EMPOWERING OCEANS: GROWING CAPACITY IN CORAL REEF CONSERVATION AND RESTORATION IN THE GLOBAL SOUTH

CORDAP R&D TECHNOLOGY ROADMAP

cordap
G20 Coral Research & Development Accelerator Platform

جامعة الملك عبدالله للعلوم والتقنية
King Abdullah University of Science and Technology

Credits: Renata Romeo / Ocean Image Bank

Table of contents

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Scope of work

To increase capacity for successful coral conservation and restoration in the Global South, CORDAP hosted a four-day workshop in the large port city of Mombasa, Kenya from March 12th to 15th, 2024. The workshop brought together representatives from academia, industry, conservation, restoration, and government from 19 Global South countries (25 nations in total; Figure 1). The workshop shed light on the pivotal importance of increasing capacity in propelling forward coral conservation and restoration projects.

Over four intensive days, participants collaboratively identified the most pressing challenges to coral reef conservation and restoration in the Global South and devised actionable strategies to overcome them. Recognizing the diverse backgrounds, experiences, cultures, and regions represented, the discussions centered on finding shared challenges and scalable solutions that transcend local specificities and benefit a broad range of stakeholders. Through group brainstorming and discussions, the workshop facilitated dynamic exchanges, ensuring that the voices and perspectives of a diverse, gender-balanced group spanning multiple sectors, career stages, and conservation disciplines were amplified.

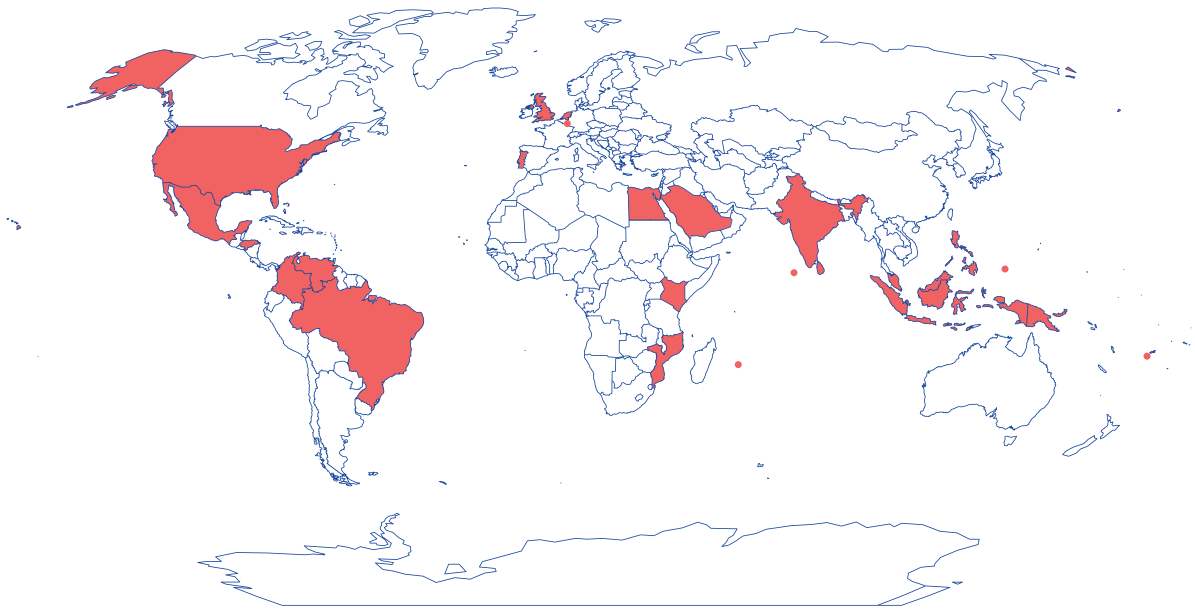

Figure 1. Map showing countries and regions represented in the in-person workshop held in Mombasa, Kenya (March 2024).

Day one of the workshop was dedicated to identifying challenges for coral conservation in the Global South and revealed a remarkable consensus among the participants. These challenges were nested within six overarching priority areas:

- **Capacity development**
- **Collaborations**
  (international, cross-sector, scientists and policy makers, community engagement)
- **Project management**
- **Facility, tools, research, and innovation**
- **Policy and governance**
- **Funding**

Through a collaborative voting process, participants honed in on the most pressing challenges within each priority area, orming the foundation for the days that followed.

With the challenges identified, day two focused on co-developing context-appropriate solutions. Working in multi-disciplinary groups, participants strategized actionable responses for each challenge, drawing on their diverse experiences to ensure that solutions were innovative, grounded, and scalable.

On the third day, participants translated proposed solutions into concrete action plans. Each group outlined key steps for implementation, identified target stakeholders, established preliminary timelines, and discussed required resources to bring the ideas to life.

Central to the workshop's objectives was translating the discussions and action plans into tangible outcomes. Day four thus pivoted towards crafting strategies to amplify the visibility of these action plans and, more generally, outputs derived from the group discussions, ensuring that the momentum generated within the workshop would translate into real-world impact. Some suggestions were to summarize the discussions on a scientific publication, and develop a road map that could inform CORDAP and other funding agencies.

As the kick-off event for what CORDAP and their partners envision as a long-term program, the CORDAP workshop in Mombasa stands as a progress in the global effort to conserve and/or restore coral reefs. Recognising that investing in the people doing the work is as crucial as investing in the conservation actions themselves, the workshop emphasized the importance of empowering communities with the resources needed for success. We hope the bonds forged and insights gleaned during this workshop will continue reverberating, catalyzing sustained action and innovation in coral reef conservation worldwide.

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1. Executive summary

Coral reefs are critical ecosystems that sustain marine biodiversity, protect coastlines, and support the livelihoods and food security of millions, particularly in the Global South (Sporgeon, 1992; Knowlton *et al.*, 2010). Yet, they face unprecedented threats due to climate change, overfishing, pollution, and habitat destruction. Despite these regions hosting the majority of coral reefs, research, funding, and decision-making capacity remain disproportionately concentrated in high-income countries. This imbalance perpetuates inequities and hinders the development of locally driven, effective conservation and restoration strategies.

To address these challenges, CORDAP convened a four-day workshop in March 2024 in Mombasa, Kenya, gathering over 50 participants from 25 countries. The workshop brought together researchers, practitioners, policy experts, and community leaders from the Global South to identify core challenges and co-create solutions that can strengthen coral reef conservation and restoration across diverse local contexts.

Participants identified six priority areas requiring urgent action:

1. Capacity Development
2. Integrative Collaborations
3. Project Management
4. Facilities, Tools, Research, and Innovation
5. Policy and Governance
6. Funding

Across these areas, the roadmap outlines targeted, actionable recommendations — from establishing standardized practitioner training and fostering regional mentorship networks, to integrating local and traditional knowledge, promoting stakeholder engagement, and designing sustainable funding models. The roadmap also emphasizes the need for inclusive science communication, ocean literacy, and long-term partnerships that bridge the gap between policy and practice.

Through detailed case studies, practical frameworks, and a collaborative action plan, this roadmap aims to guide funders, governments, institutions, and NGOs in designing equitable, scalable, and locally embedded solutions. By investing in people, building regional capacity, and supporting community-driven innovation, we can unlock the potential for transformative change in coral reef conservation.

This document is both a reflection of current challenges and a blueprint for coordinated, inclusive, and lasting impact — ensuring that coral reefs and the communities that depend on them can thrive into the future.

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1.1. Summary table of the priority areas and recommendations

Priority area	Key recommendations
Capacity development	- Establish standardized training programs for practitioners
	- Support long-term mentoring, exchange programs, and professional networks
	- Increase access to scuba and fieldwork certifications
Integrative collaborations	- Facilitate multi-stakeholder partnerships (e.g., community, academia, government, private sector)
	- Promote co-development of projects with local communities
	- Incentivize equitable international collaborations
Project management	- Provide training in proposal writing, budgeting, monitoring, and evaluation
	- Develop accessible toolkits and templates for effective project implementation
	- Support early-career professionals in managing restoration projects
Facilities, tools, research, and innovation	- Improve access to essential infrastructure (labs, nurseries, monitoring equipment)
	- Support the development and transfer of context-appropriate technologies
	- Fund innovation hubs in the Global South
Policy and governance	- Encourage national and local governments to support reef restoration in policy agendas
	- Promote inclusion of local/traditional knowledge in management plans
	- Advocate for policies that enable community leadership and equitable benefit sharing
Funding	- Create flexible, long-term funding models that support local leadership and continuity
	- Include training and certification costs in grants
	- Increase accessibility to funding for Global South institutions and community-based organizations

2. Roadmap

2.1 Introduction

Coral reefs serve as vital lifelines for coastal communities, offering sustenance, economic opportunities, and cultural significance to millions worldwide (Sporgeon, 1992; Knowlton *et al.*, 2010). From fisheries and tourism industries to safeguarding coastlines and enhancing food security, coral reefs play a multifaceted role in promoting the wellbeing and economic stability of coastal populations. Their preservation is not only crucial for marine biodiversity but also for the resilience and prosperity of communities reliant on these invaluable marine ecosystems. However, despite their ecological and socioeconomic value, coral reefs face unprecedented threats due to human activities, including climate change (Figure 2), overfishing, pollution, and habitat destruction.

Figure 2. A high-coral cover reef near Shimoni, Kenya in the early stages of bleaching as a result of prolonged high-temperature exposure (taken just after the Mombasa workshop in late March 2024, when the temperature was approximately 32 °C).

The need for science-based conservation and restoration efforts to safeguard coral reefs has never been more urgent (Knowlton *et al.*, 2021). Despite coral reef's critical importance, conservationists in these regions face numerous challenges, including limited resources, lack of trained personnel, low access to technology, and funding (see Hein and Staub [2021] for a cursory, non-exhaustive overview of the coral reef funding landscape).

Despite most coral reefs being located in tropical regions, governance, educational institutions, research facilities, technology, and funding mechanisms are predominantly concentrated in high-income nations outside these areas (Morrison *et al.*, 2020; Tolochko and Vadrot, 2021). This geographical and economic disconnect perpetuates inequities in coral reef research and conservation (Spalding *et al.*, 2023). For instance, high-impact scientific publications

predominantly emerge from institutions in developed countries (Campos-Arceiz *et al.*, 2018; Maas *et al.*, 2021; Nurcahyo and Meijaard, 2018; Tennant *et al.*, 2016), and much of this research remains inaccessible due to paywalls (Else, 2018).

Additionally, "parachute research" — where international scientists, often from higher-income countries, conduct field studies in lower-income nations without meaningful engagement or follow-up with local researchers and stakeholders — further exacerbates disparities (Asase *et al.*, 2022; Haelewaters *et al.*, 2021; Maas *et al.*, 2019; Stefanoudis *et al.*, 2021). This practice fosters dependency on external expertise, neglects the specific research needs of local communities, and undermines efforts to sustain local research capacity. By sidelining local knowledge and expertise, parachute science not only perpetuates inequalities but also limits the effectiveness and relevance of conservation efforts in the country where the research was conducted. At the same time, valuable traditional knowledge about the distribution, ecology, natural history, and potential uses of tropical species remains largely inaccessible to the broader scientific community (Baker *et al.*, 2019; Berkes *et al.*, 2000; Muhumuza and Balkwill, 2013). Excluding local researchers reinforces historical disadvantages faced by the Global South in science and development; this exclusion not only deepens inequalities but also risks introducing biases in scientific practices and conservation priorities (Armenteras, 2021; Pettorelli *et al.*, 2021).

Ocean literacy is essential for bridging the gap between scientific projects and local communities by highlighting their relevance and fostering engagement. However, access to ocean education remains starkly unequal across countries (UNESCO-IOC, 2024). For example, early-career scientists' involvement in international fora continues to be determined by country of origin, the majority of scientific literature remains behind expensive paywalls (Else, 2018), and access to tertiary education in ocean science remains unequally distributed (UNESCO-IOC, 2021). Women and underrepresented groups continue to face barriers in access and longevity in ocean science professions (Black 2020, Ahmadia *et al.*, 2021; Amon *et al.*, 2022).

Effective science communication is equally critical, ensuring that research findings and conservation goals are conveyed in ways that resonate with diverse audiences. When ocean science education is lacking and communication is ineffective or absent, a disconnect often arises between conservation initiatives, local communities, and policymakers. Projects that fail to align with local priorities or clearly demonstrate their significance risk being perceived as externally driven, leading to diminished community support and lower prioritization by decision-makers. This misalignment can also deter funders, further impeding conservation efforts.

Funding, as we know, lies at the root of many of these disparities. Coral research and restoration are typically associated with high costs (Schmith-Roach *et al.*, 2024) and are often awarded to locations and institutions with established records of research, infrastructure, and expertise. This perpetuates inequalities by favoring well-resourced organizations, leaving underfunded regions at a disadvantage and slowing progress toward broader change. Moreover, financing is predominantly project-based and short-term, which often leads to unsustainable outcomes once funding ends (National Research Council, 2008). Adding to this, for coral reef research, restoration, and monitoring, specialized techniques and training — such as scuba certification — are essential. However, SCUBA gear and associated training, including swimming proficiency, are costly. Unfortunately, these expenses are often excluded from grant budgets.

The lack of training, ocean literacy, and sustained opportunities for local communities perpetuates their underrepresentation in coral reef research and conservation. This contributes to a widening gap between research and practical application, leaving critical threats to local tropical biodiversity unaddressed. The importance of addressing these inequalities has been increasingly highlighted in prominent international ocean fora, such as the Our Ocean Conferences (held annually since 2014), the UN Ocean Conferences (2017, 2022 and 2025), the first Blue Economy Conference (Nairobi, 2018), and the High-Level Panel for a Sustainable Ocean Economy (2018–2022). The renewed focus on oceans under the UN Decade for Ocean Science, alongside growing efforts to integrate equity, justice, diversity, and inclusion (Harden-Davies *et al.*, 2022), presents a significant opportunity for decision-makers worldwide to support the development of locally relevant responses to the environmental crises impacting both people and the ocean — particularly those driven by global warming and biodiversity loss.

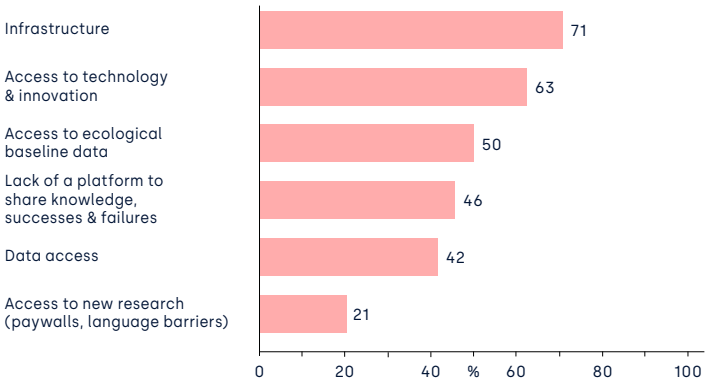
Here, we highlight the perspectives and present a set of recommendations from the CORDAP workshop aimed at identifying the main challenges faced by coral researchers in the Global South. By emphasizing the critical role of local involvement, equity in research, and sustainable funding models, we strive to contribute to a more equitable and impactful strategy for coral reef preservation. Although many challenges remain, there is a clear opportunity to develop lasting, locally-driven solutions that strengthen both scientific and community-based conservation efforts, ultimately ensuring the resilience of coral reefs and the livelihoods of the communities that depend on them.

2.2 Challenges and proposed solutions

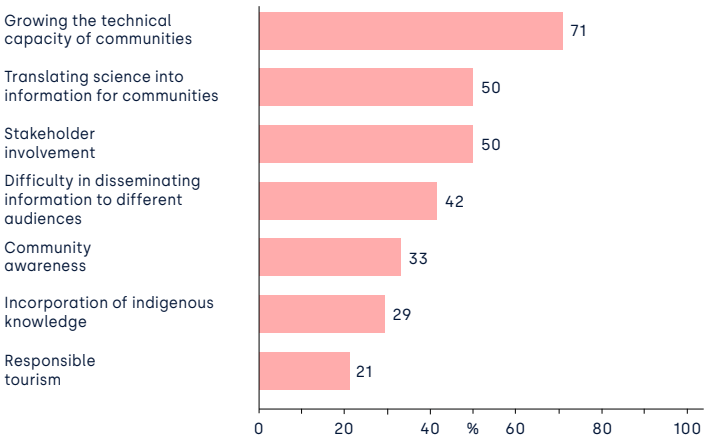
Workshop participants identified what they believe are the biggest challenges hindering research and development in the Global South. These challenges were then categorized into six key priority areas: Capacity development, Integrative collaborations, Project management, Facilities, tools, research & innovation, Policy & governance, and Funding. Each of these areas requires significant support, investment, and targeted action from CORDAP and other agencies to strengthen coral conservation efforts in the Global South (Figure 3). Through a voting process, participants selected the top

Human capacity development

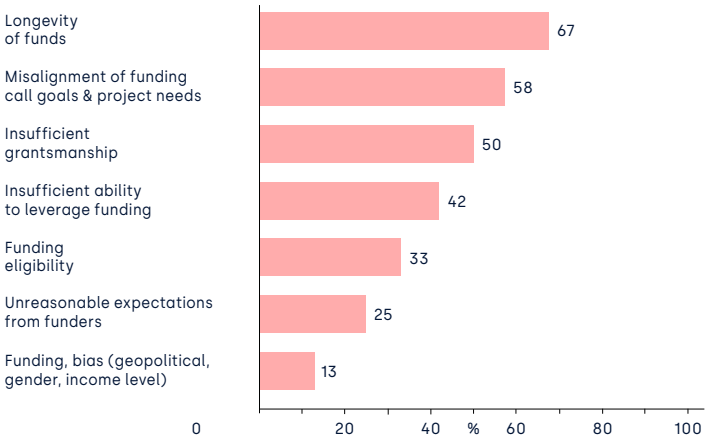
Facilities, tools, research & innovation



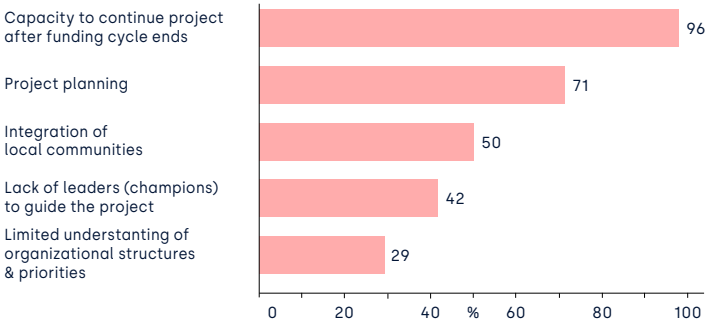
Integrative collaborations



Funding



Project management



Policy & governance

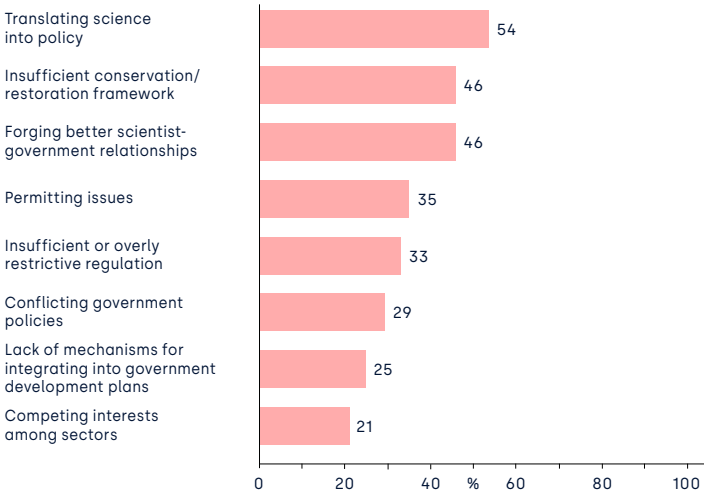


Figure 3. Results of surveys on main challenges faced by coral reef conservationists in the Global South. Participants initially identified a list of priority challenges, from which they selected their top three. Due to space limitations, challenges with lower response rates are not included in the figure.

three challenges within each priority area. While not exhaustive, this list highlights the most pressing issues as perceived by participants, along with proposed solutions to address them.

