

SPOTLIGHT

The Ocean Foundation's Ocean Science Equity Initiative: An Example of a Comprehensive, Intentionally Co-Designed Capacity Development Effort

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INTRODUCTION

The Ocean Foundation's Ocean Science Equity Initiative—EquiSea—was founded in 2022 to address systemic inequities in ocean science capacity and opportunities. It provides financial support for projects, coordinates capacity development activities, fosters collaboration and co-financing of ocean science, and supports the development of low-cost ocean science technologies. The EquiSea strategic framework was co-developed with input from more than 200 ocean science practitioners in more than 35 countries. The authors of this article are those who played the most active roles in EquiSea's development.

PROGRAM DESCRIPTION

The capacity development session at the Ocean Obs '19 meeting in Honolulu, Hawai'i, provided the impetus to establish a framework for a decadal plan and case for support to address key barriers and needs for capacity development in ocean science and ocean observing. In 2020, we prepared a draft plan based on the output of the Ocean Obs session and led a series of regional focus groups via Zoom video conferencing to gain input and feedback, using a list of specific questions designed to identify any areas of improvement over past community practices and paths for new partnerships (Table 1). Across both the Ocean Obs meeting and the virtual sessions, more than 200 researchers and ocean science practitioners provided input.

As the EquiSea co-lead team grew, we created a final decadal plan for EquiSea (Valauri-Orton et al., 2021). We recognized that implementation of the plan would require a fiscal host. The Ocean Foundation, an international community foundation, was identified as

the optimal organization to fill this role, as it provides a number of technical, financial, and programmatic services to the ocean community that are compatible with the goals of EquiSea.

RESULTS

Community dialogues elucidated clear inequities in ocean science capacity driven by factors ranging from clear physical and infrastructural needs to systemic and interwoven practices of funding, job placement, and recognition. Such inequities created gaps in capacity and opportunities across geographic areas. It was noted that existing efforts to address ocean science capacity needs were insufficient to address core problems, and in particular, progress would be limited if programs continued to be designed without consulting those research communities that are currently most underfunded and disenfranchised.

We collated feedback from the in-person and remote dialogues to identify the core barriers to achieving more equitable ocean science capacity and to determine what specific programmatic activities could be undertaken to address those barriers (Table 2). Many barriers were consistent across geographies surveyed. For example, respondents noted that most ocean science instruments were manufactured in high-income countries. These instruments, often recommended to meet international standards, frequently required annual maintenance by the manufacturer and lacked comprehensive user operation and maintenance manuals. For geographies outside of these manufacturing sites, shipping an instrument back for maintenance often costs more than the initial purchase price and removes the instrument from service for more than six months. The degree of

TABLE 1. Questions posed to participants of regional focus groups.

GOAL OF QUESTIONS	QUESTION TEXT
Identifying gaps in plan	Do you feel that this prospectus sufficiently outlines what would be necessary to achieve ocean observing capacity development goals over the next 10 years? Elaborate on specific outcomes you would like to see from this initiative.
Ensuring there is no inclusion of harmful practices	Are there any things that this project should avoid doing based on your experience participating in these types of projects over the years?
Ensuring regional differences are noted and reflected	Are there any things unique to your region that we should be aware of as we build out this initiative, such as specific needs or patterns that could inform the best design of this program?
Identifying potential public/private partnerships	One area we are strongly exploring is how the private sector can help finance ocean science capacity development, for example in regions where ground staff with technical expertise would be required. Are there major companies or industries in your region that you think would be interested in investing in ocean science training?
Identifying potential funders or partners	Do you have any suggestions for venues or groups that would be interested in funding or participating in this program?

cost and operational burden varied somewhat by region, but overall this was seen as a common barrier. A solution is to work with instrument developers to include repair and maintenance kits as an accessory option, provide training to regional hubs and experts on equipment repair, and ensure that detailed manuals and maintenance guides are available in multiple languages.

