

**SPOTLIGHT**

# Knowledge Sharing and Capacity Development to Promote Early Career Ocean Professionals in Small Island Developing States: The SmartNet Approach

By Sanae Chiba, Khushboo Jhugroo, Steven J. Bograd, Jörn O. Schmidt, Jennifer M. Jackson, Hanna Lachance, Mitsutaku Makino, A. Miguel Piecho-Santos, Hiroaki Saito, Erin V. Satterthwaite, and Naya Correia Sena

**INTRODUCTION**

Given the challenges Small Island Developing States (SIDS) face in achieving ocean sustainability, the Barcelona Statement issued after the 2024 Ocean Decade Conference identified further investment in capacity development of SIDS and other underrepresented groups as one of the high-priority crosscutting issues (<https://oceanexpert.org/document/34098>). The statement calls for transforming international organizations by expanding existing capacity development services beyond their conventional geographical areas.

Investment in the career development of younger generations who engage in ocean-related sectors, including natural and social sciences, education, policymaking, management, and industry, is one mechanism that supports capacity development for SIDS. While large-scale capacity development projects, often backed by governmental and philanthropic sponsors, are highly competitive and complex to implement, investing in fostering future generations will help countries build robust foundations for long-term, knowledge-based marine environmental and ecosystem management.

In 2021, two intergovernmental marine science organizations, the International Council for the Exploration of the Sea (ICES) and the North Pacific Marine Science Organization (PICES), established

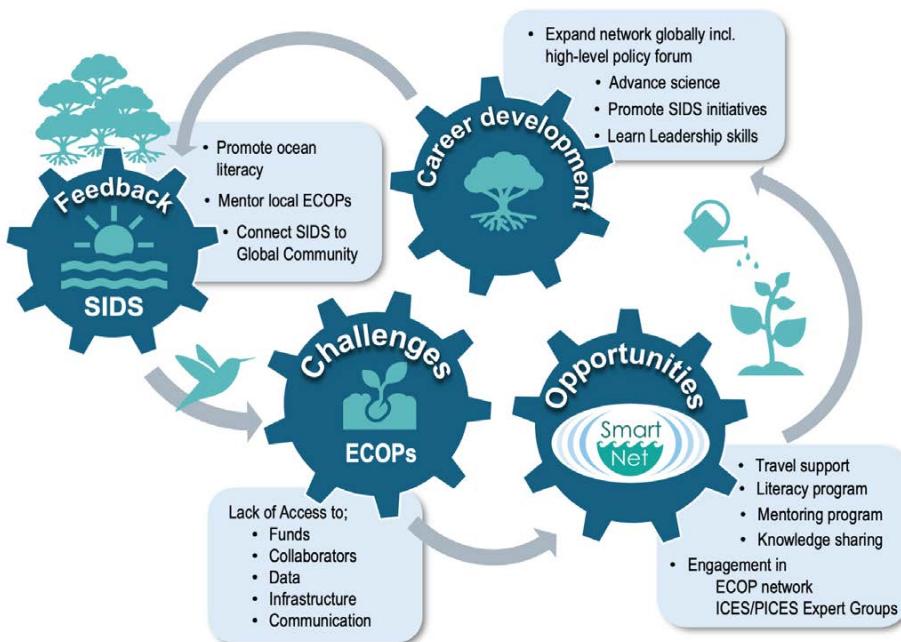
a joint program called SmartNet: Sustainability of MARine ecosystems Through global knowledge NETworks. Endorsed as a program of the UN Decade of Ocean Science for Sustainable Development (2021–2030), SmartNet aims to build a global knowledge network for ocean science by strengthening the collaboration of ICES/PICES scientists and beyond (Trainer et al., 2021). We review how SmartNet leverages the established ICES and PICES frameworks, infrastructure, and partnerships to expand opportunities for early career ocean professionals (ECOPs) from SIDS as an example of global community engagement.

**SmartNet APPROACHES IN CREATING OPPORTUNITIES**

Through SmartNet, ICES and PICES are expanding ECOP opportunities beyond their conventional geographical regions. Because ICES and PICES offer a range of capacity development opportunities for ECOPs in their member countries regardless of citizenship, the immediate and tangible actions focus on promoting the engagement of students, postdocs, and other young professionals from SIDS residing in member countries in these activities. This engagement provides them with hands-on experience in international scientific collaboration and leadership (Figure 1).