Further challenges are explored throughout this document, with Figure 4 illustrating a word cloud of the most frequently occurring terms in the proposed solutions to these issues. The workshop also served as a platform for participants to reflect on local success stories and the challenges they face in their respective regions (see Box 1 and "Success Stories.").

The overlap among certain topics underscores the complexity and interconnectedness of these challenges (Figure 5), illustrating their multifaceted nature and the intricacies involved in effectively addressing them.

Figure 4. Word cloud showcasing the most frequently mentioned terms in proposed solutions for enhancing expertise in coral reef conservation across the Global South, as identified by workshop participants.

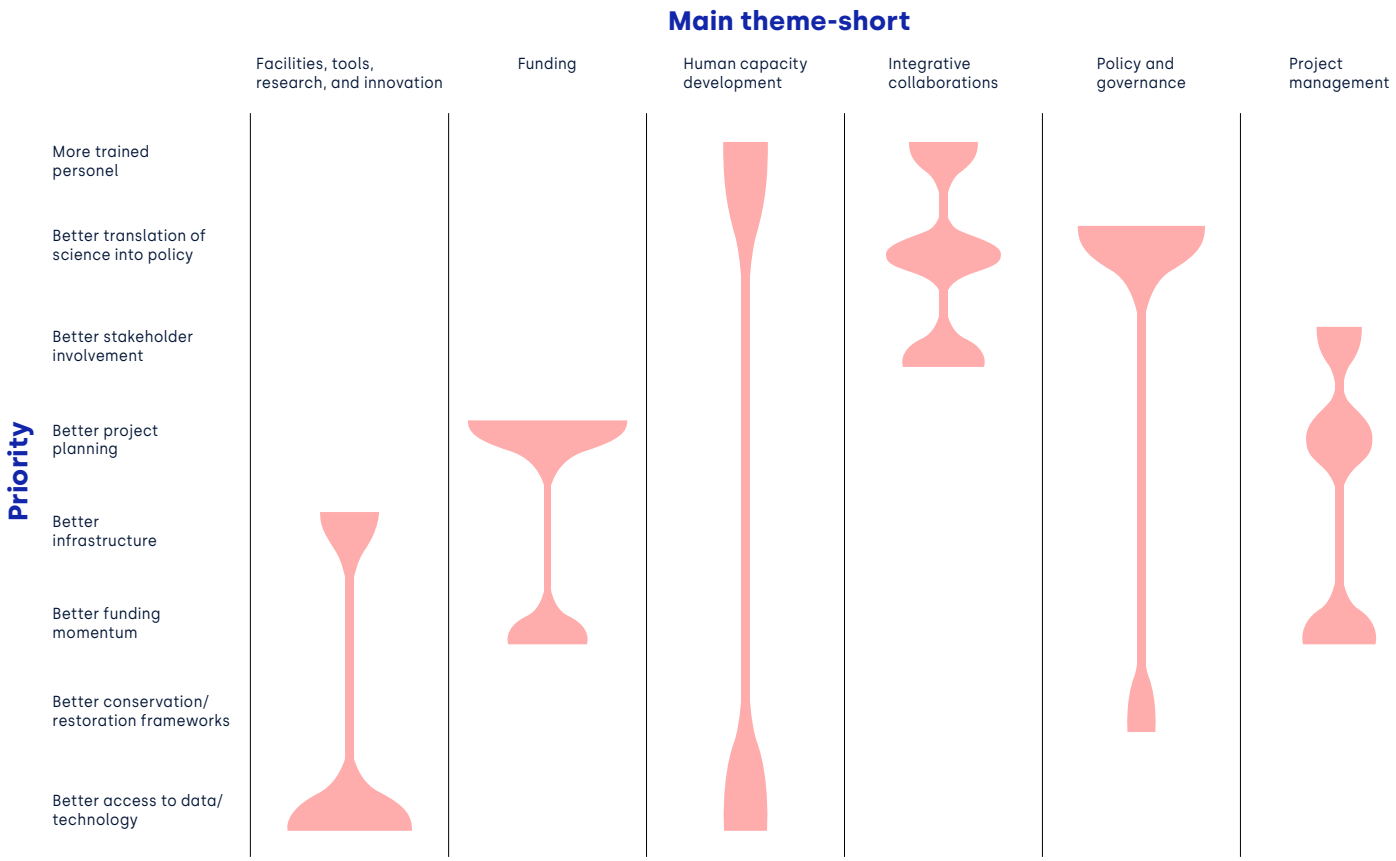


Figure 5. Plot showing overlap of priorities across the six major challenges identified by the workshop attendees. The width of the violin plots are proportional to the number of times a particular recommendation was made.

Figure 6. A coral restoration project led by REEFolution (Shimoni, Kenya).

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Box 1: Coral conservation in the Western Indian Ocean (WIO):

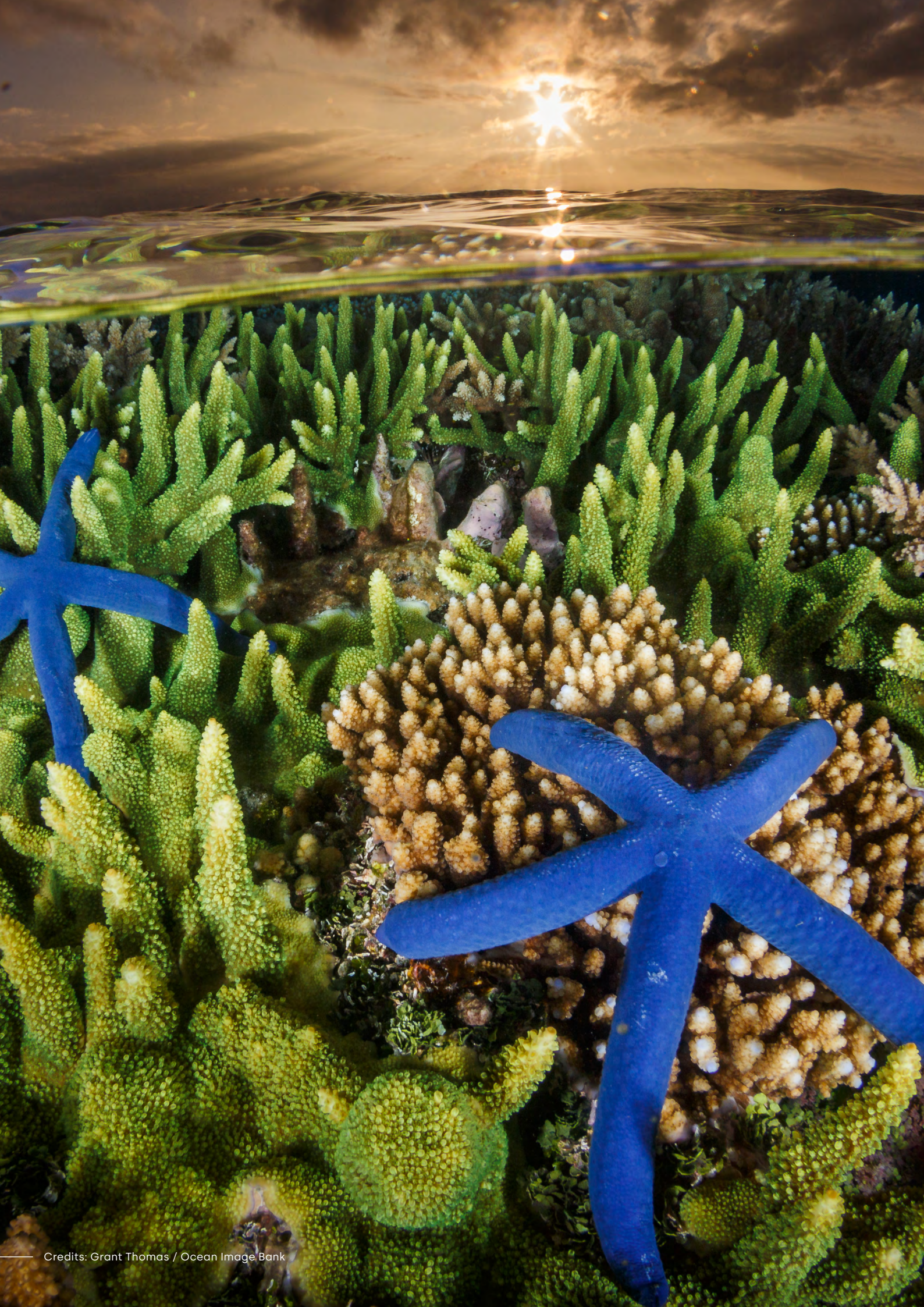
Coral reefs in the WIO are under increasing threat from climate change, overfishing, coastal development, and pollution. In response, coral reef restoration efforts are expanding across the region. However, achieving lasting ecological and social impact requires adaptive management and inclusive governance that connect community engagement, national policies, and regional collaboration.

Despite growing interest, many restoration initiatives face significant limitations. Projects often lack adequate financial resources, technical expertise, and institutional support, constraining their ability to scale and adapt. For example the recent closure of major funders such as USAID has placed ongoing reef restoration projects in Tanzania and Madagascar at risk of collapse, with funding withdrawals also leading to the loss of technical capacity. Transboundary reef systems — such as those shared between Tanzania and Kenya — suffer from weak legal harmonization and fragmented governance, making coordinated action difficult and inconsistent. Additionally, traditional ecological knowledge remains undervalued in restoration planning and monitoring, while community involvement varies widely in depth and effectiveness.

Nevertheless, several successful models demonstrate what is possible when governance systems are well-aligned and communities are empowered (Box 1-Figure 1). In Madagascar, Locally Managed Marine Areas (LMMAs) integrate coral restoration with community-led conservation and resource management. Kenya's Kuruwitu Community Conservancy has effectively combined reef restoration with sustainable tourism and alternative livelihoods, creating local incentives for stewardship. REEFolution (Figure 6; see also "Success Stories"-case study#1.) has pioneered coral restoration within MPAs in southern Kenya, focusing on capacity-building, education, and the use of scientifically informed restoration techniques to enhance reef structure and fisheries recovery. In Seychelles, Nature Seychelles has implemented one of the most advanced coral reef restoration programs in the region. To boost governance, the Western Indian Ocean Marine Protected Area Network (WIOMPAN) supports collaboration among coral reef MPA managers, while the Western Indian Ocean Marine Science Association (WIOMSA) advances cross-border training, policy development, and co-produced science to support integrated governance.

Scaling coral reef restoration in the WIO will depend on sustained, coordinated governance that is adaptive, inclusive, and rooted in long-term commitment. This includes aligning restoration efforts with local socio-economic and cultural contexts, strengthening capacity, co-management and benefit-sharing mechanisms, securing long-term financing, and harmonizing legal and policy frameworks across the region. Bridging the gap between science and policy through co-designed research and participatory decision-making will be essential for building the resilience of both coral reef ecosystems and the communities that depend on them.

Box 1: Figure 1. Illustration of the need for integrating multiple components for successful coral restoration.



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2.3. Priority area 1: Capacity development

Capacity development[1] is recognised as a critical challenge in the United Nations Decade of Ocean Science for Sustainable Development (UNESCO-IOC, 2021) and in Sustainable Development Target 14.a (UNGA 2015). One definition of capacity development is "the process by which individuals and organisations obtain, strengthen, and maintain the capabilities to set and achieve their own development objectives over time" (UNESCO-IOC, 2021). It is crucial in coral conservation as it equips local communities, scientists, and practitioners with the knowledge, skills, and tools necessary to manage and restore coral ecosystems effectively. By building technical expertise, fostering leadership, and promoting community engagement, capacity development ensures that conservation efforts are sustainable and resilient over the long term. It empowers local stakeholders to take ownership of projects, enhances the quality of conservation activities, and enables the integration of traditional knowledge with scientific practices. Ultimately, capacity development strengthens the ability of communities and organizations to adapt to changing environmental conditions and scale successful coral conservation efforts.

Challenge 1: Standardized training and accreditation

The absence of standardized training programs and accreditation processes within the conservation sector in developing countries can contribute to inconsistencies in skill levels and qualifications among professionals. Without universally recognized standards for training and accreditation, it becomes challenging to assess the proficiency and credibility of individuals working in conservation roles, leading to uncertainties in the quality of conservation efforts.

Additionally, the absence of standardized training certification makes it difficult to transfer personnel from project to project. This issue is particularly detrimental to local community members who receive training and acquire valuable skills during short-term projects (or projects where funds have an end date). Once these projects conclude, they often struggle to find employment opportunities due to the lack of recognized certification. Training and skill development should serve as an advantage for local communities enabling them to secure jobs in other organizations. Standardized accreditation would help ensure that their expertise is acknowledged and transferable, fostering long-term career stability and enhancing local capacity in conservation efforts. A roadmap for developing a certification system was proposed by some workshop participants (Figure 7), highlighting key steps toward addressing this challenge.

To improve capacity development, several key solutions have been proposed:

- **Standardized certification:**

Establish a standardized certification system for coral restoration practitioners with clearly defined accreditation criteria that align with best practices in restoration programs. This system would ensure consistency, credibility, and effectiveness in coral restoration efforts across the sector. The certification process should encompass technical skills, project management capabilities, and environmental impact assessment, ensuring that practitioners are well-equipped to deliver high-quality restoration work. While a few organizations currently offer their own certifications, a unified, recognized certification framework would promote greater professional accountability and enhance collaboration across the field. Additionally, this standardized certification could facilitate career progression, create opportunities for cross-border employment, and help attract funding and support from donors and governments.

– The Reef Resilience Network (RRN) Training Program provides certification for coral reef managers

– The International Coral Reef Initiative (ICRI) Coral Restoration Database and ICRI Coral Restoration Guidelines help establish best practices for restoration projects globally.

– The Coral Restoration Consortium (CRC) is working to develop standardized training and accreditation programs for coral restoration practitioners.

– Global Coral Conservation and Restoration Practitioner Training Academy (Box 2).

[1] The term "capacity building" is increasingly viewed as colonial, as it implies that a place lacks any pre-existing capacity — an assumption that is often inaccurate. As a result, this term is being phased out in favor of "capacity development."However, "capacity development" as a broad term may also overlook the importance of two-way engagement, and in the future, it too may be replaced by terms like "capacity sharing." For the purposes of this article, we use "capacity development" because our focus is on identifying strategic ways to enhance the ability of a particular region and its people to conserve or, when necessary, restore imperiled coral reef habitats.

Figure 7. Illustration of a roadmap proposed by participants of the workshop outlining the key steps for establishing a certification system to address the shortage of trained personnel in conservation and restoration efforts. C (Who): the key stakeholders responsible for implementation, such as institutions, NGOs, and funding agencies, F (Feasibility): the level of difficulty or effort required to complete the step (e.g., High or Moderate), T (Time): the estimated duration needed to accomplish each step.

- **Establish regional standards and support career growth:**

Develop and implement regional standards to ensure consistency and uniformity in conservation practices across diverse areas, facilitating collaboration and effective knowledge-sharing. These standards should cover key aspects such as project management, monitoring techniques, and restoration protocols. In parallel, create a comprehensive policy for staff progression that outlines clear pathways for professional development, skill enhancement, and career advancement. This policy should include opportunities for continued education, leadership training, and mentorship, enabling staff to grow within their roles and contribute more effectively to conservation goals. Supporting career growth not only boosts morale and retention but also ensures a highly skilled, motivated workforce equipped to address the evolving challenges of conservation.

– The Mesoamerican Reef Restoration Network (MAR-RRN) develops region-specific restoration strategies and training programs to ensure consistency across Mesoamerica.

