PACIFIC MARINE KNOWLEDGE AND RESEARCH

KNOWLEDGE AND MANAGEMENT

KEY POINTS

- Knowledge integrated from accurate observations using modern science and local knowledge is the basis of informed management for sustainable development.
- Marine research capacity building will depend on long-term partnerships for learning exchanges, collaborative data collection, and integrated knowledge management.
- Building capacity for scientific research in the Pacific will require commitments to a culture of science, strengthening links between research and policy development.
- Strengthened marine science can provide social benefits, promote economic sectors such as fisheries and tourism, and support disaster risk reduction efforts.

HOW ISSUE LINKS TO/IMPACTS SDGs BEYOND SDG14 LIFE BELOW WATER

- All Goals: Management for sustainable development relies on sound, up to date information
- SDG4: quality education to inform decisions and create options (4.3, 4.3, 4.7, 4.b)
- SDG8: achieve higher levels of economic productivity through diversification, technological upgrading and innovation (8.2)
- SDG9: enhance scientific research, support domestic technology development, research and innovation, and facilitate sustainable and resilient infrastructure development in developing countries. (9.5, 9.a, 9.b) For the Pacific islands, sustainable infrastructure relies on ocean science and marine weather and hazard forecasting
- SDG17: partnership to reach the sustainable development goals through financing, capacity building, and technology sharing (targets ii, iii, 2, 6, 7, 8, 9, 16, iv-c)

BACKGROUND

1. **Effective marine resource and environment management relies on sound, sustained information collection.** Marine systems support Pacific livelihoods and economies, and ocean patterns also affect the islands themselves. Baselines and monitoring combined with local knowledge are vital for sustainable development and resilient management.
2. **Progress toward the SDGs requires measurements of baselines and changes.** The Global Ocean Commission suggested indicators for SDG14 components[1]. SDG14.3 requires pH monitoring of vulnerable populations, such as coral reefs. Such monitoring is at the forefront of global technology, and the Pacific region will need assistance for access.
3. **Data informs sustainable management.** Leader engagement with science and evidence-based knowledge will increase the effectiveness of planning. Capacity for monitoring and analysis are a critical need for Pacific states, and this capacity development is encouraged under UNCLOS XIII and XIV.
4. **The Pacific needs effective knowledge management**. Cultures and populations are changing rapidly, and traditional and local knowledge is being lost. Traditional knowledge of ecosystems, where it still exists, is insufficient alone to respond to rapid changes and environmental loss. In addition to training of staff in marine science and local knowledge, incorporation of this knowledge into management processes will demonstrate Pacific leadership in sustainable development.
5. **Data access and management strengthen research and policy.** Data custodianship is complicated by connectivity limitations and high staff turnover, requiring innovative storage and transmission practices for effective data use. Access and storage using regional hubs has been successful and could be expanded in practice.
6. **New technology can ease capacity demands.** Efficient use of available technology can reduce the need for in-country capacity for some monitoring. The usefulness of 'big data' for governance has been demonstrated for large protected area management.[2]

SPREP PROE

UN environment

7. **The potential coordination facilitated by regional frameworks is a strength of the Pacific region.** The region has a solid regional policy backdrop through the Pacific Islands Regional Ocean Policy (2002) and the Framework for a Pacific Oceanscape endorsed by Pacific Leaders in 2010. Ocean observing technology is complex, costly, and sensitive. Global capacity is limited, but oceanography has benefited from large collaborative efforts. Such collaborations are a Pacific strength.
8. **The Pacific region is a member of existing global ocean data networks.** These networks include the Pacific Islands section of the Global Ocean Observing System Regional Alliance (GOOS) of IOC-UNESCO and the Global Ocean Acidification Observing Network (GOA-ON). There are also existing opportunities for technology transfer and partnerships, such as Global Fishing Watch.
9. **The world needs Pacific science data, and the Pacific needs more scientists,** requiring support systems that encourage scientists to train and stay in the region. Partnerships can create opportunity to apply the guiding principles and approaches for technology transfer and capacity development foreseen in UNCLOS toward publishing and disseminating the results of marine research, providing training programs and scientist exchanges, and establishing regional marine science and technology centres.
10. **Research carries responsibilities.** Environmental and social impacts of research are as important as the global data heritage.[3] Frameworks on access and benefit sharing need further development, with a focus on marine bioprospecting and genetic resources.[4]
11. **Underwater heritage is an opportunity for research.** The Pacific contains >4,000 underwater heritage assets, ranging from submerged villages and fishing weirs to WWII wrecks, with potential others unmapped and unstudied. These sites hold information about early seafarers, vessel technologies, fishing methods, and Pacific cultures.[5] UNESCO assists Pacific SIDS to build capacity through workshops and the UNESCO University Twinning and Networking (UNITWIN) programme for maritime archaeology. In addition, the Pacific has an opportunity to lead on best tourism practice for UCH sites.
12. **Key research will focus on coastal ecosystems.** Scientific planning can identify key target areas for efficient research. For example, coastal systems are highly variable, and there is much to learn about coastal ecology. We do not know the full present extent of ocean acidification or its variability in Pacific island coastal and reef environments. These data are technically and technologically difficult to obtain. Partnerships can assist.
13. **Pacific weather and climate are driven by the ocean**, but forecasting is limited by lack of marine data. Pacific island infrastructure and economies are affected by marine health and hazards. Sea level rise, land-use change, and reef changes have altered the expected patterns of inundation and water flow, and these changes can combine with increased storm severity or natural disasters with devastating results.
14. **Regional priorities can be used to direct action**. It has been suggested that key global technology transfer and capacity development priorities could include support for international science cooperation and technology development; networks of marine science and technology centres; open data; sample sharing; training, mentoring and skill development.[6] The Intergovernmental Oceanographic commissions (IOC UNESCO) could provide useful input toward targeting these priorities: in open access to data and information (through the Ocean Biogeographic Information System); human capacity-building through regional training centres (Ocean Teacher Global Academy); development of guides, manuals, codes of conduct and best practices in marine scientific research (e.g., through the Argo Project) and data standards and management (International Oceanographic Data and Information Exchange).
15. **Building marine capacity for the region requires a comprehensive and integrated approach.** From elementary- to university-level, there is a need for linkages and consistency in curricula and for more linkages to be made between University teaching and approaches and tools used by governments. Postgraduate degrees need to be proliferated in topics of regional development significance and to work with governments and regional bodies. Additional technical training of professionals needs to be structured and accredited through bodies such as Pacific TAFE. Further professionalization of marine researchers and managers could be strengthened to build sustainable regional capacity and improve retention to the region.

1 Global Ocean Commission 2016. The future of our ocean: Next steps and priorities. Annex II: Proposed elements of indicators for SDG14.

2 Jablonicky et al. 2016 Satellite tracking to monitor area-based management tools & identify governance gaps in fisheries beyond national jurisdiction. Nereus brief

3 Hubert A. 2011. The New Paradox in Marine Scientific Research: Regulating the Potential Environmental Impacts of Conducting Ocean Science. Ocean Development & International Law 42:329–355

4 Ntona 2015. Benefit sharing and marine scientific research and The transfer of marine technology as benefit-sharing. Benelex Blog, University of Edinburgh

5 UNESCO 2010. Underwater Cultural Heritage in Oceania. 111 p. For further details: www.unesco.org/new/en/culture/themes/underwater-cultural-heritage/

6 IOC-UNESCO, Permanent Missions to UN of Belgium and Fiji. 2016. Side event: Capacity building and transfer of marine technology.