

SPOTLIGHT

Strengthening Ocean Science Capacity: Insights from the West Africa Marine Science Symposium

By Edem Mahu, Julia Lutringer, Annette Kailey Ankrah, and Kwame Koranteng

INTRODUCTION

West Africa has an extensive coastline stretching 7,367 km over 12 mainland countries and two archipelagos. The region's coastal and marine ecosystems are among the most productive and biologically diverse in the world. However, the ocean resources are under intense anthropogenic pressures encompassing pollution, habitat degradation, biodiversity loss, overfishing, and climate-change-induced sea level rise. These challenges call for science-based and community-led actions to reverse current negative trends. Unfortunately, poor capacity to understand West Africa's ocean is an age-old struggle by scientists in the region, and it remains among the least studied globally.

The inaugural West Africa Marine Science Symposium (WAMSS) held in Ghana in August 2023 brought together 244 participants, including scientists, storytellers, government and nongovernmental bodies, early-career ocean professionals (ECOPs), Indigenous communities, and funders (Figure 1) to facilitate knowledge exchange, foster collaborations, identify barriers impeding science and policy goals, and define priority regional research areas. The symposium featured seven sessions focused on marine environmental health, restoring and conserving living marine resources, enhancing access to critical knowledge of Africa's Eastern Atlantic, building coastal community resilience to hazards, advancing outreach and science communication through storytelling, fostering community leadership in ocean knowledge generation, and a high-level panel on ocean science capacity in West Africa. This article presents the outcomes of the high-level panel session on ocean science, focusing on the barriers and challenges to conducting ocean science research in West Africa, recommendations for fostering a sustainable future, and the positive impacts on ocean science capacity in the sub-region observed one year after WAMSS.

BARRIERS TO OCEAN RESEARCH IN WEST AFRICA

The workshop panel on ocean science capacity in West Africa identified several barriers, including poor collaboration, inadequate infrastructure and technology, insufficient funding, data gaps, language barriers, ineffective research communication, and limited support

for ECOPs. The lack of a unifying regional body for scientists leads to poor collaboration, fragmented efforts, and duplicated research across the sub-region. Language barriers further impede inter-country collaboration and effective community engagement. Significant constraints in scientific research infrastructure, including inadequate space for scientists and students, insufficient laboratory facilities, a lack of equipment, and the absence of research vessels, pose significant challenges to advancing research efforts. Budgetary and personnel constraints, regional piracy, tampering with at-sea research platforms, and the lack of high-speed supercomputers severely hinder research efforts. Ocean science in the region faces sustainability challenges due to short-term external funding, misaligned thematic priorities, limited regional government support, and unequal collaborations that often result in "parachute science." Limited internet connectivity, inadequate data management infrastructure, and restricted access to regional and international data portals hinder data sharing among scientists, leaving most data confined to institutional repositories and inaccessible to the public. Limited funding for open-access publishing and minimal efforts to translate research into accessible formats or local dialects hinder the usefulness of scientific findings at the community level. Lastly, ECOPs in West Africa face challenges such as limited educational support, mentorship, field experience, and job opportunities, compounded by funding constraints, visa issues for international meetings, and frequent rejection of research submissions, leading many to pursue opportunities abroad and contributing to the region's brain drain.

The following actions were recommended by the panel to help to advance ocean science in the West Africa sub-region:

- Create a subregional body to promote collaboration, set unified research and policy agendas, and gain recognition from governments and funding agencies.
- Create consortiums and collaborative platforms for conducting large-scale research activities in the region.
- Conduct virtual assessments of current resources and deficiencies, invest in local infrastructure (labs, equipment, low-cost technology), and encourage public-private partnerships for building research tools and technology centers.

FIGURE 1. Participants in the first West Africa Marine Science Symposium, held in Ghana in 2023, are gathered here.



- Improve cloud computing capacity and promote the shared use of research infrastructure across countries.
- Use frameworks like the UN Decade of Ocean Science to secure funding, train scientists and ECOPs in grant acquisition, and encourage submission of endorsed projects.
- Support open-access publications, engage policymakers in co-designing projects, and collaborate with non-scientists to share research.
- Organize subregional meetings like WAMSS to exchange ideas and identify gaps.
- Provide mentoring, networking, funding, internships, training, and postgraduate research opportunities for ECOPs and researchers.
- Facilitate ECOP participation in conferences and exchange programs.
- Retain women and other minority groups in ocean-related fields by providing care support.

IMPACT OF WAMSS ON OCEAN SCIENCE CAPACITY

A year after WAMSS, its impact on ocean science capacity in the sub-region is clear. Post meeting participant evaluations indicate that it strengthened networking, which led to collaborative research, skills enhancement, and graduate training (Figure 2). Unlike traditional research symposia that focus primarily on presenting research findings, WAMSS went further by hosting side events featuring talks on grantsmanship, internships, and funding opportunities from organizations such as the National Geographic Society, US Office of Naval Research, Partnership for Observation of the Global Ocean, Nature Environment Wildlife and Filmmakers (NEWF), and Mission Blue. A dedicated session on science communication and storytelling led by NEWF allowed participants to build capacity in these areas.