– The Australian Institute of Marine Science (AIMS) and Great Barrier Reef Foundation set regional benchmarks for restoration methodologies and career pathways in the Great Barrier Reef.

– WIOMSA provides grants and training to support career development for marine conservation professionals in the region.

- **Create a unified platform for capacity development:**

Launch a comprehensive, centralized platform that offers a wide range of resources, training materials, standardized protocols, and best practices to enhance capacity development in coral restoration and conservation. This platform would serve as a one-stop resource hub, making it easier for local communities, practitioners, and organizations to access high-quality training opportunities, research updates, and practical tools. By consolidating information across various sectors, the platform would streamline access to training, reducing the time and effort required to navigate multiple, fragmented sources. Additionally, it could provide tailored learning pathways based on different skill levels and geographic contexts, ensuring that users receive relevant, context-specific guidance. The platform could also feature networking capabilities to foster collaboration, mentorship, and knowledge sharing among conservationists, researchers, and policy makers, ultimately accelerating the implementation of effective conservation practices.

– Both CRC and the Coral Restoration Foundation (CRF) are interested in developing networking platforms, and the current plan is to establish centralized web platforms with regional hubs in key coral reef areas (potentially using the 10 Global Coral Reef Monitoring Network [GCRMN] "regional nodes").

– GCRMN and the Atlantic and Gulf Rapid Reef Assessment (AGRRA) provides standardized data collection protocols and facilitates knowledge-sharing among conservationists worldwide.

– The UN Decade on Ecosystem Restoration Coral Reef Hub serves as a platform for sharing knowledge, training materials, and resources for all ecosystem restoration.

– WIOMSA can be supported to also serve as a global platform as it is currently hosting the regional network of coral reef restoration practitioners in the Western Indian Ocean. Also, WIOMSA conducts certification of MPA managers in the region to promote good practice; it could adopt a similar approach for coral restoration.

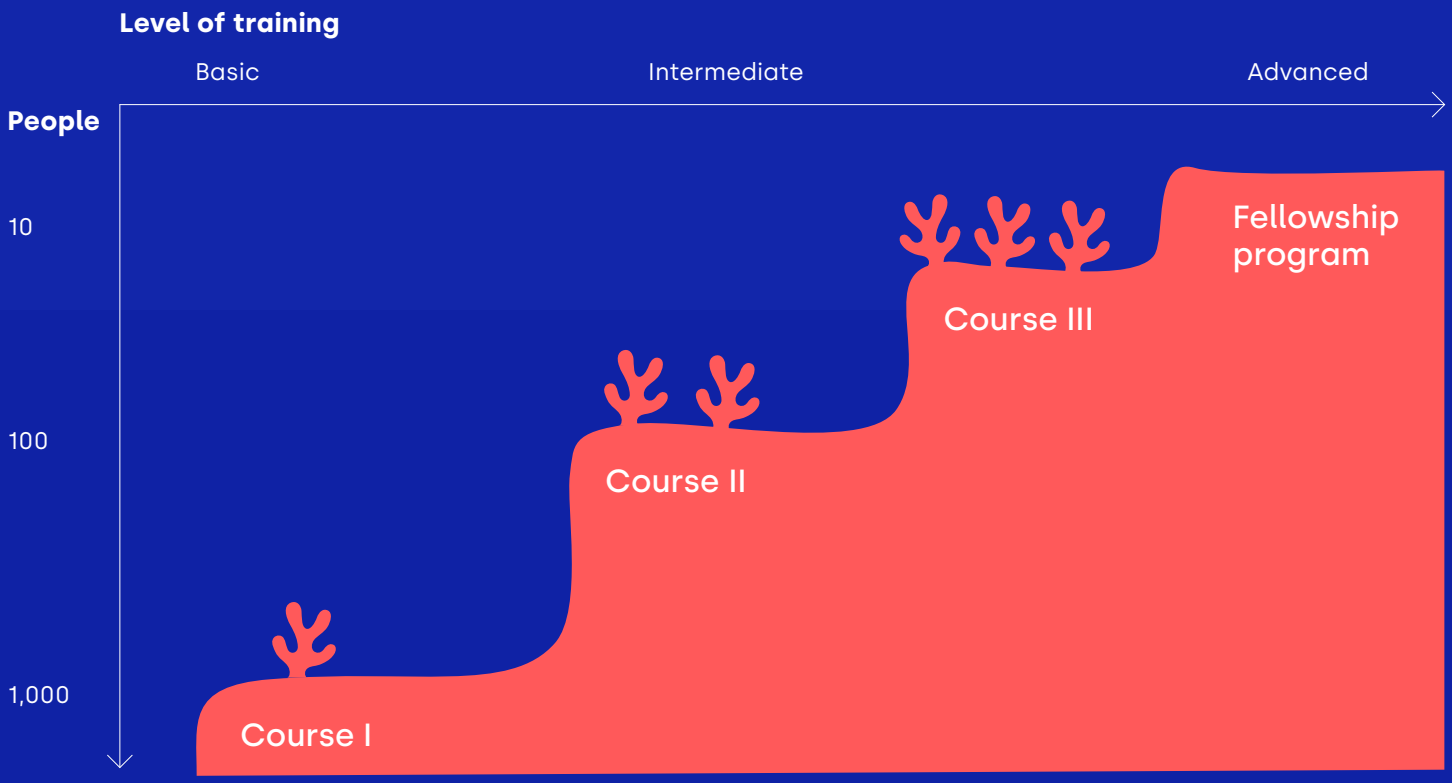
For more details on one exciting, new initiative slated to be launched in 2025, the Global Coral Conservation and Restoration Practitioner Training Academy, please see Box 2.

Box 2: The Global Coral Conservation and Restoration Practitioner Training Academy.

Both the CORDAP-funded workshop in Mombasa, Kenya, and the Reef Futures conference in Cancún, Mexico (December 2024) highlighted a critical need for advanced training in coral conservation methods and technologies. Currently, only a limited number of experts possess the skills required to protect reefs and/or restore them to where they will maintain resilience in the face of forthcoming marine heatwaves and other stress events. However, scaling up conservation and restoration efforts will require thousands — if not tens of thousands — of well-trained, in-water practitioners. While existing webinars and occasional in-person courses offer training in specific techniques (see the "Summary of Recommendations" table for examples.), there is no formal, structured program guiding individuals from basic coral biology to advanced conservation, restoration strategies, and emergency response approaches — all of which are essential for large-scale, long-term reef preservation.

Recognizing this gap, numerous organizations — including CORDAP — are actively fundraising to support the development of comprehensive training resources. These efforts include commissioning online content (such as the Khaled bin Sultan Living Ocean Foundation's [KSLOF] Coral Reef Ecology Curriculum), designing syllabi spanning fundamental biology to cutting-edge restoration methods, funding instructors, and organizing regional, in-person training programs. A structured series of "train-the-trainer" courses, ranging from basic to advanced levels, is currently under development. However, the final content, course sizes, and durations will be in consultation with local practitioners to ensure relevance and accessibility. Leveraging pre-existing networks such as CRC, the International Coral Reef Society (ICRS), and WIOMSA, this initiative has the potential for rapid and widespread impact (Box 2-Figure 1). Making a significant portion of the material freely available online will allow

thousands of practitioners and scientists to receive training efficiently. In addition to aiding in the restoration of degraded reef habitats, these highly skilled professionals could be quickly mobilized for emergency coral rescue missions — an area that will be further explored in a 2025 workshop co-funded by CORDAP and the King Abdullah University of Science and Technology (KAUST) Coral Restoration Initiative (KCRI).



Box 2: Figure 1. Preliminary design for the Global Coral Conservation and Restoration Practitioner Training Academy.

Challenge 2: Ocean literacy across sectors, stakeholders, and local communities

A lack of ocean literacy among the general public and policymakers in developing countries poses a significant barrier to marine conservation and sustainable ocean management. Without a fundamental understanding of the importance of marine ecosystems, the threats they face, and the actions needed for their protection, stakeholders may be less likely to support conservation efforts, making it challenging to secure the political commitment and financial resources necessary for meaningful action. Additionally, limited awareness can undermine public trust, reduce community engagement, and weaken overall support for conservation initiatives. The absence of ocean literacy also creates a disconnect — many people may fail to recognize the direct link between coral reef conservation and their fishing livelihoods, or how overfishing can damage coral reefs, ultimately jeopardizing the region's tourism industry, for example. To address the challenge of ocean literacy across sectors, stakeholders and local communities, several recommendations have been proposed:

- **Support regional educational initiatives:**

Launch and provide ongoing support for regional educational programs aimed at engaging diverse stakeholders, including local communities, policymakers, industry leaders, and the general public. These initiatives should focus on raising awareness about coral conservation and the importance of ecosystem health across different sectors of society. By using effective science communication strategies, such as infographics, videos, and interactive social media campaigns, these programs can simplify complex environmental issues and make them more accessible to a broader audience. Additionally, incorporating hands-on learning opportunities, community workshops, and local ambassador programs would help ensure that the education is not only informative but also action-oriented. Tailoring the content to different cultural contexts and learning styles will also maximize the impact of these programs, fostering a deeper, more sustained commitment to coral conservation at the regional level.

– Mesoamerican Reef Leadership Program (MAR Leadership) trains young professionals in the Mesoamerican region to improve reef conservation through leadership development and communication strategies.

– The Nature Conservancy's (TNC) Reef Resilience Network (RRN) provides online courses, webinars, and toolkits to equip managers and policymakers with science-based coral reef conservation strategies.

– ICRI Awareness Campaigns develops educational materials, infographics, and social media campaigns to engage policymakers and the public in reef protection efforts.

– Coral Sea Foundation trains leaders in Micronesia, and its website has tutorials and training resources

– Brazil has become the first country to officially integrate Ocean Literacy into its national school curriculum, supported by UNESCO. This initiative, known as the "Blue Curriculum," aims to educate students about the importance of the ocean and its connection to everyday life.

- **Facilitate Stakeholder Engagement:**

Organize coral restoration site visits to provide stakeholders with firsthand experiences of coral ecosystems and the challenges they face. These visits create opportunities for direct observation, fostering a deeper understanding of the intricacies of coral restoration efforts. By engaging stakeholders — ranging from local communities and policymakers to researchers and conservation organizations — these site visits promote a sense of ownership and responsibility. Additionally, these engagements help prioritize coral conservation by showcasing the tangible impacts of restoration work, strengthening collaborations, and facilitating informed decision-making that supports long-term ecosystem health and resilience.

– CRF has a dive and snorkel program, in which staff offer hands-on experiences where anyone can participate in coral outplanting activities.

- **Prioritize Communication Strategy:**

A robust communication strategy is essential for the success of coral restoration projects and for effectively evaluating grants. A well-defined communication plan with clear goals, objectives, and measurable outcomes ensures that all stakeholders — ranging from local communities to policymakers and donors — are kept informed and engaged throughout the project. This strategy should outline key messaging, target audiences, communication channels, and a timeline for regular updates. By maintaining transparency and consistency in communication, the strategy helps to coordinate efforts, align expectations, and foster collaboration among all involved parties. Additionally, it enables the project team to demonstrate progress, showcase successes, and highlight challenges in a way that is both informative and motivating. Integrating communication into every stage of the restoration process not only strengthens the project's impact but also helps build long-term public support, ensuring the sustainability of conservation efforts.

– TNC and the Resilient Reefs Initiative both ensure that every funded restoration project includes a structured communication component, with key performance indicators to measure outreach success.

– The CORDAP communications team actively promotes many of the projects it has funded through its social media channels and website.

Credits: Idrees Babu

Challenge 3: Personnel training

Many conservation organizations in developing countries face difficulties in recruiting and retaining personnel who possess the necessary skills and expertise to address conservation challenges effectively. Limited access to quality training programs, educational resources, and professional development opportunities may result in a workforce that lacks the knowledge and competencies required to implement successful conservation initiatives.

As highlighted in Priority 1, the issue is not solely the lack of knowledge. While local community members may acquire valuable skills and experience through direct involvement in projects, the lack of standardization in accreditation creates barriers to accessing positions in other organizations. Furthermore, training is a multifaceted process that extends beyond formal courses. It encompasses mentorship, where early-career professionals can learn directly from more established researchers, as well as hands-on exposure to advanced technologies, such as through visits to relevant facilities. These opportunities not only enhance technical competence but also help foster long-term professional growth and career development.

CRC conducted a regional survey of specific coral restoration practitioner training needs in late 2023, and amongst the major recommendations was the desire for in-person regional meetings. Indeed, the results of the CRC survey are being integrated of the generally higher levels presented herein to inform future global initiatives for which CORDAP and other agencies are actively fundraising (e.g., Box 2).

Addressing the shortage of trained personnel in coral restoration and conservation requires a multi-step (Figure 7), multi-faceted approach:

- **Establish mentorship programs:**

Develop structured mentorship programs that connect experienced professionals with emerging talent to foster knowledge transfer and professional growth. These programs should focus on facilitating collaborative research, providing guidance on career development, and offering opportunities for hands-on experience. By pairing early-career individuals with established experts, the mentorship process encourages shared learning, skill development, and the cultivation of leadership abilities. Additionally, mentorship should extend beyond traditional academic training to include practical skills in research methodologies, data analysis, and the application of cutting-edge technologies. These programs can also serve as platforms for building professional networks, enhancing the long-term sustainability of conservation efforts.

– ICRS has a mentorship program for early career professionals, pairing early career researchers with more experienced ones.

– The National Geographic Society's Early Career Grants is a highly competitive grant that includes mentorship from senior researchers and conservationists to guide young scientists and explorers.

– The Pew Marine Fellows Program provides mentorship and funding for emerging ocean conservation leaders.

– The New England Aquarium's Marine Conservation Action Fund (MCAF) is a small grants and fellowship program that provides support for community-based projects spearheaded by local conservation leaders in low- and middle-income countries around the globe. It provides funding, mentorship and opportunities for professional development.

- **Foster the next generation of experts:**

Establish grant mechanisms that provide scholarships, internships, and exchange opportunities for students and practitioners, with a focus on underrepresented regions, to nurture the next generation of conservation leaders. These initiatives would create pathways for young professionals to gain hands-on experience, expand their networks, and deepen their expertise in coral restoration and marine conservation. Furthermore, make it a requirement for research grants to include support for students from the Global South, ensuring more equitable access to educational and professional opportunities. This approach would not only diversify the pool of future experts but also foster greater inclusivity and representation in the global conservation community.

– ICRS has developed the John Ogden President's Awards to support scientists, reef managers, and policy makers from developing countries who are involved in coral reef research and conservation.

– Project Zero is actively fundraising via their "Coral Collective" to support not only the training academy described in Box 2, but also a fellowship program whereby students or practitioners with the need to learn new coral conservation or restoration skills can travel to a host laboratory for an extended period.

– Schmidt Ocean Institute's Student Opportunities Program provides hands-on experience aboard research expeditions to train future ocean scientists.

- **Deliver targeted training:**

Provide cost-effective, high-quality technical capacity-building training and workshops tailored to the specific

needs of local communities and stakeholders. This should be informed by thorough needs assessments to ensure that the training is relevant, practical, and aligned with the unique challenges and priorities of the region. By focusing on local context, the training can address both immediate skills gaps and long-term capacity development goals. Additionally, these programs should incorporate diverse learning methods, including hands-on activities, peer learning, and field-based training, to enhance engagement and retention. To maximize the impact, the training should also include follow-up support, such as mentorship, access to resources, and ongoing skill development opportunities, ensuring that participants can apply what they've learned effectively in their local contexts.

– TNC-RRN has online training and short courses on coral reef restoration, resilience- based management and others.

– Coral Sea Foundation trains leaders in Micronesia, and its website has tutorials and training resources.

- **Create a collaborative knowledge hub:**

Establish a dynamic platform for sharing knowledge, insights, and lessons learned from coral restoration efforts, both locally and globally. This platform would serve as a centralized resource to enhance the skill sets of restoration professionals by fostering collaboration, facilitating the exchange of best practices, and promoting innovation in restoration techniques. By connecting practitioners, researchers, and policymakers, the hub would create opportunities for cross-border learning and joint problem-solving. It should include features like case studies, toolkits, discussion fora, and webinars to ensure that a wide range of knowledge is accessible and actionable. Additionally, the hub could incorporate user-generated content, allowing individuals to share their unique experiences and solutions, further enriching the collective expertise. The goal is to create a living, evolving space where restoration professionals can continuously build their capabilities and contribute to the ongoing advancement of coral conservation efforts (Figure 8).

– This platform can also serve as a hub for connecting CORDAP grantees, fostering networking and collaboration across projects. Additionally, the platform can host regular training sessions (as suggested in Priority 1 above), continuous professional development programs, and affordable massive open online courses to ensure sustained learning and ongoing skill enhancement for participants.

– CRC can potentially serve as this hub, grouping all stakeholders and practitioners working on coral restoration.