Some barriers presented regional nuances, such as the nature of the gap between current resources and needs. For example, one institution noted a lack of applications for graduate degrees in ocean sciences, despite sufficient academic infrastructure, due to a lack of downstream career opportunities. In other regions, there was insufficient academic infrastructure to train an ocean science workforce, or government or academic infrastructure may have been strong in one aspect (such as human capital) but weak in another (such as facilities). Many respondents noted that failure by external partners to properly engage local experts in design in order to leverage and respond to specific regional opportunities and needs has frequently resulted in well-intentioned, costly, but ineffective capacity development efforts.

To ensure dedicated resourcing for EquiSea, in 2022 The Ocean Foundation officially expanded and transitioned its International Ocean Acidification Initiative, which had previously been focused on capacity development for ocean acidification, to become the Ocean Science Equity Initiative, or EquiSea. The decadal plan developed in 2020 became the basis for the new iteration of EquiSea's strategic plan.

TABLE 2. Barriers to equitable ocean science capacity and recommended strategies identified through community conversations.

BARRIERS TO EQUITABLE CAPACITY FOR OCEAN SCIENCE	
1. High cost and complexity of many ocean science technologies.	
2. Limited in-country access to basic infrastructure such as internet, stable electricity, and basic laboratory and field supplies.	
3. Limited international coordination and investment in ocean science capacity, leading to disparate training opportunities and inadequate financial resources for infrastructure and research.	
4. Limited employment and professional opportunities in oceanography in all but the traditionally well-funded nations.	
5. Limited public, private, and government interest in ocean science programs in lesser-resourced regions.	
6. Lack of funding to sustain any long-term monitoring efforts in lesser-resourced regions.	
RECOMMENDED PROGRAMMATIC AREAS TO ADDRESS IDENTIFIED BARRIERS	
1. Establish a philanthropic fund to enable equitable distribution of ocean science capacity, including through funding of training programs and infrastructure grants.	
2. Coordinate with relevant international processes and partners to ensure effective delivery of capacity development.	
3. Foster collaboration between scientists and policymakers to enhance national support for sustained ocean science programs.	
4. Engage private sector actors to provide job training and employment opportunities in ocean science.	
5. Engage with ocean science technology developers to ensure a pipeline of accessible technology suitable for use in under-resourced regions.	

Since this transition, EquiSea has successfully secured financing for and delivered activities in all five programmatic areas (Table 2, bottom). Each project is designed and co-implemented with regional partners to ensure regional needs are understood and met. Recent and ongoing projects include the creation of a regional training center for ocean acidification in the Pacific Islands, establishment of a regional training center for ocean acidification in the Gulf of Guinea, and design of a women in ocean science fellowship program in partnership with the US National Oceanic and Atmospheric Administration (NOAA).

LESSONS LEARNED

During EquiSea's multi-year development and strategic planning process, it became clear that there is not enough investment in capacity development for ocean science. Many efforts, while well-intentioned, fail to meet the needs of partners and often further exacerbate power issues. Effective capacity development requires meaningful co-design and co-implementation, which is time and resource intensive. The ocean science community should be cognizant of the expertise and skills required to implement effective capacity development activities.

We recommend that those who work in the capacity development space consider the barriers and programmatic strategies we have identified and conduct listening sessions and outreach to regional experts before finalizing a project plan or design. Project timelines should allow sufficient time for this input-gathering prior to addressing any key deliverables, and budgets should reflect the costs of time and expertise not only for project staff but also for those providing guidance. Communication with partners about the overall project arc should be clear, allowing them to decide how much they can engage when they may have diverse priorities and limited resources. While additional investments of time and partitioning of funds into more design may seem to limit the ability to make progress in addressing a key gap in ocean science, we have both heard and seen firsthand that the overall result yields projects that establish rather than erode trust, best address salient needs, and create more lasting sustainability.

REFERENCE

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ACKNOWLEDGMENTS

We acknowledge the Government of Sweden and an anonymous grantor for providing funding to The Ocean Foundation for the strategic development and implementation of the Ocean Science Equity Initiative. Specific projects implemented by the Ocean Science Equity Initiative have also been funded by the NOAA Ocean Acidification Program and the Global Ocean Monitoring and Observing program.

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ARTICLE DOI. <https://doi.org/10.5670/oceanog.2025.104>