Through networks established at WAMSS, at least 16 ECOP participants have gained mentorship opportunities, and 12 have engaged in joint research projects and collaborative mentorship. Approximately 17 participants, primarily ECOPs, have benefited from short-term training gained through networks established at WAMSS, enhancing personal skills such as science communication, storytelling, scuba diving, and technical and grant writing. Through WAMSS, two participants have enrolled in master's degree programs, while another has begun a PhD program. Through the network built during WAMSS, the Africa Marine Mammals Conservation Organization (AMCO) got funding from NEWF to train four people in scuba diving and storytelling in South Africa at NEWF. One WAMSS partner in this initiative received equipment and funding support from AMCO for collecting data on marine mammals in Ghana. Another WAMSS participant received scuba master certification through NEWF and is currently working on setting up Ghana's first dive school. His dive campaigns are helping to conserve coral reefs in Ghana. Some WAMSS participants have become National Geographic Society Explorers, receiving grants to support their conservation work. WAMSS further facilitated the creation of a large research consortium involving multiple Gulf of Guinea countries. The consortium convened in Ghana in August 2024, supported by funding from the US Office of Naval Research, to identify research areas and gaps, build on existing research initiatives, and develop a joint research proposal. The consortium has submitted a ship-time proposal titled "Gulf of Guinea Integrated Exploration for Novel Insights (GEINI)" to the Schmidt Ocean Institute for ship time in 2027.

CONCLUSION

Sub-regional meetings like WAMSS can have a significant impact on their participants. Beyond serving as platforms for presenting and disseminating research findings, these gatherings foster

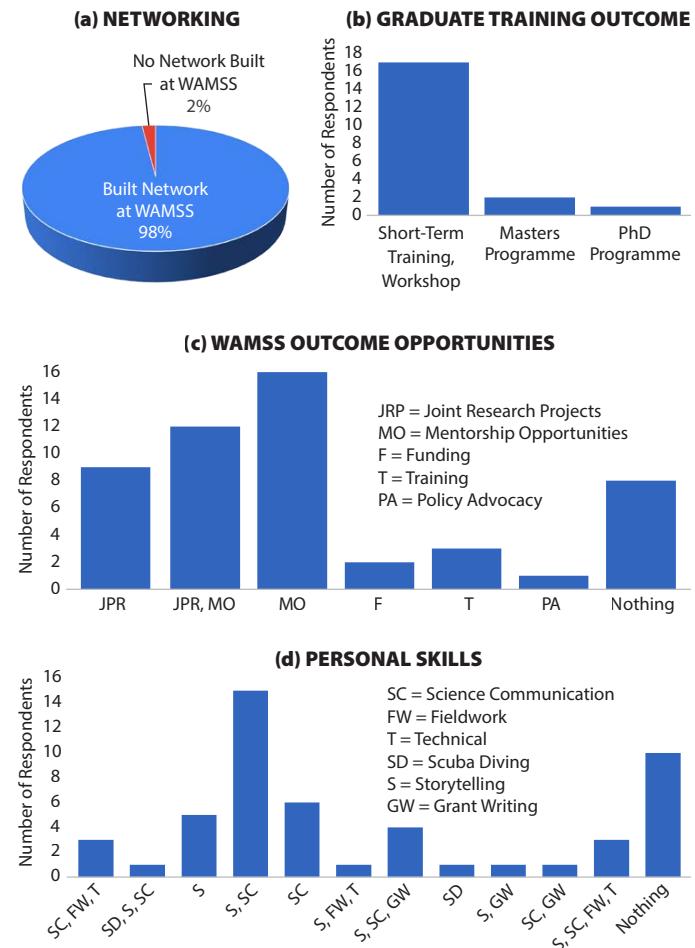


FIGURE 2. Post evaluations of the impacts of the West Africa Marine Science Symposium indicate positive results in a number of areas: (a) networking, (b) graduate training, (c) joint research projects, mentorship, funding and training, and (d) personal skills.

collaboration and networking among scientists, policymakers, and stakeholders. They have the potential to unify fragmented efforts, allowing minimal resources to be pooled into larger, more effective research teams. Such meetings create opportunities to build critical skills in under-resourced communities, bridge knowledge gaps, and enhance research capacity. By bringing together diverse perspectives, these meetings can drive innovative solutions, foster mentorship, and ultimately strengthen the region's ability to address pressing marine and coastal challenges.

ACKNOWLEDGMENTS

The National Geographic Society funded the first WAMSS through grant No. PFA-23-Mahu. The authors are grateful to the Society, the University of Ghana, the Partnership for Observation of the Global Ocean, the NEWF Africa Refocused Programme, and the Coastal Ocean Environment Summer School in Nigeria and Ghana for supporting the symposium in diverse ways. We thank all session participants for giving the session the utmost importance and engaging immensely.

AUTHORS

Edem Mahu (emahu@ug.edu.gh), Department of Marine and Fisheries Sciences, University of Ghana, Accra, Ghana. **Julia Luthringer**, Paul M. Angell Family Foundation, Washington, DC, USA. **Annette Kailey Ankrah**, Department of Marine and Fisheries Sciences, University of Ghana, Accra, Ghana. **Kwame Koranteng**, UN Ocean Decade Africa Task Force, Tema, Ghana.