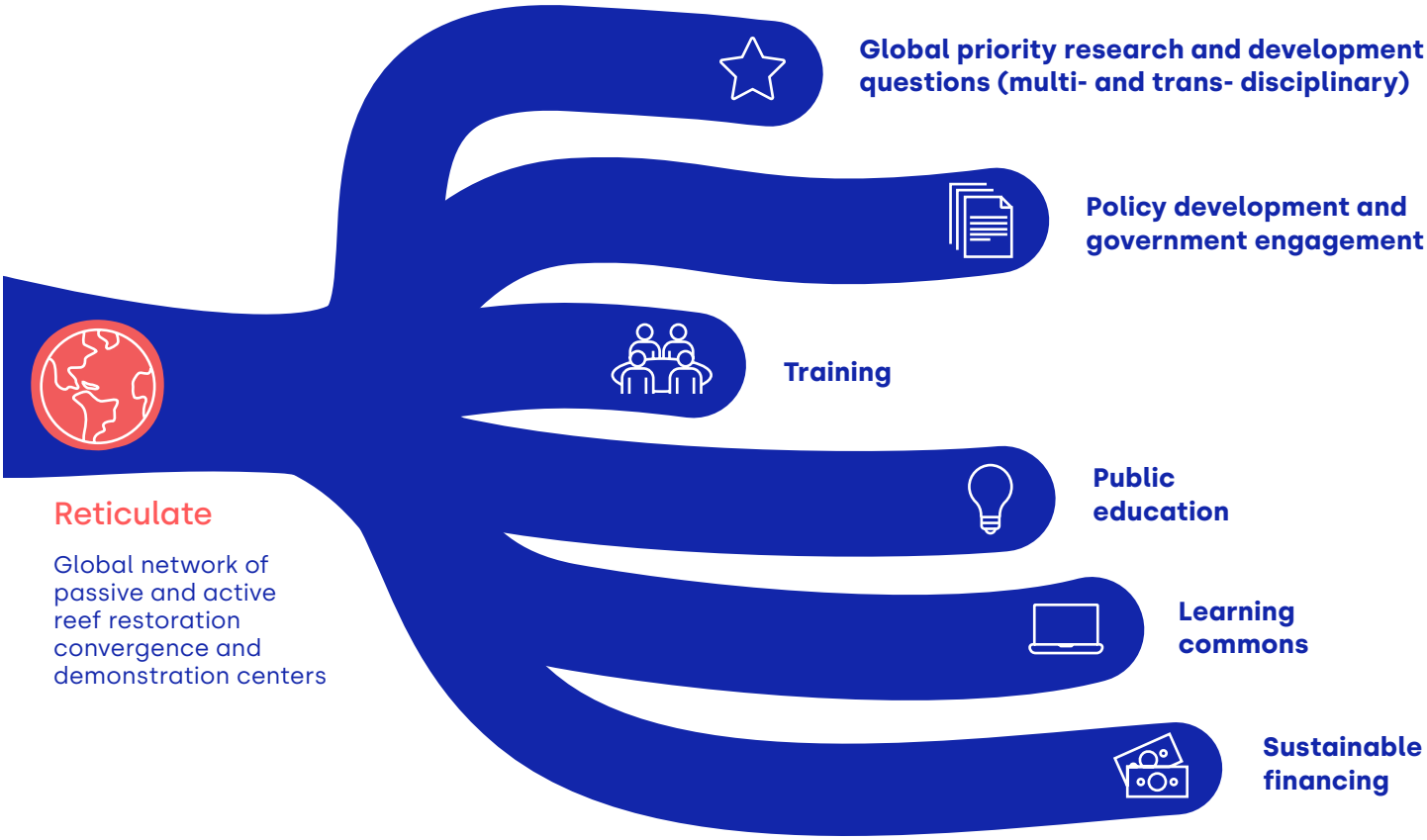


Figure 8. A proposal suggested by the workshop participants for "Reticulate:" a roadmap for an interconnected platform for coral reef conservation.

Credits: Grant Thomas / Ocean Image Bank

2.4. Priority area 2: Integrative collaborations

Coral conservation presents complex challenges that demand solutions extending beyond disciplinary and sectoral boundaries. Achieving effective and lasting outcomes requires cross-sectoral collaboration, bringing together governments, academia, non-governmental organizations (NGOs), local communities, and the private sector. By integrating diverse expertise and resources, these partnerships drive innovative, scalable solutions that enhance reef resilience and ensure the sustainability of marine ecosystems.

Policymakers play a crucial role in establishing regulatory frameworks, sec uring funding, and prioritizing coral restoration within national and international agendas. The private sector contributes through financial investment, technological advancements, and scalable conservation models. Equally essential is the involvement of local communities, whose traditional knowledge and long-term stewardship enhance the ecological and cultural relevance of restoration efforts.

NGOs and academic institutions serve as key connectors between science, policy, and practice. NGOs facilitate community engagement, secure resources, and implement conservation initiatives, while academic institutions provide research, monitoring, and the development of cutting-edge restoration techniques. Their collaboration ensures that conservation strategies are both scientifically rigorous and practically applicable. By bringing together these diverse actors, coral conservation initiatives can more effectively address ecological, socio-economic, and political challenges, driving sustainable and impactful solutions for the future of coral reefs.

Challenge 1: Growing technical capacity of local communities

Strengthening the technical capacity of local communities is foundational to the long-term success and sustainability of coral reef conservation and restoration efforts. Empowering community members with the necessary knowledge, skills, and tools not only ensures that interventions are locally led and contextually relevant, but also fosters a strong sense of ownership and stewardship over natural resources.

Investing in capacity building enhances ecosystem resilience by embedding ecological knowledge within the community and enabling the development of locally appropriate, adaptive management strategies. It also drives co-benefits such as economic development, job creation, and the growth of local expertise in conservation science and restoration techniques.

A well-trained and supported local workforce is better positioned to monitor ecological changes, implement best practices, and respond proactively to emerging environmental challenges, including those related to climate change. By centering local leadership and technical autonomy, capacity building lays the groundwork for enduring ecological, social, and economic resilience in coral reef regions. Ultimately, building local technical capacity transforms communities from passive beneficiaries into empowered partners — essential actors in safeguarding coral reef ecosystems for future generations.


Credits: Ralp Mana

A few recommendations to improve technical capacity of local communities:

- **Identify and address training gaps:**

Conduct comprehensive assessments to identify the specific training needs of local communities and design tailored development opportunities that address these gaps. By understanding the unique challenges and priorities of each community, we can offer diverse and relevant learning experiences, such as in-person training sessions, workshops, seminars, exchange visits, and paid internship programs. These opportunities should be designed to be accessible to a wide range of participants, considering factors such as location, cost, and skill level. Offering a mix of learning formats — ranging from hands-on, field-based training to more formal classroom settings — ensures that all learning styles are supported. Additionally, incorporating mentorship and peer-to-peer learning into these training programs can help build local networks of expertise, enabling continuous knowledge exchange and long-term capacity development. By addressing training gaps in this holistic way, we can equip communities with the skills needed to effectively manage coral restoration efforts and promote sustainable environmental stewardship.

– Workshop attendee Dr. Yimnang Golbuu of TNC-Palau has recently initiated a CORDAP-funded project with Dr. Stephen Palumbi of Stanford University (USA) on training local community members in Micronesia in how to identify heat-tolerant corals for restoration projects.

– Pacific Island Marine Protected Area Community (PIMPAC) Learning Exchanges: Organizes regional exchanges where practitioners visit successful conservation sites to learn best practices firsthand.

- **Promote community-driven conservation:**

Implement citizen science programs to actively involve local communities in coral conservation efforts by empowering individuals to contribute to data collection, monitoring, and restoration activities. These programs not only enhance the scientific understanding of coral ecosystems but also provide valuable learning experiences that build local expertise and foster a deeper sense of ownership over conservation initiatives. By engaging community members in hands-on conservation work, these programs create opportunities for personal and collective growth, while strengthening local stewardship of coral reefs. Additionally, citizen science initiatives help to raise awareness about the importance of coral ecosystems, driving greater community support for sustainable practices. To maximize the impact of these programs, they should be designed to be inclusive, accessible, and culturally appropriate, ensuring broad participation across all segments of society. Furthermore,

– Restore with Resilience in Hawaii hosts community days where local participants learn about and assist in coral restoration through activities like photo documentation, measurements, tagging, and coral fragmenting.

– Laamaseelu Masveriyaa in the Maldives, trains fishermen on sustainable fishing practices, equips fishers with state-of-the-art safety equipment for working at sea but also provides them with a reliable and profitable marketplace to sell their catch, ensuring both environmental and economic benefits.

– CoralWatch (Australia), REEF (Florida, USA), Reef Check (Global) and Eyes of the Reef (Hawaii), Pala Dalik (New Caledonia) uses citizen science and outreach programs to educate local communities, divers, and tourists about coral health through color-based monitoring charts and transects.

- **Integrate local knowledge:**

Incorporate traditional ecological knowledge and local expertise into training materials and conservation strategies, recognizing the value of indigenous and community-based knowledge in ecosystem management. By honoring and integrating local knowledge, we ensure that conservation efforts are both culturally relevant and ecologically sound. This approach not only enriches scientific methods but also strengthens the cultural connection of communities to their environment, fostering greater ownership and commitment to conservation outcomes. Collaborating with local communities to document and integrate their knowledge can lead to more effective, adaptive strategies that reflect the unique ecological and social dynamics of each region. Moreover, combining traditional practices with modern science creates a more holistic, sustainable approach to conservation that is grounded in both the wisdom of past generations and the innovations of the future. Ensuring that these strategies are inclusive and respectful of local cultures also promotes social equity and helps preserve cultural heritage alongside environmental sustainability.

– Kulana Noií, in Hawaii is a manual developed from Hawaii Sea grant that is a starting point for deeper conversation and lays out a set of ideas, values on how to work with native Hawaiian communities

– In 2024, in the Maldives, a protocol on coral larvae rearing was largely developed by locals through a series of workshops

– The Locally Managed Marine Area (LMMA) Network works across the Pacific Islands, Southeast Asia, and the Indian Ocean to support community-led marine conservation by integrating traditional ecological knowledge with modern science.

– The Indigenous and Community Conserved Areas (ICCA) Consortium is a global organization that supports Indigenous-led conservation by advocating for the recognition of customary governance and traditional management practices in policy frameworks.

– Kua'āina Ulu 'Auamo (KUA) is a Hawaii-based network that empowers local communities and Indigenous practitioners to manage natural resources using traditional stewardship practices, such as loko i'a (Hawaiian fishponds) and community-based fisheries management.

Challenge 2: Translating science into information for communities (i.e., lay audiences)

Effectively translating scientific research into accessible information for local communities is crucial for fostering understanding, engagement, and collective action. Complex scientific data, when presented in technical language, often alienate lay audiences and limit their ability to grasp the urgency of issues like coral conservation. To overcome this barrier, it is essential to simplify scientific findings into clear, relatable language and engaging visuals, such as infographics, storytelling, and interactive media. This approach makes the science more approachable and helps communities understand how it directly impacts their lives and local environment. By providing actionable insights, communities can make informed decisions, actively participate in conservation efforts, and advocate for policies that address their specific needs and challenges.

Moreover, translating science should not only focus on simplifying complex concepts but also involve co-creating content with local stakeholders, ensuring that the information resonates with cultural norms and values. This collaborative approach empowers communities to take ownership of conservation initiatives and strengthens their role as informed advocates for their environment.

Here are a few recommendations to improve translation of scientific concepts to lay audiences:

- **Enhancing accessibility:**

Simplify and present scientific information in engaging, interactive formats to make complex concepts more accessible to a wider audience. By utilizing tools such as report cards, infographics, videos, and newsletters, we can transform technical data into easily digestible and visually compelling content. These formats should not only be user-friendly but also interactive, allowing audiences to engage with the material in a way that resonates with different learning styles. For example, videos can showcase real-world examples of conservation efforts, while infographics can distill key messages and trends at a glance. Additionally, newsletters can serve as regular updates, keeping communities informed about ongoing projects and progress. Incorporating storytelling into these formats further humanizes the data, making it relatable and impactful.

– By utilizing diverse media, we ensure that the information is accessible to various age groups, literacy levels, and technological access points. This approach encourages a broader audience to engage with the material, understand its relevance, and take proactive steps toward conservation.

– Both the Atlantic and Gulf Rapid Reef Assessment (AGRRA) and Healthy Reefs for Healthy People (HRHP)

make excellent coral reef report cards at country and regional scales that present complex ecological data in simplified ways that are easily accessible by managers and government officials.

– Many organizations have great visuals in their website, with infographics, videos, and report cards to communicate complex conservation information. Examples include The Ocean Agency, Coral Reef Alliance, and the NOAA Coral Reef Conservation Program.

– CORDAP's web series "To the rescue of corals" illustrates how scientific projects can turn into informative mini-documentaries that make a good use of storytelling to engage the audience.

- **Different languages:**

Translate key research findings into different languages to ensure accessibility for non-English speakers and promote inclusivity in conservation efforts. Language should not be a barrier to understanding critical environmental issues, so it is essential to provide accurate, culturally sensitive translations of research findings, reports, and educational materials. By doing so, we ensure that local communities, including indigenous populations, can fully engage with the information and contribute meaningfully to conservation initiatives. In addition to translation, consider local communication preferences to enhance the clarity and relevance of the materials. This approach not only fosters equitable access to knowledge but also strengthens the relationship between scientific research and the communities it aims to serve, empowering them to make informed decisions, advocate for policy changes, and actively participate in conservation efforts.

– ChatGPT and other emerging, AI-driven platforms are making this goal ever-more achievable.

– TNC-RRN provides translated resources, toolkits, and training material in English, Spanish, French, and Bahasa Indonesia to support global reef managers.

- **Community engagement:**

Facilitate meaningful community involvement by providing accessible opportunities for direct engagement, such as easily understandable newsletters, feedback fora, and interactive discussions. These tools can serve as platforms for communities to stay informed about ongoing conservation efforts and share their perspectives, concerns, and suggestions. Newsletters should be written in clear, jargon-free language, and feature updates on local projects, successes, and challenges, ensuring that the community feels connected to the process. Feedback fora, both online and in-person, should be open, inclusive spaces where community members can voice their opinions and contribute to decision-making. Additionally, incorporating community-driven content, such as success stories or testimonials, can further foster a sense of ownership and pride in the conservation efforts. By actively involving communities in the planning, implementation, and evaluation of conservation projects, we empower them to take on leadership roles, build trust, and strengthen collaboration between local populations and conservation professionals. This holistic approach ensures that conservation strategies are not only effective but also responsive to the needs and priorities of the people they aim to support.

– Last year (2024), REEFolution with support from Media for Nature collaborated with SECORE to translate and publish a Coral Heroes comic book in Ki(swahili) through the Reef Stewardship Project funded by the Rufford Foundation under the Second Rufford Small Grant.

– Kua'āina Ulu 'Auamo (KUA) –A Hawaii-based network that fosters community-driven conservation by sharing updates through newsletters and hosting gatherings where local resource managers provide input on stewardship efforts.

– One People One Reef works with Pacific Island communities, particularly in Micronesia, to integrate traditional ecological knowledge with marine science. They engage communities through newsletters, participatory workshops, and local feedback fora to support sustainable fisheries management.

- **Digital outreach:**

Leverage social media platforms to broaden the reach of scientific knowledge, making it more accessible, engaging, and interactive for a diverse audience. Social media provides a powerful tool for breaking down complex scientific concepts into digestible, visually appealing content that resonates with people across different age groups, education levels, and geographic locations. By using infographics, short videos, interactive polls, and live discussions, we can capture the public's attention and foster a deeper understanding of conservation issues. Engaging posts and targeted campaigns can also create a sense of community, encouraging individuals to share ideas, ask questions, and actively participate in conservation conversations. Additionally, social media can serve as a platform for promoting local success stories, showcasing how communities are making a difference, and inspiring others to take action. To maximize impact, it's essential to tailor content to platform-specific formats and audience preferences, ensuring that messages are both relevant and shareable.

Challenge 3: Stakeholder involvement

Engaging a diverse range of stakeholders — including local communities, scientists, government agencies, NGOs, and the private sector — is crucial to ensuring that multiple perspectives and areas of expertise are integrated into the design and implementation of conservation projects. Local communities are especially vital partners in this process, as their deep knowledge of the ecosystem, traditional practices, and local challenges can significantly enhance the effectiveness and cultural relevance of restoration efforts. Involving stakeholders from the outset and maintaining consistent engagement throughout the project helps align objectives with local needs, fostering a sense of ownership and ensuring that the project is grounded in the realities of the community.

This collaborative approach not only builds trust but also promotes active participation, as stakeholders are more likely to support initiatives that reflect their priorities and concerns. Engaging stakeholders early also helps to identify potential champions who can advocate for the project and address any concerns or opposition before they become barriers. It also creates opportunities for cross-sectoral partnerships, where diverse resources, knowledge, and capacities can be shared, maximizing the impact of the restoration efforts.

Furthermore, continuous stakeholder involvement ensures that projects remain adaptive and flexible, allowing for adjustments based on ongoing feedback and changing circumstances. By making the process inclusive and responsive, stakeholder engagement fosters a more supportive and sustainable environment for the success of the project.

Recommendations to increase stakeholder engagement:

- **Map stakeholders' roles and responsibilities pre-, during-, and post-project:**

Clearly mapping and defining the roles and responsibilities of all stakeholders before, during, and after the project is essential for ensuring accountability, transparency, and effective collaboration throughout the project's lifecycle. Establishing a clear framework for who is responsible for specific tasks at each stage of the project helps prevent overlap, gaps in responsibility, and confusion. Pre-project, this involves identifying key stakeholders, establishing communication channels, and defining the scope of their involvement. During the project, roles should be continually assessed and adapted as needed to address emerging challenges and opportunities. Clear task delegation ensures that everyone knows what is expected of them, minimizing delays and enhancing project efficiency.

Post-project, defining responsibilities for monitoring, evaluation, and long-term sustainability ensures that the project's impacts are measured and maintained. This also encourages a sense of shared ownership and commitment to the project's ongoing success. By clearly communicating roles, stakeholders can work together more effectively, ensuring that project milestones are met and that resources are used efficiently. Additionally, a well-defined responsibility structure facilitates greater transparency and helps build trust among stakeholders, as each participant understands their contributions and how they impact

Credits: Yen-Yi Lee / Ocean Image Bank

the project's success. This approach ultimately leads to more coordinated, effective, and sustainable project outcomes.

– TNC-RRN provides training for conservation practitioners on stakeholder mapping, ensuring clarity in roles and responsibilities for marine management and resilience planning.

- **Assess stakeholder expectations and motivations:**

Thoroughly assess the expectations and motivations of each stakeholder to gain a clear understanding of what they hope to achieve and what drives their participation in the project. By evaluating these factors, we can ensure that all stakeholders are working toward shared objectives and that their needs and interests are acknowledged and addressed. This process not only helps to align individual goals with the broader project aims but also fosters stronger commitment and engagement throughout the project's lifecycle.