ICES and PICES have formal groups led by and dedicated to promoting ECOPs. These groups are integral to SmartNet. In collaboration with the Global ECOP Programme (Roman and Kostianaia, 2023), these ICES and PICES groups work to engage with SIDS ECOPs and enhance their career advancement. Among other activities, SmartNet ECOPs proactively connect ECOPs with established scientists by organizing networking and career development events such as mentor-mentee matching and trainings at ICES- and PICES-sponsored meetings. Those connections are nurtured year-round, providing continuous career development support for SIDS ECOPs.

SmartNet also fosters the development of leadership skills among SIDS ECOPs by engaging them in various ICES and PICES expert groups that focus on international collaboration. Participation allows ECOPs to gain experience in the organizational and governance processes of intergovernmental science organizations, contributing to collaborative efforts to address global challenges. Upon their engagement in ECOP groups and other expert groups, SmartNet leverages existing travel support schemes to send SIDS ECOPs to annual meetings and co-sponsored symposia, enabling them to expand their professional networks.



**FIGURE 1.** Challenges faced by Small Island Developing States (SIDS) early career ocean professionals (ECOPs) and ways that SmartNet supports their career development by leveraging ICES and PICES frameworks. The diagram illustrates a positive feedback loop that reinforces the capacity development of SIDS ECOPs.

## EXAMPLES OF SUCCESSES

Two ECOPs, authors Khushboo Jhugroo from Mauritius and Naya Sena from Cabo Verde, have actively engaged with SmartNet to enhance its outreach to SIDS. Travel support allowed them to attend the PICES annual meetings in 2022 and 2023, where, during SmartNet-led workshops, they shared their experiences and highlighted the challenges faced by SIDS. They have also facilitated collaboration and knowledge-sharing on ocean literacy efforts among ECOPs in the North Pacific and in Africa, strengthening the global network of young ocean professionals. Building on their mentor-mentee relationships with senior scientists, both ECOPs played key roles in contributing to SmartNet-sponsored workshops and publications (including this article) on knowledge-sharing and capacity development. Jhugroo's story as a SIDS ECOP is highlighted in a short film featuring SmartNet that was screened at an international film festival to encourage global community engagement (<https://youtu.be/s0UXa3jjhQ8?si=gW3QMSK1QjWW6tV5>).

A recent highlight of their achievements is their participation at the Ocean Decade Conference in Barcelona in April 2024 (Jhugroo et al., 2024). Jhugroo and Sena participated in a variety of events, both within and beyond those sponsored by SmartNet, as speakers, panellists, and moderators. Jhugroo advocated for the critical need for geopolitical inclusivity, showcased the unique challenges and contributions of SIDS, and urged actions to address those challenges. Sena, as a coordinator of ECOP Cabo Verde, facilitated dialogue between the ECOP Africa and Global ECOP programs, and presented her research on a common framework for SIDS to address challenges surrounding Ocean Decade actions. The conference also provided them with opportunities to engage in high-level, cross-sectoral dialogues, which helped them gain insights into the latest ocean policy developments as well as potential future collaborations. Jhugroo represented PICES in the workshop on the science-policy interface in the Global South organized by the International Panel for Ocean Sustainability. Sena also had the opportunity to meet informally with the President of Cabo Verde, the inaugural speaker of the opening ceremony and the current Patron of the Ocean Decade Alliance.

## LESSONS LEARNED AND RECOMMENDATIONS

Recognizing the challenges faced by SIDS, Zitoun et al. (2020) encourage a national-level, bottom-up approach to enhance capacity development for sustainable ocean management. The successes of two ECOPs as described here demonstrate that investment by international organizations in SIDS ECOPs—who can serve as ambassadors linking their states to the global community—offers an effective bottom-up approach for delivering tailored solutions to individual states.

Jhugroo and Sena joined the PICES regions by securing highly competitive opportunities, such as graduate school enrollment or postdoctoral fellowships within member countries. A drawback of programs that send ECOPs to foreign countries for academic enrollment is the potential for “brain drain,” as they may build their careers abroad rather than returning to their home countries (Urban and Seeyave, 2021). However, once integrated into the close-knit ICES and PICES communities, their engagement and professional networks can endure even if they leave member countries. Many young scientists who joined ICES and PICES have indeed risen to lead expert groups and governing bodies after years of active engagement. In this context, we are confident that SmartNet can continue to support SIDS ECOPs in connecting their countries with the global community, regardless of their locations.

While exploring opportunities within ICES and PICES, we recognized that international and local organizations offer numerous frame-

works or programs for ocean-related capacity-building, for example, onboard and laboratory training courses, visiting scholar programs, and travel grants. To maximize opportunities for SIDS ECOPs, we must use multiple frameworks creatively through multilateral collaborations. For example, through the visiting scientist program of the Scientific Committee on Oceanic Research (SCOR), SmartNet scientists can directly impact their countries' capacity development by organizing in-country training courses for ECOPs.

