ecosystems would vanish. No living thing can exist without terrestrial, coastal, or marine water. Therefore, the threats that severe pathogen contamination, climate change, and pollution on land and in the sea pose to both the quantity and quality of water while also being exacerbated by human activities like urbanisation, industrial and agricultural activity, and a lack of basic sanitation in many regions, represent some of the major challenges that society will face in the coming decades. These are social, ecological, and scientific issues. Extreme weather events and inadequate water resource management disproportionately negatively impact people experiencing poverty, the vulnerable, discriminated groups, indigenous peoples, women, and children who are particularly in danger of water quality deterioration and scarcity.*

*To overcome these concerns, UNEP/EA.3/Res.10 outlined an urgency to eradicate the gaps in society's knowledge of water quality resulting from a lack of data and regular monitoring. It invited member States to establish and improve water quality monitoring networks and to enhance public access to relevant information on water quality status. It stated the case for promoting the employment of safe and efficient water use whilst augmenting water quality data collection and subsequent data sharing to support the implementation of the water-related Sustainable Development Goals (SDGs). Encouraging all stakeholders to embrace the concept of the engagement, at all political levels, of the public, private, academic, cultural and civil sectors (known collectively as the Quintuple Helix) supported by a strong programme of capacity development, the resolution reiterates that the availability and accessibility of adequate, predictable and sustainable resource mobilisation from all sources, technology development, dissemination, diffusion and transfer, on mutually agreed terms, and capacity-building are important to the effective prevention, reduction and management of water pollution.*

*It is necessary to understand and communicate to all stakeholders, ranging from the hitherto uninformed layperson to the highly specialised expert, from the political decision maker to the individual affected by a specific water quality-related event, what both the key drivers and key pressures are at any given time, in a manner which is accessible and therefore comprehensible to all. Therefore, what has been created is a digital product. It will be a pathway to a comprehensive World Water Quality Assessment. It responds to the request formulated by the United Nations Environment Assembly to work with relevant international organisations to develop a World Water Quality Assessment. Being a digital platform permits the Pathway to the World Water Quality Assessment to be constantly updated and expanded. Just as importantly, it invites all people, no matter their level of expertise, to learn about water quality and how this is one of the topics that touch on all aspects of the triple planetary crisis of nature, pollution, and biodiversity. The information on the website will be presented in a manner accessible to all audiences by keeping a simple design, permitting the reader to obtain, if required, more in-depth analyses at the click of a button. The user-centered platform aims at satisfying the demands of any individual or entity requiring water quality information.*

*The objective and ambition behind the assessment are that within a relatively short period of time, the Pathway to a World Water Quality Assessment becomes, by combining research articles, access to data hubs, and the inclusion of input from diverse sources of water quality information from around the globe, constitutes the principal point of reference for all water quality stakeholders. It will provide a meeting place for all concerned actors and inspire society to understand and act on water pollution, one of the*



*principal risks facing modern society, especially in a world where we are not on track to achieve the environmental dimension of the Sustainable Development Goals.*

*For more information, click on the link: <https://www.unep.org/interactives/wwqa/>*

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**THE WWQA BULLETIN BOARD**

**The WWQA Conference 2023 – Nairobi**



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*The World Water Quality Alliance is delighted to announce the dates of The WWQA Conference 2023, which this year will be held at the United Nations in Nairobi from the 18th until the 20th of September 2023. The WWQA has organized this event to promote local dialogue, engagement, and exchange, to highlight how the data generated by the World Water Quality Assessment can be transformed into practical local action and how, as a result, all members of society can maintain a permanent dialogue with decision-makers at a supranational level.*

*Development aid experts, scientists, and water experts are invited to actively observe, learn from and engage with the members of the WWQA workstreams. As in the 2022 Conference in Konstanz, the Local Water Forums will be crucial. They are composed of local politicians, business people, and researchers, but most importantly of all, ordinary citizens representing all genders, ethnic groups, low-income sectors, and the whole social reality of where they live, who have become engaged in the issue of water quality together with neighborhood cultural actors capable of communicating the importance of water quality and stimulating an emotional response. They will be joined by Youth organizations recognizing the need to become engaged and, more importantly, to initiate and lead actions that address issues that will directly affect their generation's future and their respective communities' future.*

*Over three days, the onsite event will discuss the results and achievements of the WWQA as a whole, the outcomes of the UN Water Conference in New York, the work of Local Water Forums, and the initiatives undertaken by the WWQA Youth Platform. The role of citizen science will be discussed. Above all, the conference will seek to establish permanent ties between the high-level strategist and the local stakeholder, youth, and society. It will promote and support the transformation of scientific knowledge into practical actions and enhance the local community's role in resolving one of our most critical global challenges, water quality.*

*For those who wish to attend, please register at: <https://forms.office.com/e/pXJn8XPgws>.*

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\*Unless otherwise indicated, all contributions are by the WWQA coordination team.

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YEMAYA welcomes articles, opinions and audio-visual material related to the issue of water quality. Please send any contribution to [wwqa-coordination@un.org](mailto:wwqa-coordination@un.org) with a short 100-word biography, the name of your organisation and a phone number where you can be contacted.