Understanding stakeholder motivations is key to anticipating potential challenges, resolving conflicts, and identifying areas for collaboration. Early identification of concerns or differing priorities allows for proactive problem-solving and the development of strategies to address them, reducing the risk of misunderstandings or opposition down the line. Additionally, this insight informs the creation of tailored communication strategies that resonate with each stakeholder's values and interests, ensuring that messaging is clear, relevant, and compelling. By consistently assessing and revisiting stakeholder expectations throughout the project, we can keep everyone aligned, engaged, and motivated to contribute to the success of the initiative.

- **Conduct an assessment of community training needs:**

Conduct a thorough assessment of the knowledge, skills, and resources required for local stakeholders to actively and effectively participate in the project. This evaluation should consider the existing capabilities of the community, as well as any gaps in knowledge or skills that may hinder their involvement. By identifying these needs, we can design tailored capacity development programs that align with the community's unique strengths, aspirations, and cultural context. The assessment should be comprehensive, engaging key community members in the process to ensure that their perspectives and priorities are fully understood. This participatory approach not only helps build trust but also ensures that the training is relevant and addresses the real needs of the community. Tailored programs could include hands-on training, workshops, mentorship, or technical support that enables community members to take on leadership roles within the project. Additionally, these programs should be designed to be flexible, allowing for ongoing learning and adaptation as the project evolves.

- **Co-design the project with the community:**

Integrate the community's voices, knowledge, and needs directly into the project design by co-developing the project plan alongside them. This process ensures that the project reflects local priorities, values, and cultural practices, making it more relevant and effective. Using localized examples and culturally appropriate messaging helps to emphasize key conservation goals, making them more relatable and meaningful to the community. By involving community members in the planning stage, you not only gain valuable insights but also empower them to take ownership of the project, increasing their investment in its success.

Engaging the community from the outset fosters a sense of partnership and shared responsibility, leading to stronger collaboration and greater commitment. This participatory approach also helps identify potential challenges early, allowing for adaptive solutions that are tailored to the local context. Moreover, it builds trust between stakeholders, reducing the risk of conflicts and increasing the likelihood of long-term, sustainable outcomes. By co-designing the project, the community becomes a true partner in the process, ensuring that conservation efforts are not only scientifically sound but also socially equitable and locally driven. For examples of how to successfully develop and lead community-backed coral reef restoration initiatives, see case studies 1-2 in the "Success stories" section.

2.5. Priority area 3: Project management

Effective project management is crucial for the success of coral conservation and restoration projects, particularly in the Global South, where challenges such as limited resources, technical capacity, and institutional support can hinder progress. Robust project management ensures that all phases of the restoration process — from planning and stakeholder engagement to execution and monitoring — are carried out efficiently, transparently, and in alignment with the project's objectives. In the context of coral conservation and restoration, managing a diverse group of stakeholders — including local communities, NGOs, government agencies, and international organizations — requires clear coordination and communication. Proper project management helps define roles and responsibilities, ensuring that everyone involved understands their contributions and that tasks are executed on time. By establishing clear expectations and processes, project management fosters collaboration and minimizes misunderstandings, enhancing the collective impact of the initiative.

Given that ecological and socio-economic challenges are often intertwined in many regions, particularly in the Global South, effective project management is essential for adapting strategies to changing circumstances. It allows for proactive risk management, the flexibility to adjust approaches based on community feedback or environmental shifts, and the capacity to troubleshoot unforeseen challenges. A well-managed project also ensures that strategies are both scientifically robust and culturally relevant, making the restoration efforts more sustainable and locally supported.

Moreover, strong project management enhances accountability, ensuring that milestones are met, progress is tracked, and the use of funds is optimized. Regular monitoring and reporting on project outcomes help maintain transparency with stakeholders, secure continued funding, and demonstrate the impact of the project. Ultimately, effective project management increases the likelihood of achieving successful, long-term coral restoration outcomes.

Challenge 1: Capacity to continue the project after the funding cycle has ended

For researchers in developing countries, ensuring the capacity to sustain coral restoration projects beyond the initial funding cycle is critical to achieving lasting, meaningful impact. This requires equipping local teams with the essential skills, tools, and networks that enable them to continue the work independently after the initial fund ends and giving them access and opportunity to acquire other sources of funding. A strong focus on capacity building, including comprehensive training for early-career researchers, creates a solid foundation for continuity and empowers local teams to take ownership of ongoing efforts.

Many funding sources and grants come with strict deadlines and short durations, which often create uncertainty regarding the continuation of projects. These time limitations can make it challenging to plan for long-term sustainability, particularly when there is no guarantee of securing future funding. This short-term funding cycle also discourages community members from engaging in long-term training opportunities, as they may not see the value of investing time and effort into skills development without assurance of continued support or project continuity. Without the certainty of ongoing funding, local stakeholders may be less motivated to engage deeply, limiting the potential for sustained community-driven conservation efforts.

In addition to training, fostering collaborations between local researchers, international experts, NGOs, and government agencies helps build long-term partnerships that provide sustained support and access to a wider range of resources. Engaging local communities in the project ensures that restoration efforts are embedded within the cultural and socio-economic fabric of the region, increasing the likelihood of long-term success. This collaborative, community-driven approach also helps generate local buy-in, ensuring that the project is not seen as an external intervention but as an integral part of the community's development and environmental stewardship.

Securing access to alternative funding sources, such as local grants, government support, or private-sector partnerships, is key to ensuring the financial sustainability of the project after the initial funding period. Developing strong relationships with funding bodies and creating a diverse funding strategy helps reduce reliance on a single source and enables the project to continue thriving. For an example of private sector engagement, see "Success stories"-case study 5.

Moreover, by ensuring that the skills acquired by trainees, interns, and local stakeholders remain relevant and transferable beyond the project duration, the initiative gains respect and credibility within the community. This builds trust, strengthens local capacities, and promotes deeper collaboration among all involved parties. Ultimately, this approach helps shift the perspective from short-term job opportunities or isolated training sessions to long-term, sustainable development pathways, which contribute to the broader goal of ecosystem restoration and community resilience.

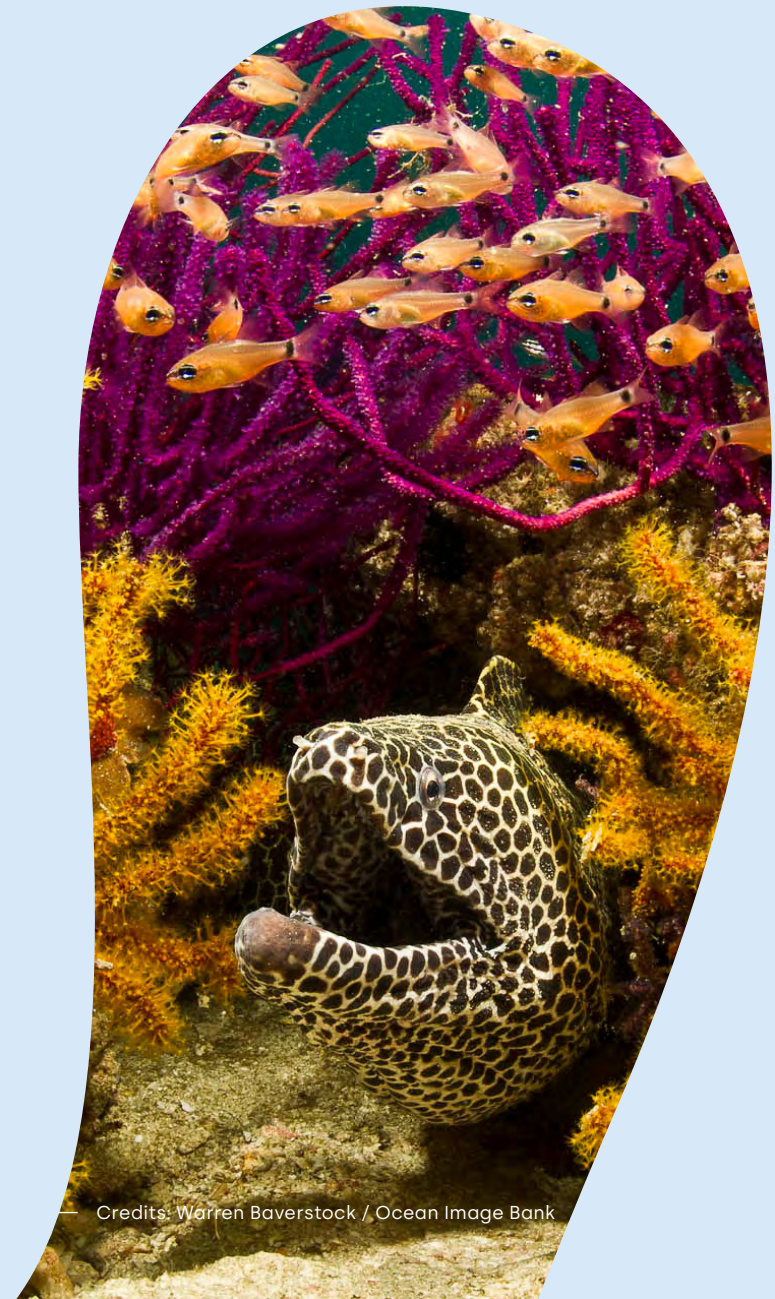
Recommendations to guarantee continuation of the project:

- **Create contingency plans to adapt to unexpected challenges:**

Unforeseen challenges — such as funding shortages, environmental changes, regulatory shifts, or logistical disruptions — can threaten the progress and sustainability of conservation projects. To mitigate these risks, it is essential to develop comprehensive contingency plans that outline clear strategies for risk management, alternative funding sources, adaptive project designs, and flexible implementation timelines. A robust contingency plan should include proactive financial strategies, such as securing diversified funding sources, establishing emergency reserves, and fostering partnerships with multiple stakeholders to reduce reliance on a single funding stream. Additionally, integrating adaptive management approaches — such as modifying project designs in response to changing environmental conditions — ensures continued effectiveness in achieving conservation goals.

Regularly reviewing, testing, and updating these contingency plans is crucial for maintaining resilience. Conducting scenario planning and stress-testing different risk factors helps identify vulnerabilities and refine response strategies before crises occur. Furthermore, equipping local teams with crisis management training and decision-making frameworks ensures they can respond swiftly and effectively when challenges arise.

– TNC-RRN offers guidance on developing risk management strategies to ensure continuity in coral restoration efforts.



— Credits: Warren Baverstock / Ocean Image Bank

- **Establish sustainable finance mechanisms and support community enterprises:**

Developing long-term financial sustainability is essential for the success of conservation initiatives. Establishing innovative and resilient finance models, such as conservation trust funds, payment for ecosystem services (PES), or ecotourism-based revenue streams, can provide ongoing financial support for restoration efforts. Encouraging local enterprises — such as sustainable fisheries, eco-friendly tourism, or community-led coral farming — helps generate income while promoting environmental stewardship. These initiatives not only reduce dependence on short-term external funding but also empower local communities to take ownership of conservation efforts.

Providing financial literacy training and capacity-building programs ensures that community members have the skills to manage funds effectively and scale their enterprises. Additionally, fostering partnerships with government agencies, NGOs, and the private sector can open up new investment opportunities and create financial resilience.

– The Blue Finance Initiative develops sustainable finance models by working with governments and private investors to create long-term funding solutions for marine conservation.

– The aforementioned LMMA Network supports coastal communities in generating revenue through eco-tourism and sustainable fisheries management.

- **Develop business planning for local initiatives to ensure sustainability:**

Effective business planning is essential for transforming local conservation initiatives into financially resilient and self-sustaining enterprises. Developing actionable business plans with clear goals, revenue models, and financial strategies enables communities to build long-term economic stability while advancing conservation efforts. These plans should outline sustainable income-generating activities — such as ecotourism, sustainable fisheries, or nature-based enterprises — that align with environmental stewardship and community needs.

To enhance resilience, business plans should include strategies for diversifying revenue streams, securing investment opportunities, and accessing financial support through grants, microfinancing, or partnerships with private sector stakeholders. Additionally, integrating financial literacy training and entrepreneurial development programs empowers community members with the skills to manage and grow their enterprises effectively.

- **Identify and empower local champions for long-term project sustainability:**

Local champions play a critical role in ensuring the long-term success of conservation projects by providing leadership, maintaining momentum, and fostering a sense of ownership within the community. Identifying individuals with a strong commitment to environmental stewardship and passion and equipping them with the necessary skills, knowledge, and resources empowers them to drive projects forward beyond the initial funding cycle.

To maximize their impact, local champions should receive leadership training, technical expertise, and mentorship opportunities from experienced professionals and organizations. Establishing peer networks and support systems allows them to share best practices, collaborate on solutions, and strengthen their capacity to manage projects effectively.

Additionally, providing financial and institutional support — such as stipends, access to funding opportunities, and integration into decision-making processes — ensures that these leaders can dedicate time and effort to sustaining conservation initiatives. Recognizing and celebrating their contributions through community engagement and public acknowledgment further reinforces their role and inspires broader participation.

– Blue Ventures trains and empowers local leaders in Madagascar and other regions to become conservation ambassadors and lead sustainable marine management initiatives.

Credits: Gregory Piper / Ocean Image Bank

Challenge 2: Project planning

Project planning is the foundation of successful and sustainable conservation initiatives. A well-structured plan integrates all essential components — funding strategies, capacity building, community engagement, policy alignment, risk management, and long-term sustainability measures — to ensure lasting impact. By developing clear, context-specific objectives, conservation efforts can be tailored to address the unique environmental, social, and economic challenges of a given region.

Effective planning goes beyond setting goals; it requires proactive coordination among local communities, governments, NGOs, and private sector partners to build capacity and secure necessary resources. This includes establishing sustainable financing models, designing training programs to equip local stakeholders with critical skills, and fostering collaboration to ensure inclusive decision-making. Additionally, comprehensive risk management

strategies help projects anticipate and adapt to unforeseen challenges, such as regulatory changes, environmental shifts, or funding uncertainties.

Monitoring and evaluation frameworks should also be embedded within the planning process to track progress, measure impact, and make data-driven adjustments. By integrating all these elements, project planning becomes a dynamic and adaptive tool that drives long-term conservation success while empowering local communities to take ownership of environmental stewardship.

Recommendations to improve project planning:

- **Provide training on project management:**

Building local capacity through project management training is essential for ensuring the long-term success and sustainability of conservation initiatives. By equipping local leaders, community members, and stakeholders with essential skills in planning, implementation, and monitoring, projects can achieve more efficient resource allocation, realistic goal-setting, and greater adaptability in the face of unforeseen challenges.

Training should cover key areas such as budgeting and financial management, stakeholder coordination, risk assessment, adaptive management strategies, and data-driven decision-making. Incorporating hands-on learning experiences, mentorship opportunities, and case studies from successful projects can further enhance practical understanding and application; see "Success stories" — case study 4 for an example.

Beyond technical skills, fostering leadership development and effective communication ensures that local teams can advocate for their initiatives, engage with policymakers, and mobilize support from diverse partners. Establishing peer networks and ongoing capacity-building programs also helps sustain knowledge transfer, enabling future generations to lead conservation efforts with confidence.

– TNC's RRN (discussed above) provides training and resources for conservation practitioners on strategic planning, MEL frameworks, and effective communication strategies to enhance coral reef resilience.

- **Establish strategic planning for effective conservation:**

Develop a comprehensive implementation roadmap that outlines key milestones, responsibilities, and timelines to guide project execution. Accompany this with a robust communication strategy to ensure all stakeholders are informed, engaged, and aligned with the project's goals. Define SMART objectives (Specific, Measurable, Achievable, Relevant, and Time-bound) to provide clear direction and track progress effectively. Integrate a Monitoring, Evaluation, and Learning (MEL) framework to facilitate continuous assessment, adaptive management, and evidence-based decision-making. This approach promotes transparency, fosters accountability, and ensures long-term impact by enabling the project to evolve in response to new challenges and insights.

Challenge 3: Integration of local communities

A key challenge in conservation projects — particularly in the Global South — is the limited integration of local communities, often stemming from the practice of parachute science, where external researchers or organizations lead initiatives with minimal local collaboration. This top-down approach frequently results in misaligned priorities, lack of local buy-in, and ultimately, reduced long-term impact.

For conservation efforts to be truly effective and sustainable, local communities must be meaningfully involved at every stage of the process — from initial planning and decision-making to implementation and long-term management. This includes recognizing and respecting local knowledge systems, engaging stakeholders early, and creating opportunities for co-creation and shared leadership. Equally important is building local capacity through targeted training, mentorship, and resource allocation, ensuring that communities are equipped to continue managing and sustaining conservation actions independently once external support concludes.

This inclusive approach not only fosters a stronger sense of ownership and empowerment but also ensures that conservation efforts are more culturally appropriate, socially relevant, and ecologically effective. Ultimately, integrating and investing in local communities transforms conservation from an externally driven intervention into a locally led movement, increasing the likelihood of lasting environmental and social benefits.

Recommendations to improve local integration:

- **Co-design with communities from the start:**

Engaging local stakeholders from the earliest stages of a conservation project is essential to ensure that the initiative reflects community values, needs,

and priorities. This means moving beyond simple consultation to genuine co-creation, where local voices actively shape the project's goals, strategies, and implementation. Establishing open, two-way communication is critical — clearly conveying the project's objectives, methods, potential benefits, and limitations builds trust and helps manage expectations. Early and transparent engagement also strengthens social license and promotes long-term collaboration, increasing the likelihood of community ownership and sustained outcomes. By embedding equity, mutual respect, and cultural sensitivity into the co-design process, conservation projects become more inclusive, adaptive, and resilient to future challenges.

– Please see the REEFolution "Success Story"-case study 1 for an example of how to successfully launch a community-driven restoration initiative.

– One People One Reef co-designs with Micronesian outer island communities from the start, blending traditional knowledge with modern science and technology to advance adaptive management and conservation.