The Intergovernmental Oceanographic Commission of UNESCO collates information on capacity development opportunities from around the world on the Ocean CD-Hub (<https://oceandc.org>). Also, the Barcelona Statement recommends launching online tools to enhance opportunities for philanthropic funding for various Ocean Decade actions engaging SIDS. We strongly recommend leveraging these resources to develop an integrated, user-friendly information hub under the Ocean Decade Capacity Development initiative. This hub would make capacity development and sharing opportunities easily discoverable and accessible, and facilitate effective coordination and communication among various networks. While support from a single program is limited, a coordinated global effort can unlock exceptional opportunities for SIDS ECOPs.

## REFERENCES

Jhugroo, K., N. Sena, R. Roman, and S. Bograd. 2024. Ocean Decade Conference – Barcelona: PICES ECOPs at the Barcelona Conference of The UN Decade of Ocean Science for Sustainable Development. *PICES Press* 32(2):18–23.

Roman, R., and E. Kostiania. 2023. ECOP Programme Onboarding Handbook for Coordinators and Focal Points. UN Decade of Ocean Science for Sustainable Development, 17 pp., <https://www.ecopdecade.org/wp-content/uploads/2023/12/ECOP-Programme-Onboarding-Handbook-Final-Version-2.pdf>.

Trainer, V.L., B. Sonia, S.J. Bograd, S. Chiba, E.V. Satterthwaite, L. Waters, J. Schmidt, E. Johannessen, W. Karp, and A.C. Brusendorff. 2021. Championing ocean diversity. Pp. 228–231 in *ECO Magazine Special Issue UN Decade of Ocean Science for Sustainable Development*, <http://digital.ecomagazine.com/publication/frame.php?i=707374&p=228&pn=&ver=html5>.

Urban, E., and S. Seeyave. 2021. Visiting scientists provide capacity development: Lessons learned by POGO and SCOR. *Oceanography* 34(3):44–52, <https://doi.org/10.5670/oceanog.2021.306>.

Zitoun, R., S.G. Sander, P. Masque, S. Perez Pijuan, and P.W. Swarzenski. 2020. Review of the scientific and institutional capacity of Small Island Developing States in support of a bottom-up approach to achieve Sustainable Development Goal 14 targets. *Oceans* 1(3):109–132, <https://doi.org/10.3390/oceans1030009>.

## ACKNOWLEDGMENTS

The idea for this article came from the achievement of the workshop “Sharing Capacity and Promoting Solutions for Marine Ecosystem Sustainability within the UN Decade of Ocean Science” at the PICES 2023 annual meeting. We thank the ICES and PICES communities for their passion and tireless efforts for the promotion of ECOPs in our community and beyond, which inspired us to write this paper.

## AUTHORS

**Sanae Chiba** ([sanae.chiba@pices.int](mailto:sanae.chiba@pices.int)), North Pacific Marine Science Organization (PICES), Sidney, BC, Canada. **Khushboo Jhugroo**, Vancouver, BC, Canada.

**Steven J. Bograd**, NOAA Southwest Fisheries Science Center Ecosystem Science Division, Monterey, CA, USA. **Jörn O. Schmidt**, WorldFish, Penang, Malaysia. **Jennifer M. Jackson**, Institute of Ocean Sciences, Fisheries and Oceans Canada, Sidney, BC, Canada. **Hanna Lachance**, Leading Solutions in support of NOAA Fisheries Office of Science and Technology, Silver Spring, MD, USA.

**Mitsutaku Makino**, Atmosphere and Ocean Research Institute, University of Tokyo, Kashiwa-shi, Chiba, Japan. **A. Miguel Piecho-Santos**, Portuguese Institute for Sea and Atmosphere and Algarve Centre of Marine Sciences, Lisbon, Portugal.

**Hiroaki Saito**, Atmosphere and Ocean Research Institute, University of Tokyo, Kashiwa-shi, Chiba, Japan. **Erin V. Satterthwaite**, CalCOFI and California Sea Grant, Scripps Institution of Oceanography, University of California San Diego, La Jolla, CA, USA. **Naya Correia Sena**, Atmosphere and Ocean Research Institute, University of Tokyo, Kashiwa-shi, Chiba, Japan.

ARTICLE DOI. <https://doi.org/10.5670/oceanog.2025.108>