- **Promote community education and active participation (ocean literacy):**

Strengthen marine conservation efforts by investing in community education that fosters ocean literacy and deepens understanding of local marine ecosystems. Educational programs should be inclusive, culturally relevant, and tailored to diverse audiences — from youth to elders — to build widespread awareness of the importance of marine conservation. By connecting ecological concepts with local knowledge and everyday experiences, communities become empowered to participate meaningfully in stewardship efforts. Beyond raising awareness, education should actively encourage hands-on participation through citizen science, local monitoring programs, and conservation activities. This not only reinforces knowledge but also cultivates a strong sense of responsibility, pride, and ownership over marine resources. Ultimately, increasing ocean literacy is key to building long-term community support and capacity for sustainable marine conservation.

– KSLOF has been developing educational content for students aged 9 to 10 and 16 to 18 in a variety of languages (inc. English, Spanish, French, & Arabic); see the "Success stories" section for a specific example of their in-person work in Fiji (case study 3), as well as Box 2.

- **Include salaries for trained community members and create alternative livelihood opportunities:**

Ensure long-term community engagement and equity by providing fair compensation for trained local participants. Recognizing and valuing the time, knowledge, and labor of community members through paid roles — such as monitoring, guiding, and restoration work — helps move away from models that rely on unpaid volunteerism. In parallel, develop alternative and sustainable livelihood opportunities that align with conservation goals, such as eco-tourism, artisanal products, sustainable aquaculture, or reef-friendly agriculture. These income-generating pathways reduce dependency on extractive practices and strengthen community resilience. By integrating economic incentives with conservation, projects become more inclusive, foster local ownership, and enhance the long-term sustainability of both livelihoods and ecosystems.

- **Build capacity by offering training while valuing and incorporating traditional knowledge:**

Strengthen conservation outcomes by offering targeted training programs that build local skills in monitoring, restoration, management, and other relevant areas. At the same time, actively recognize, respect, and incorporate traditional ecological knowledge, which often reflects generations of close interaction with local ecosystems. Integrating scientific and traditional approaches fosters mutual learning, enhances the relevance and effectiveness of interventions, and promotes cross-cultural respect. This collaborative model not only empowers communities but also ensures that conservation strategies are grounded in both local context and global best practices.


Credits: Arthur Tuda

Figure 9. Local community members in Kenya getting trained on coral identification and health assessment.

2.6. Priority area 4: Facility, tools, research, and innovation

Researchers in the Global South often face significant challenges due to limited access to essential facilities, tools, and innovative technologies required for effective coral conservation and/or reef restoration. These challenges are often connected with inadequate funding for research infrastructure, limited availability of advanced laboratory equipment, and restricted access to cutting-edge methods such as advanced genetic analysis, climate-resilient coral propagation, and advanced monitoring systems.

Additionally, researchers in developing nations often face barriers to accessing global scientific networks and knowledge-sharing platforms, further isolating them from technological advancements. For example, while ICRS serves as the leading global organization for coral reef scientists, an analysis of its membership composition as of February 5, 2025, revealed that nearly 90% of its members are from the Global North. Moreover, nearly 70% of all members come from just five countries: the United States, Australia, the United Kingdom, Germany, and Japan. Despite ICRS's efforts to provide free membership and reduce fees for students and early-career scientists from developing nations, representation remains heavily skewed.

Similarly, only 10-15% of the attendees of the most recent Reef Futures conference held in December 2024 were from the Global South, despite the event being held in a low-to-middle-income (LMIC) country (Mexico). This inequality not only hinders the pace of coral restoration efforts in regions where reefs are most at risk but also limits the global understanding of diverse coral ecosystems, as these regions often harbor unique and understudied biodiversity. Addressing this gap requires targeted investments in infrastructure, creating partnerships with well-equipped institutions, fostering technology transfer, and prioritizing capacity-building initiatives.

One key suggestion that emerged from a recent survey from CRC was the desire for more regional in-person meetings. Many researchers acknowledge that in-person interactions are often more effective for collaboration and knowledge retention, yet securing funding to attend such gatherings remains a major hurdle. The Reef Futures conference exemplified this challenge: while in-person participation fosters stronger discussions and professional connections, remote attendance, while more accessible, often leads to less meaningful engagement and long-term impact.

Challenge 1: Infrastructure

Successful coral reef restoration and conservation efforts often depend on access to critical infrastructure, including controlled tanks, heating and water quality systems, field sampling equipment (e.g., boats, snorkeling and diving gear), environmental monitoring tools, laboratory equipment, and even dedicated laboratory or field stations. Yet, infrastructure needs are often overlooked by major grant programs, which typically prioritize operational costs and short-term research over foundational capacity building. This lack of support limits the ability of local researchers and practitioners — especially in the Global South — to carry out long-term, high-quality work.

To address this gap, funding mechanisms must evolve to include support for the development and maintenance of essential infrastructure. Establishing targeted infrastructure grants, institutional partnerships, and equipment-sharing networks could dramatically enhance local research capacity, foster innovation, and reduce dependency on external collaborators. Additionally, creating regional hubs and exchange programs for training and resource-sharing would facilitate knowledge transfer and build sustained collaborations across the international scientific and conservation communities.

Some recommendations:

- **Create mechanisms to fund infrastructure:**

Develop targeted funding mechanisms — such as grants, subsidies, or low-interest loans — to support the construction of new research and conservation facilities, as well as the modernization and maintenance of existing infrastructure. These funds should prioritize essential needs such as laboratory space, water quality and climate control systems, equipment for coral husbandry and restoration, and fieldwork logistics (e.g., boats, diving gear, and environmental monitoring tools). Mechanisms should be accessible to local institutions and community-based organizations, with streamlined application processes and long-term support to ensure sustainability. Investing in infrastructure not only enhances local capacity but also promotes self-sufficiency, enabling more equitable participation in global research and conservation efforts.

- **Partner with other labs, agencies, and establish consortiums with other facilities:**

Foster strategic collaborations among academic institutions, government agencies, NGOs, and private sector partners to promote the sharing of facilities, expertise, tools, and resources. Establish formal consortia or networks that encourage joint research initiatives, data sharing, and coordinated conservation strategies. Creating exchange programs for students, early-career researchers, and professionals can facilitate knowledge transfer, build technical skills, and strengthen long-term partnerships. These collaborations not only optimize the use of existing infrastructure and reduce redundancy, but also enhance capacity-building, increase access to specialized equipment, and foster innovation through interdisciplinary approaches. Strong inter-institutional partnerships can amplify impact, improve funding opportunities, and ensure that research and conservation efforts are scalable, inclusive, and globally connected.

- **Develop manuals for locals to build low-cost, affordable field labs:**

Create comprehensive, user-friendly manuals and toolkits that guide local communities, practitioners, and early-career researchers in designing and constructing affordable field laboratories using locally available materials.

These guides should include modular "lab-in-a-box" blueprints that are adaptable to various environmental and logistical contexts, and cover essential components such as water quality testing, basic molecular and ecological tools, and sample storage. Incorporating visual step-by-step instructions, maintenance tips, and safety protocols ensures usability regardless of technical background. When paired with training workshops and digital resources (e.g., videos, open-access repositories), these manuals can empower communities to conduct meaningful scientific work, support long-term monitoring, and reduce dependence on centralized or foreign infrastructure. Including case studies of successful low-cost labs can further inspire innovation and build confidence in local capacity.

– CORDAP is currently funding two lab-in-a-box systems: ReefSeed from the Australian Institute of Marine Science (AIMS; PI = Andrea Severati), already deployed and functioning in the Maldives, and a mobile spawning lab from Dr. Michael Sweet (University of Derby) that will be used to culture ornamental corals in Indonesia (PI = Dr. Rita Rachmawati).

Challenge 2: Access to technology and innovation

Beyond the physical limitations of infrastructure, a major barrier for researchers — particularly in the Global South — is limited access to cutting-edge technology, innovative tools, and up-to-date scientific literature. This lack of access restricts their ability to conduct high-impact research, apply modern methodologies, and contribute meaningfully to the global scientific discourse. Critically, many academic journals remain behind paywalls, making it difficult for researchers to stay informed of the latest developments or to publish their own work in high-visibility platforms due to costly publication fees.

Bridging this gap requires a multifaceted approach. Promoting open-access publishing, subsidizing article processing charges, and providing institutional access to scientific journals are essential first steps. In parallel, initiatives that facilitate access to technological innovations — such as affordable sensors, automated monitoring tools, and software for data analysis — are vital for advancing research capacity and supporting scalable restoration projects. Equally important is training researchers and practitioners in the use of these tools through targeted workshops, mentorship programs, and virtual learning platforms. By democratizing access to both knowledge and technology, we can empower a broader range of scientists and practitioners to participate in and lead cutting-edge research, resulting in more inclusive, collaborative, and effective conservation outcomes at regional and global scales.

Recommendations to improve access to technology and innovation:

- **Support networking, capacity development, and open-access:**

Promote inclusive networking platforms and collaborative initiatives that connect researchers, practitioners, and community leaders across regions, fostering a more cohesive and informed conservation community. Invest in capacity development through workshops, mentorships, and exchange programs that build technical skills and leadership, particularly in underrepresented regions. Support and incentivize open-access publishing and the use of preprint servers to ensure that knowledge, data, and findings are freely available, accelerating innovation and

enabling broader participation in the scientific process. Facilitating cost-free knowledge sharing not only reduces barriers to entry but also strengthens global collaboration and drives more equitable and impactful conservation outcomes.

– CORDAP requires that all articles emerging from their funded projects should be published in open-access format, and the fees necessary to do so can be included in proposal budgets.

- **Facilitate access and sharing of technologies:**

Create accessible, multilingual platforms that provide hands-on training modules, technical tutorials, and blueprints for innovative technologies used in marine conservation. These platforms should also include clear data-sharing guidelines and promote the ethical and open exchange of information. Establish centralized, well-maintained databases that catalog both successful and unsuccessful tools, methods, and technologies — allowing for broader learning, minimizing repeated mistakes, and accelerating innovation.

– CORDAP, SECORE, and CRC will soon launch a web portal for freely exchanging coral conservation and restoration technologies; see Box 3 for details.

– See MERMAID for a platform geared towards standardizing coral reef data collection.

- **Integrate technology in conservation projects:**

Ensure that the acquisition, implementation, and maintenance of appropriate technologies are fully integrated into project planning and budgets. This includes not only initial purchase costs, but also long-term operational expenses, training for local stakeholders, and technical support to ensure sustainable use. Prioritize scalable, context-appropriate, and user-friendly technologies that align with local capacity and environmental conditions. Embedding technology into conservation efforts in this way can enhance data collection, monitoring, and decision-making, while also improving project transparency, efficiency, and long-term impact.

- **Encourage collaboration between facilities:**

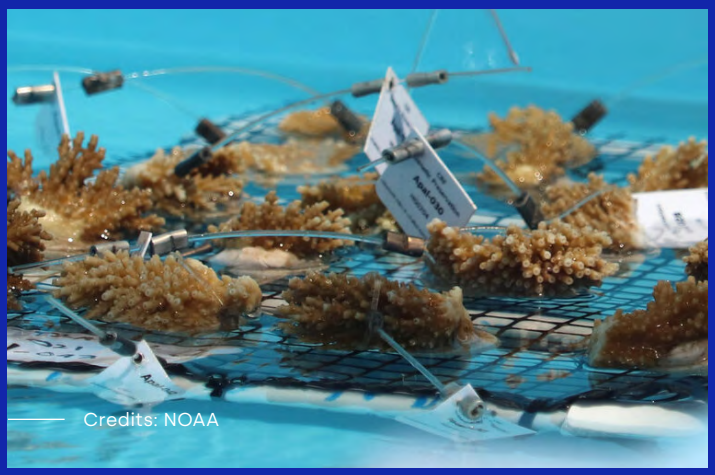
Promote strategic partnerships between research institutions, conservation centers, and local facilities to foster the sharing of resources, expertise, infrastructure, and technological innovations. These collaborations can optimize the use of limited resources, reduce duplication of efforts, and enhance the overall quality and scale of conservation outcomes. Establishing formal networks or consortiums can facilitate joint research projects, coordinated training programs, and shared access to specialized equipment, while also building long-term relationships that strengthen regional and global conservation capacity.

Credits: Martin Colognoli / Ocean Image Bank

Box 3: "Coral Solutions Hub":

The Coral Solutions Hub, developed by Coral Reef Consortium and co-funded by CORDAP centralizes coral conservation and restoration technologies

from across the globe. It is a "one-stop-shop" for those looking to stage coral reef interventions, not limited to coral restoration projects and coral strengthening approaches, such as assisted evolution and nutrient/ dietary supplementation (Box 3: Figure 1).



Box 3: Figure 1. Caribbean corals being fed a high-calorie diet to increase energy stores, which could allow them to better survive future heat waves.

Challenge 3: Access to ecological baseline data

While technological advances and innovation are essential for driving forward new conservation tools and strategies, the foundation of effective coral reef restoration lies in robust ecological baseline data. Such data is critical for assessing the health and composition of reef ecosystems, identifying trends, and understanding the cumulative impacts of both local and global stressors over time. Yet, many regions — especially in the Global South — lack even basic baseline information, resulting in major knowledge gaps that hinder informed decision-making and adaptive management. Despite its importance, baseline data collection is often underfunded and under-prioritized in conservation grant calls. Increasing investment in long-term ecological monitoring and baseline studies is essential not only to contextualize restoration interventions but also to set meaningful conservation targets, evaluate progress, and ensure accountability. Moreover, integrating local knowledge and training local stakeholders in monitoring practices can ensure that data collection is sustained beyond the lifespan of individual projects.

Suggestions to improve access to generating and assessing pre-existing ecological baseline data:

- **Support funding for basic monitoring:**

Advocate for and secure dedicated funding streams to support long-term, standardized ecological monitoring efforts. Continuous monitoring is essential for detecting environmental and biological changes, evaluating the effectiveness of restoration and conservation interventions, and guiding adaptive management. Funding should cover essential components such as training, field equipment, data management tools, and support for local monitoring teams to ensure consistent, high-quality data collection over time. Emphasizing the value of basic monitoring in grant frameworks and national conservation strategies can help embed it as a core component of reef stewardship.

- **Develop data-sharing guidelines:**

Establish clear and standardized data-sharing guidelines to promote transparency, accessibility, and equitable collaboration among stakeholders, including researchers, practitioners, policymakers, and local communities. These guidelines should outline protocols for data ownership, attribution, usage rights, and data security, while ensuring that sensitive or community-derived data are handled ethically. Encouraging open data practices and interoperable formats will facilitate knowledge exchange across institutions and regions, helping to build a more connected and informed conservation network. Including provisions for capacity-building around data literacy can further ensure that all stakeholders are able to access, interpret, and apply the shared information effectively.

– Initiatives like the GCRMN have attempted to centralize coral reef benthic data, yet much of the collective dataset cannot be accessed due to data-sharing restrictions, nor were data collected via similar methodologies across regions.

- **Implement citizen science projects to collect baseline information:**

Engage local communities in well-designed citizen science initiatives to gather critical baseline ecological data. These projects not only expand the scope and frequency of environmental monitoring, especially in under-resourced areas, but also foster inclusive participation by incorporating diverse local perspectives and traditional knowledge. Citizen science empowers communities through hands-on involvement, enhancing ocean literacy, environmental stewardship, and long-term engagement in conservation efforts. To maximize impact, projects should include training, standardized data collection protocols, and feedback loops to ensure data quality and keep participants informed on how their contributions are being used in decision-making and scientific research.

– Pre-existing platforms like iNaturalist have been used to run such citizen science campaigns.

– PADI Project Aware, and the SCUBA diving industry in general, could be a key ally in this endeavor.

– CoralWatch, REEF, Reef Check, Eyes of the Reef, Pala Dalik: Citizen science for coral health.

Credits: Yen-Yi Lee / Ocean Image Bank

2.7. Priority area 5: Policy and governance

Effective and enduring coral conservation efforts cannot operate in silos — they must be embedded within broader governance structures and developed through inclusive, cross-sectoral collaboration. Local governments play a central role in this process, as they are uniquely positioned to establish enabling policy frameworks that ensure long-term sustainability. This includes creating streamlined permitting processes, offering co-financing or funding incentives, integrating conservation into coastal development and climate adaptation plans, and formally recognizing community-based efforts to enhance legitimacy and local support.

Partnerships between scientists, conservation practitioners, community leaders, and government agencies strengthen the institutional foundations needed to implement and scale coral reef restoration and protection. Involving policymakers from the outset ensures alignment between scientific objectives and policy priorities, facilitates knowledge transfer, and can drive regulatory innovations that support restoration (e.g., zoning for reef refugia, carbon offset frameworks, or legal recognition of restoration as a management tool).

Furthermore, engaging in policy dialogue at national and international levels helps elevate local conservation efforts to influence broader environmental governance, attract funding, and promote coherence with global frameworks like the Convention on Biological Diversity and the UN Sustainable Development Goals. Ultimately, good governance rooted in transparency, accountability, and participatory decision-making is essential for the success and resilience of coral reef conservation strategies.

Challenge 1: Translating science into policy

Effectively engaging policymakers begins with the ability to clearly translate scientific findings — particularly those generated through community-based research — into actionable and policy-relevant information. This involves more than just sharing data; it requires strategic communication that highlights the implications of the research for local ecosystems, communities, and development goals.

To build meaningful connections with decision-makers, key messages must be presented in a clear, concise, and compelling manner. This includes emphasizing how the findings relate to existing policies or regulatory frameworks, demonstrating the potential social, economic, and environmental benefits of action, and framing scientific insights in ways that resonate with local and national priorities. Using policy briefs, infographics, and executive summaries can help distill complex information into digestible formats tailored to non-scientific audiences.

Moreover, co-producing knowledge with community stakeholders adds credibility and ensures the science reflects local needs and realities, which further strengthens its policy relevance. Demonstrating that research supports evidence-based decision-making and can enhance policy outcomes — whether through improved resource management, disaster resilience, or climate adaptation — establishes a strong foundation for collaboration. Ultimately, bridging the science-policy gap requires consistent engagement, relationship-building, and the ability to frame science as a tool for solving real-world problems — thereby gaining the attention, trust, and support of policymakers.

Some recommendations to improve communication between scientists and policy makers:

- **Establish two-way communication between science and policy:**

Foster ongoing, two-way dialogue between the scientific community and policymakers to ensure mutual understanding and influence. This means not only translating scientific findings into actionable policy recommendations, but also integrating policy needs and priorities into the research process. Creating regular opportunities for exchange — such as policy roundtables, joint workshops, or science-policy advisory panels — encourages co-learning, builds trust, and ensures that research is relevant, timely, and aligned with decision-making processes. This dynamic relationship helps science better inform policy while enabling policies to guide research agendas toward the most pressing societal and environmental challenges.

– The UN Nippon Foundation Fellowship trains government officials and other mid level professionals from developing countries in ocean governance and marine policy making it easier to communicate to policy makers.

- **Develop an effective communication strategy:**

Establish a comprehensive and proactive communication strategy to ensure scientific findings are clearly conveyed, widely understood, and actionable. Present complex data in accessible and engaging formats — such as report cards, infographics, videos, and interactive dashboards — to make information meaningful for a broad range of stakeholders, including policymakers, funders, and local communities.

Allocate specific funding for science communication, including the creation of tailored communication materials and the hiring of dedicated staff or science communicators skilled at translating technical research into policy-relevant and community-friendly language. Embed science communication as a core component of project design — not an afterthought — to ensure its integration throughout all stages of the project.

Further, ensure that outreach and engagement activities are included in project timelines and budgets, including public presentations, media engagement, co-developed messaging with communities, and multilingual materials where needed. This approach increases transparency, strengthens community buy-in, enhances policy influence, and ultimately maximizes the visibility and impact of conservation initiatives.

– AGRRA develops coral reef report cards at country and regional scales, simplifying complex ecological data for managers and officials.

– HRHP produces coral reef report cards to track reef health and present data in an accessible format.

- **Hire a dedicated facilitator for cross-sector communication:**

Smooth, effective collaboration and mutual understanding among scientists, policymakers, community leaders, NGOs, and other stakeholders. This role is critical for aligning project goals across disciplines and sectors, translating complex scientific findings into actionable insights, and helping stakeholders navigate cultural, institutional, or technical barriers that may impede progress.

The facilitator should be experienced in both science communication and stakeholder engagement, capable of fostering inclusive dialogue, mediating differing priorities, and co-developing solutions that reflect both ecological and social considerations. In transdisciplinary projects, this position enhances transparency, builds trust, and ensures that all voices are heard and integrated into decision-making processes — ultimately increasing the effectiveness, relevance, and sustainability of conservation outcomes.

Consider integrating this role from the project's inception and budgeting for continuous involvement throughout implementation, monitoring, and adaptive management phases.

- **Set clear, actionable goals with policymakers and government agents:**

Collaborate directly with policymakers and government representatives to co-develop concrete, measurable, and time-bound goals that align with national and local policies, development plans, and conservation priorities. Ensure these goals are not only scientifically sound but also politically and socially feasible. By demonstrating how the project's objectives contribute to broader policy targets — such as climate adaptation, biodiversity protection, or sustainable livelihoods — you strengthen the project's relevance and increase the likelihood of institutional support.

Establish shared indicators of success and clear timelines, and define the roles and responsibilities of each actor involved. This co-creation process builds ownership, fosters accountability, and creates a foundation for long-term policy integration and support beyond the lifespan of the project.

Where possible, formalize these goals within existing governance structures (e.g., through MOUs, working groups, or integration into local management plans) to enhance implementation and ensure institutional continuity.

- **Produce policy briefs from research results:**

Develop concise, accessible, and visually engaging policy briefs that synthesize key research findings, emphasize their real-world implications, and offer clear, evidence-based recommendations tailored to the needs of policymakers and relevant stakeholders. These briefs should translate complex scientific insights into actionable guidance, using plain language, infographics, and targeted messaging to maximize understanding and uptake.

To enhance impact, ensure that policy briefs are aligned with current policy priorities and frameworks at local, national, and regional levels. Where appropriate, co-create briefs with stakeholders to increase relevance, legitimacy, and buy-in. Distribute briefs strategically through trusted networks, decision-making fora, and policy dialogues to foster informed, science-based governance.

– An ICRS Science to Policy paper (Knowlton *et al.*, 2021) provides actionable recommendations to guide policymakers in addressing coral conservation challenges.

Challenge 2: Forging better scientist-government relationship

Building robust, trust-based relationships between scientists and government actors is essential for translating research into impactful conservation policy and action. When policymakers understand and value scientific knowledge, they are more likely to champion environmental issues like coral reef protection and integrate them into policy agendas.

Creating regular, meaningful opportunities for policymakers to engage directly with science fosters this connection. Immersive experiences — such as site visits, snorkeling, and diving — allow decision-makers to witness the ecological value of coral reefs and the urgent threats they face. These hands-on engagements humanize the science, build empathy, and make conservation challenges more tangible.

Beyond exposure, actively involving policymakers in the co-design, planning, and implementation of conservation projects strengthens alignment with political priorities and regulatory frameworks. This participatory approach ensures that scientific efforts are grounded in practical realities, increasing the likelihood of institutional support, streamlined permitting, and sustained funding.

Effective scientist-government relationships are built on mutual respect, two-way communication, and long-term engagement — not just one-off interactions. Regular policy dialogues, technical briefings, joint workshops, and advisory committees can institutionalize collaboration and create durable channels for science-informed governance.

Some recommendations to create better scientist-government relationship:

- **Create opportunities for team-building and informal interactions:**

Intentionally create opportunities for team-building and informal engagement between scientists, policymakers, and community stakeholders. Allocate dedicated resources for immersive, shared experiences — such as snorkeling excursions, introductory dive courses, or field visits to restoration sites — that bring participants into direct contact with the ecosystems they aim to protect.

These informal settings foster personal connections, break down hierarchical barriers, and build trust among collaborators, while also raising awareness of conservation issues in a memorable and impactful way. Shared experiences in the water can help policymakers gain a deeper emotional and sensory understanding of coral reef systems, making the science more relatable and the need for action more compelling.

Incorporating social elements — such as group meals, storytelling sessions, or cultural exchanges — can further strengthen relationships, promote open communication, and lay the foundation for long-term collaboration. These informal interactions complement formal meetings and project structures by nurturing the human connections that underpin successful, cross-sector partnerships.

- **Establish formal platforms for discussions and idea exchange:**

Create structured, inclusive platforms that facilitate regular dialogue and knowledge exchange among stakeholders from diverse sectors — including government, academia, NGOs, Indigenous and local communities, and the private sector. These platforms should be designed to encourage open communication, foster collaboration, and build mutual understanding across disciplines and perspectives.

By institutionalizing these spaces — such as through multi-stakeholder working groups, advisory councils, roundtable fora, or community assemblies — you promote continuity, transparency, and shared ownership of conservation initiatives. Such platforms can serve multiple purposes: co-developing policy recommendations, resolving conflicts, identifying synergies, aligning goals, and coordinating actions across sectors.

Ensure that these platforms are accessible, culturally sensitive, and supported by clear governance structures, facilitation mechanisms, and transparent decision-making processes. Incorporate mechanisms for integrating traditional ecological knowledge and local insights alongside scientific expertise to enrich discussions and ground decisions in lived experience.

- **Promote multi-disciplinary projects:**

Design and implement projects that intentionally integrate science, policy, and practice by fostering collaboration across diverse disciplines — including ecology, economics, social sciences, law, engineering, and public health. Tackling complex conservation challenges, such as coral reef degradation, requires

Credits: Hannes Klostermann / Ocean Image Bank

holistic approaches that draw on multiple knowledge systems and skill sets.

Encouraging interdisciplinary and transdisciplinary collaboration enhances problem-solving by bridging gaps between research and real-world decision-making. These projects should be co-developed with a wide range of stakeholders — policymakers, practitioners, local communities, and private sector actors — to ensure relevance, applicability, and collective ownership.

Support mechanisms for knowledge exchange, joint training, and co-publication can strengthen cross-sector understanding and promote innovative, systems-based solutions. Embedding policy analysis, governance frameworks, and socio-economic assessments into conservation projects increases their strategic impact and accelerates uptake into policy and planning processes.

- **Co-design or co-produce projects with decision-makers:**

Actively involve decision-makers — such as government officials, policy advisors, and community leaders — in the co-design and co-production of projects from the earliest stages. This collaborative approach ensures that project goals, methods, and outcomes are directly aligned with policy priorities, regulatory frameworks, and on-the-ground realities.

Co-designed projects are more likely to be relevant, feasible, and actionable, as they incorporate the practical constraints, institutional knowledge, and strategic interests of decision-makers. This process fosters mutual understanding, builds trust, and increases the likelihood of policy uptake and long-term support.

Incorporating decision-makers as partners — not just end-users — also enhances transparency, accountability, and shared ownership of outcomes. It creates space for iterative feedback, adaptive management, and joint problem-solving throughout the project lifecycle.

To strengthen this approach, establish formal mechanisms for engagement — such as advisory committees, stakeholder working groups, or participatory planning sessions — and ensure that these are inclusive, well-facilitated, and documented. Where appropriate, include opportunities for capacity building so that all participants can contribute meaningfully to the co-production process.

- **Include experts with policy and environmental experience and offer training opportunities:**

Integrate experts with dual expertise in environmental science and policy into project teams to bridge the gap between research and decision-making. These individuals — such as policy advisors, environmental lawyers, or practitioners with government experience — can help translate scientific findings into policy-relevant language, anticipate regulatory challenges, and align project outcomes with legislative and planning frameworks.

In parallel, offer targeted training opportunities for scientists, community leaders, and other project stakeholders to build their understanding of policy processes, institutional structures, and decision-making cycles. This may include workshops on environmental governance, regulatory frameworks, policy writing, strategic communication, or advocacy strategies.

By fostering policy literacy and cross-sector competencies, you empower participants to more effectively engage with policymakers, influence outcomes, and contribute to the development of practical, scalable solutions. Cross-training also encourages more holistic project design and promotes collaboration across traditionally siloed fields.

- **Hold regular meetings with government officials:**

Establish a routine schedule of meetings with government officials to maintain open lines of communication, build trust, and ensure sustained engagement throughout the project lifecycle. These meetings should include formal presentations, progress updates, and opportunities for dialogue, allowing officials to stay informed, provide input, and align the project with evolving policy priorities.

Regular interactions help reinforce transparency, demonstrate accountability, and create a shared sense of ownership over the project's goals and outcomes. They also offer a platform for addressing emerging challenges, adjusting strategies, and identifying opportunities for policy integration, resource support, or regulatory alignment.

To maximize effectiveness, tailor meeting formats and content to the needs and preferences of government partners. Consider incorporating site visits, informal briefings, technical workshops, and joint planning sessions to diversify engagement and deepen relationships.

- **Learn key portions of the overall government agenda:**

Ensure that project staff are well-versed in relevant elements of the national, regional, and local government agendas, including development plans, climate strategies, biodiversity targets, and sectoral priorities (e.g., fisheries, tourism, coastal development). Understanding the broader policy landscape enables teams to design conservation initiatives that are contextually appropriate, strategically aligned, and positioned for institutional support.

This alignment helps frame conservation efforts not as standalone environmental interventions, but as integral contributions to national goals such as climate resilience, sustainable livelihoods, disaster risk reduction, or economic diversification. It also facilitates more effective communication with policymakers, allowing project teams to speak the language of government priorities and identify natural points of synergy.

To operationalize this, conduct a policy scan or stakeholder mapping at the outset of the project, and offer internal briefings or training sessions to build political literacy among staff. Maintain regular updates on evolving policy developments to adapt project messaging and objectives as needed.

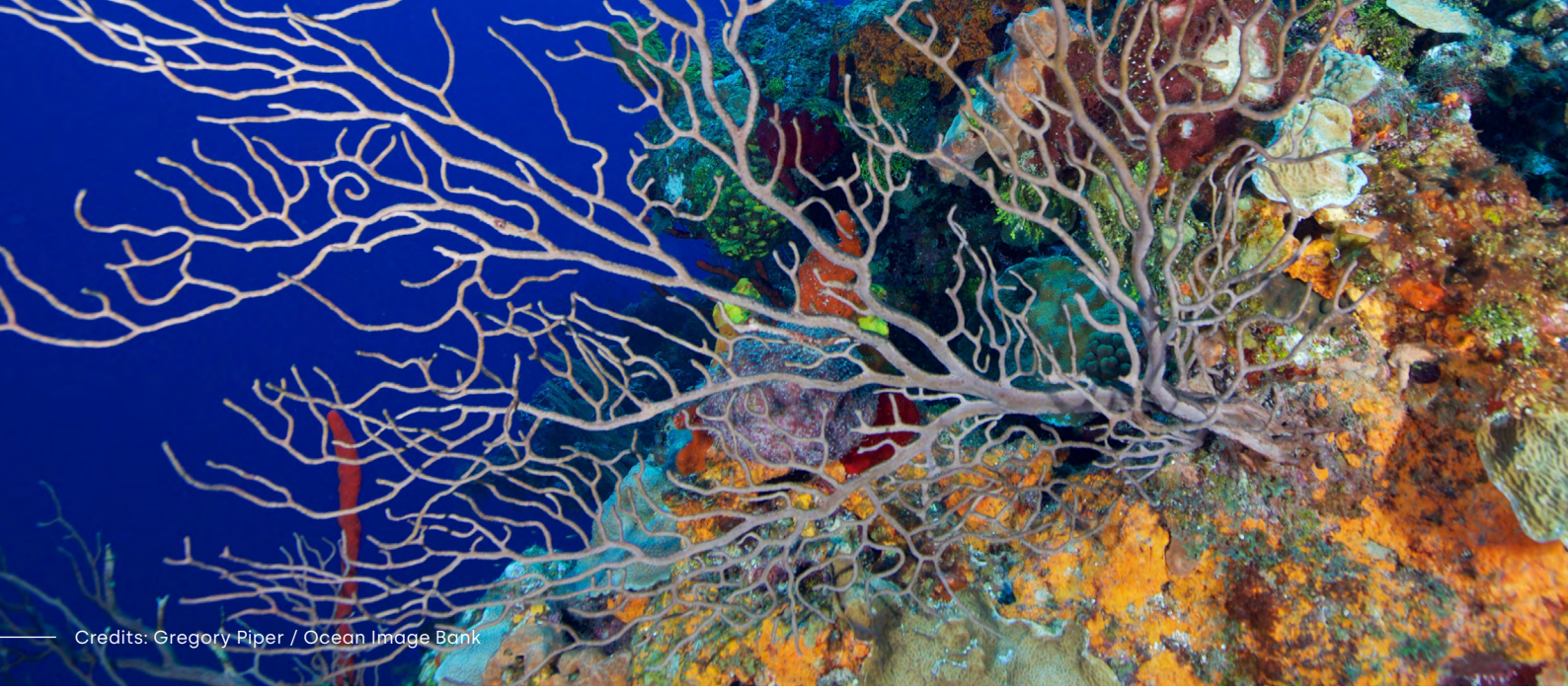
- **Develop a knowledge-sharing platform:**

Establish a dedicated, user-friendly platform for knowledge sharing that facilitates the exchange of data, tools, lessons learned, and best practices among stakeholders involved in conservation, policy, and community engagement. This platform should serve as a centralized hub where scientists, policymakers, practitioners, and local communities can access relevant resources, contribute insights, and collaborate to address shared challenges.

To maximize impact, ensure the platform is designed with accessibility, interactivity, and inclusivity in mind. Content should be available in multiple formats — such as briefs, case studies, toolkits, videos, and webinars — and tailored to meet the needs of diverse users, including non-specialists. Features such as discussion fora, Q&A spaces, multilingual support, and regular updates can foster dynamic, two-way knowledge exchange.

Incorporate mechanisms for curating high-quality content, tracking user engagement, and promoting contributions from underrepresented voices, including Indigenous knowledge holders and community-based organizations. Where possible, integrate the platform with existing networks, government portals, or regional knowledge hubs to enhance visibility and reach.

– Data "dashboards" represent one popular means of distilling and then presently oftentimes dense, esoteric data in a way that can be readily digested by a wide audience; AGRRA data dashboards are discussed above.



Credits: Gregory Piper / Ocean Image Bank

2.8. Priority area 6: Funding

While the lack of funding is often cited as the primary barrier to conservation in the Global South, the challenge is more nuanced than simple resource scarcity. Though securing adequate financial support remains essential, equally important is the ability to effectively manage, sustain, and strategically align available funding with local priorities and long-term conservation goals. Many promising initiatives struggle not only due to insufficient funds, but also because of gaps in financial planning, grant-writing capacity, donor engagement, and mechanisms for equitable and transparent fund distribution. Without targeted training and institutional support, communities and conservation actors may face difficulties in navigating complex funding landscapes, complying with donor requirements, and demonstrating impact.

To address this, capacity development in financial literacy, grant acquisition, budgeting, and monitoring is critical.

Empowering local organizations and leaders to identify funding opportunities, design competitive proposals, and manage resources responsibly helps ensure that funds translate into tangible, sustainable outcomes on the ground.

Moreover, funding must be aligned with the aspirations, rights, and knowledge systems of local and Indigenous communities to avoid reinforcing external dependencies or top-down decision-making. Co-developing financial strategies with local partners and investing in long-term funding models — such as trust funds, payment for ecosystem services, or public-private partnerships — can help build financial resilience and reduce reliance on short-term or externally driven projects.

Challenge 1: Longevity of funds

One of the most pressing challenges in conservation, particularly for long-term initiatives like coral restoration, is ensuring financial sustainability beyond the lifespan of short-term research or project grants. While most funding sources operate on fixed timelines, effective restoration and ecosystem management require extended, often indefinite commitments for planning, implementation, monitoring, and adaptive management.

To safeguard long-term success, it is essential to go beyond short-term budgeting and invest in strategies that ensure financial continuity and resilience. This includes training project teams and local partners to successfully identify, apply for, and manage a diverse portfolio of grants — ranging from international donor funding to regional government support and private sector sponsorships.

Building relationships with long-term donors, such as philanthropic foundations, conservation trust funds, and public-private partnerships, can provide more stable, flexible funding that aligns with evolving project needs. Establishing multi-year funding agreements, endowments, or revolving funds can also help reduce dependence on project-specific grants and provide ongoing support for critical activities such as staffing, community engagement, training, and data collection.

In addition, integrating conservation financing into national and local development plans can open up access to public budgets and international climate or biodiversity finance mechanisms (e.g., GEF, Green Climate Fund). Collaborating with financial experts and policy advisors can support this alignment and unlock new sources of institutional funding.

Some recommendations to guarantee the longevity of funds:

- **Develop a business model for sustainability:**

To ensure long-term viability, conservation projects must move beyond dependence on short-term grants and incorporate business models that generate revenue and promote financial independence. Creating a well-designed business model enables projects to maintain momentum, scale their impact, and remain adaptable in the face of changing funding environments.

An effective conservation business model clearly articulates the value the project provides — both environmentally and socioeconomically — to communities, governments, and potential investors. This value can be translated into revenue through mechanisms such as payments for ecosystem services (PES), ecotourism initiatives, blue carbon credit schemes, biodiversity offsets, certification programs, or sustainable product development. By identifying specific services or benefits that can be monetized in an ecologically responsible and socially equitable way, projects can generate funding streams that support ongoing operations while simultaneously incentivizing local stewardship.

Financial sustainability also depends on understanding and managing the project's cost structure and planning for scalability over time. This includes exploring how the model could be replicated in other regions or scaled in partnership with other organizations or sectors. Crucially, any revenue-generating strategy must ensure that local communities and key stakeholders directly benefit from these financial flows, fostering ownership, long-term engagement, and legitimacy on the ground.

– The Global Fund for Coral Reefs (GFCR) plans to invest in projects such as these.

- **Tap into broader funding opportunities:**

To support long-term conservation efforts, it is essential to look beyond traditional environmental grants and actively pursue broader, cross-sectoral funding streams. Global frameworks such as the Sustainable Development Goals (SDGs), the Paris Agreement, and the Kunming-Montreal Global Biodiversity Framework offer powerful entry points for securing diversified and sustained financial support.

Aligning conservation projects with these global initiatives opens access to a wide range of funding mechanisms — from climate adaptation and resilience financing to development-focused grants targeting livelihoods, gender equity, and sustainable economic growth. Many international donors, multilateral development banks, and philanthropic institutions are increasingly seeking integrated proposals that deliver co-benefits across multiple SDG targets, such as clean water, poverty reduction, food security, and climate action.

By framing coral reef conservation as a key contributor to global goals — such as SDG 13 (Climate Action), SDG 14 (Life Below Water), and SDG 1 (No Poverty) — projects can become more competitive for funding while demonstrating relevance to broader development agendas. This approach also facilitates cross-sector partnerships with health, education, and economic development actors, further expanding funding options and impact.

- **Encourage private sector partnerships:**

Engaging the private sector is a critical strategy for securing long-term financial support and enhancing the sustainability of coral restoration and conservation efforts. By forging meaningful partnerships with businesses — from tourism operators and seafood companies to insurance providers and technology firms — conservation projects can diversify their funding base, access new expertise, and amplify their impact.

Private sector actors increasingly recognize the value of healthy ecosystems in supporting their operations, managing risk, and meeting sustainability commitments. Coral reefs, for example, play a vital role in protecting coastal infrastructure, supporting tourism and fisheries, and providing ecosystem services that many industries depend on. Positioning reef restoration as a mutually beneficial investment — rather than a charitable cause — can open doors to sustained funding, in-kind contributions, and co-development of innovative solutions.

To build effective partnerships, conservation initiatives should identify shared interests and align restoration efforts with the environmental, social, and governance (ESG) goals of potential partners. This might include offering opportunities for corporate

social responsibility (CSR) engagement, carbon or biodiversity offsetting, employee volunteering, or co-branding of restoration sites. Transparent communication, clear roles, and measurable outcomes are essential to maintaining trust and accountability in these collaborations.

In addition, creating investment-ready models — such as blue bonds, reef insurance mechanisms, or impact investment portfolios — can attract private capital to fund large-scale, long-term initiatives. Governments and NGOs can play a facilitative role by creating policy incentives, de-risking investment, and convening platforms for public-private collaboration.

- **Establish partnerships with established organizations:**

Forming strategic partnerships with well-established organizations is a vital step toward securing long-term funding, strengthening project credibility, and ensuring the sustainability of conservation efforts. Established institutions — such as international NGOs, research institutions, multilateral agencies, and development organizations — bring not only financial resources but also technical expertise, policy influence, and extensive networks that can accelerate the success and visibility of coral reef initiatives.

By collaborating with experienced partners, projects can benefit from shared infrastructure, co-branding opportunities, and joint fundraising efforts, which can increase access to competitive funding streams and reduce administrative burdens. These partnerships can also provide vital mentorship in areas such as project design, financial management, monitoring and evaluation, and communications — ensuring that local efforts are both impactful and aligned with global best practices.

Moreover, well-established organizations often have long-standing relationships with governments, donors, and other stakeholders, which can facilitate smoother access to policy dialogues, advocacy platforms, and cross-sector collaboration. Their involvement can enhance the perceived legitimacy of a project and open doors to high-level partnerships and long-term institutional support.

To maximize the value of these collaborations, it is important to build equitable partnerships based on mutual respect, shared goals, and clearly defined roles. Local leadership and ownership should remain central, with established partners acting as enablers and allies rather than decision-makers. Ensuring transparent communication and joint planning from the outset will help foster trust and long-term alignment.

- **Develop national coral restoration frameworks:**

Developing national coral restoration frameworks is essential for scaling and sustaining reef conservation efforts in a coordinated, strategic, and inclusive manner. These frameworks should serve as comprehensive roadmaps that align scientific expertise, policy priorities, and community needs, ensuring that coral restoration becomes a recognized and supported component of national environmental and development agendas.

A well-designed framework should clearly articulate national goals, targets, and standards for coral restoration, while embedding local and Indigenous knowledge, community priorities, and context-specific approaches. By integrating community perspectives from the outset, the framework not only ensures greater relevance and equity but also fosters local ownership, which is key to long-term stewardship and success.

These frameworks can play a vital role in securing government funding, enabling more consistent public investment in restoration initiatives and helping to mainstream coral reef protection across sectors such as tourism, fisheries, climate adaptation, and coastal planning.

In addition, national frameworks can help standardize methodologies, improve coordination between stakeholders, and support robust monitoring and evaluation systems. They create an enabling environment for collaboration among government agencies, NGOs, academia, and the private sector, while guiding policy reforms and institutional support needed to scale restoration at pace and with impact.

Credits: Ewout Geerten Knoester

Challenge 2: Misalignment of grant goals with project needs

One of the most persistent challenges in conservation financing is the frequent misalignment between the goals of grant-making institutions and the actual needs and priorities of local communities. While many grants are designed with predetermined objectives — often shaped by donor agendas, reporting requirements, or global policy targets — these goals may not always reflect the realities on the ground, resulting in projects that are well-funded but poorly suited to local contexts. This disconnect can undermine the long-term effectiveness, ownership, and sustainability of conservation initiatives. Projects risk becoming extractive or performative — meeting donor metrics but failing to deliver meaningful, lasting impact for the communities they are intended to benefit.

To address this, it is essential to create more flexible, participatory, and responsive funding processes. Open and ongoing communication between grant developers, implementing partners, and local stakeholders must be prioritized from the earliest stages of project design. Co-creation processes that involve community leaders, local scientists, and practitioners help ensure that funded projects are rooted in community priorities, build on existing local efforts, and address urgent challenges with culturally appropriate and context-specific solutions.

Equally important is the need for funders to recognize and value non-traditional indicators of success, such as capacity development, governance improvements, and the strengthening of social capital. Encouraging adaptive project designs that allow for iterative learning and course correction based on community feedback can further enhance relevance and impact.

Funders should also invest in listening mechanisms — such as needs assessments, local consultations, and community-led evaluations — to ensure that funding programs are not just top-down mandates but genuine partnerships. By fostering alignment between grant goals and community needs, funders and implementers can work together to ensure that conservation efforts are not only scientifically sound and donor-compliant but also socially just, equitable, and deeply rooted in place.

Some recommendations to make funds and grants more connected to community needs:

- **Integrate multidisciplinary teams in project development:**

Incorporating multidisciplinary teams — including community members, scientists, practitioners, and policymakers — into the early stages of project development is essential for designing conservation initiatives that are inclusive, contextually relevant, and grounded in real-world needs. This collaborative approach ensures that a wide range of knowledge systems, lived experiences, and technical expertise are brought to the table, enriching the project design and enhancing its potential for success.

Engaging diverse stakeholders in the proposal development phase allows for the co-identification of priorities, the integration of local and Indigenous knowledge, and the early detection of potential barriers or conflicts. This not only improves the relevance and feasibility of the project but also builds trust, transparency, and a sense of shared ownership among all parties involved.

When community members are meaningfully involved — not just consulted — they become active contributors to shaping the project's goals, strategies, and implementation plans. Scientists and technical experts, in turn, can help translate community concerns into measurable outcomes and evidence-based interventions, while practitioners bring valuable insights on logistics, capacity, and what works in practice. This integrative process fosters more holistic and adaptive solutions that are better aligned with both community aspirations and scientific rigor.

- **Co-design pre-proposal grants with the community:**

Engaging communities in the co-design of pre-proposal grants is a critical step toward ensuring that conservation projects are grounded in local realities and aligned with community priorities from the outset. Rather than approaching communities with pre-defined ideas, collaborating during the earliest stages — before full proposals are developed — creates space for inclusive dialogue, shared problem-solving, and mutual trust-building.

This approach allows community members to help shape the project's goals, strategies, and expected outcomes, ensuring that initiatives reflect their needs, aspirations, and cultural contexts. By embedding community voices into pre-proposal development, projects are more likely to address real challenges, leverage local knowledge, and gain long-term support.

Credits: Erik Lukas / Ocean Image Bank

To do this effectively, it is important to allocate time and resources specifically for early-stage engagement — such as workshops, focus groups, or community meetings — and to ensure that communication is accessible and inclusive. Where needed, support should be provided to build capacity among community participants so they can fully engage in the co-design process as equal partners.

- **Ensure context-specific requirements for grants:**

To improve the effectiveness and equity of conservation funding, it is essential that grants are designed with context-specific requirements that reflect the social, ecological, and cultural realities of the communities they aim to support. Too often, grant structures are rigid or overly generalized, resulting in a mismatch between donor expectations and local needs, capacities, or priorities.

Developing more flexible and tailored funding mechanisms — including better match-making between funders and local implementers — ensures that conservation initiatives are not only more relevant but also more sustainable. This involves going beyond one-size-fits-all approaches and taking into account key contextual factors such as geographic location, governance systems, environmental pressures, and community dynamics. Funders should invest in understanding local conditions through participatory assessments and needs analyses before finalizing grant criteria. Where possible, calls for proposals should offer adaptable frameworks that allow applicants to define their own success indicators, timelines, and implementation models in alignment with local realities.

Better alignment between funder objectives and community needs also means supporting bottom-up proposal development, enabling communities and local organizations to play a central role in shaping projects that meet both their priorities and broader conservation or development goals. Match-making mechanisms — such as intermediary platforms, regional hubs, or trusted partner networks — can help connect funders with the right local actors, increasing transparency, trust, and accountability.

In addition, funders should ensure that grant requirements do not unintentionally exclude community-based organizations or grassroots groups due to overly complex application processes, co-financing expectations, or reporting demands. Providing flexible funding windows, capacity-building support, and simplified application pathways can help address these barriers and ensure more equitable access to resources.

– Global Environment Facility Small Grants Program (GEF SGP) provides financial and technical support to local civil society organizations and community-based organizations, with a special focus on Indigenous Peoples, women, and youth, to develop and implement innovative local actions that address global environmental issues, while also improving livelihoods and reducing poverty.

- **Conduct baseline surveys to understand community needs:**

Conducting baseline surveys is a critical first step in designing effective, inclusive, and context-sensitive conservation projects. By engaging political and social scientists to lead these efforts, projects can gain a more nuanced understanding of community needs, priorities, and socio-political dynamics, ensuring that interventions are not only ecologically sound but also socially relevant and equitable.

Baseline assessments provide essential insights into the lived experiences, economic conditions, cultural practices, governance systems, and environmental perceptions of local communities. These surveys help identify both challenges and opportunities from the community's perspective — allowing for a more accurate alignment between project goals and local realities. When done well, they can also uncover existing capacities, traditional knowledge systems, and informal institutions that are often overlooked in top-down planning processes.

Interdisciplinary involvement — particularly from social and political scientists — ensures that these surveys go beyond surface-level data collection. It allows for the exploration of power dynamics, social networks, decision-making structures, and historical relationships with external actors, all of which are crucial for developing trust and co-producing sustainable outcomes. Importantly, baseline surveys should be participatory, involving community members not only as respondents but also as collaborators in survey design, data interpretation, and priority setting. This fosters transparency, builds local ownership of the project, and ensures that findings are relevant, accurate, and actionable.

- **Release time for practitioners to focus on engagement:**

To ensure that conservation initiatives remain aligned with community priorities, it is essential to

allocate dedicated time and institutional support for practitioners to engage meaningfully with local stakeholders. Community engagement is not a one-time activity or a box to be checked — it is an ongoing, relational process that requires trust-building, listening, cultural sensitivity, and consistent presence. Yet, in many projects, practitioners are expected to manage engagement alongside a wide range of technical, administrative, and logistical duties, leaving little time for the deep, sustained interaction that genuine collaboration requires.

By formally releasing time for practitioners to focus on community engagement, project teams demonstrate a commitment to participatory approaches and equitable partnerships. This time should be protected and resourced adequately, recognizing that engagement work — such as attending community meetings, conducting follow-ups, responding to concerns, or simply being present — is foundational to a project's success.

Moreover, when practitioners are supported to build strong local relationships, they are better positioned to identify emerging challenges, adapt activities in real time, and co-develop solutions that reflect local aspirations and lived experiences. This leads to greater community ownership, improved project relevance, and more sustainable outcomes. Institutions and funders must also recognize the value of this work in performance evaluations and grant reporting. Engagement should be treated as a core deliverable — not an ancillary task — and budgets should reflect the time, travel, training, and communication resources necessary to do it well.

- **Allocate funds for science communication and marketing:**

To maximize the impact and visibility of conservation efforts, it is essential to allocate dedicated funds for science communication and marketing as a core component of project planning. Effective communication bridges the gap between scientific research, community engagement, and policy influence — ensuring that project goals, progress, and outcomes are clearly understood, accessible, and relevant to a broad range of audiences.

Science communication should not be treated as an afterthought or a luxury — it is a vital tool for building trust, fostering transparency, and mobilizing support. This includes budgeting for professional communicators, local media partnerships, and accessible storytelling tools such as videos, infographics, social media campaigns, and community radio. Funds should also support the acquisition of essential equipment — such as cameras, microphones, and editing software — as well as the training needed to use them effectively.

Importantly, communication strategies should be tailored to the needs of different stakeholders, from local community members and youth to government officials, funders, and the wider public. Materials should be produced in appropriate languages, formats, and tones, ensuring cultural relevance and accessibility. This also includes providing timely updates on project activities, celebrating milestones, and responding to feedback — making communication a two-way, inclusive process. Investing in communications and outreach can also boost fundraising and long-term sustainability. Well-crafted narratives and compelling visual content help demonstrate impact, attract new partners, and position projects within global conservation and development dialogues.

– CORDAP funds open-access publication and public outreach components for grant success stories.

– ICRS Science Communication Fellowship supports the development of policy briefs, infographics, and media engagement.

- **Allow flexibility in grant application process:**

To foster more inclusive, equitable, and impactful conservation initiatives, it is critical that the grant application process is designed with flexibility and accessibility in mind. Rigid deadlines, complex application procedures, and language barriers can unintentionally exclude local organizations, practitioners, and community groups — especially in the Global South — who may lack the institutional support or time capacity to navigate standard grant protocols.

Grant programs should explicitly accommodate the realities of community engagement and on-the-ground project development. This includes allowing flexible or rolling deadlines, especially for applicants working in remote or underserved regions where connectivity or staffing may be limited. It also means recognizing that practitioners need protected time to consult with communities, co-design initiatives, and develop proposals that are both locally relevant and technically sound.

To further enhance accessibility, funders should accept applications in multiple languages and provide clear, jargon-free guidance materials. Translation services or bilingual application platforms can significantly lower entry barriers for non-English-speaking applicants and expand participation from a more diverse set of actors, including Indigenous peoples, grassroots organizations, and small NGOs.

Application processes could also, when possible, allow for varying formats and levels of formality — such as video pitches, concept notes, or community letters of support — rather than relying solely on lengthy, text-heavy proposals. This opens space for creativity, lived experience, and storytelling, while better capturing the value of non-academic knowledge.

Challenge 3: Insufficient grantsmanship

Effective grant writing — commonly referred to as "grantsmanship" — is a crucial skill for securing the financial resources needed to support long-term conservation initiatives. However, writing competitive proposals requires a wide-ranging skill set that includes distilling complex ideas for diverse audiences, articulating clear and measurable goals, crafting compelling narratives, developing sound budgets, and aligning projects with funders' priorities. These competencies are rarely intuitive and often require specific training, mentorship, and practice.

For many conservation practitioners in the Global South, these challenges are compounded by systemic barriers such as limited access to mentorship, institutional support, and professional development opportunities. One of the most significant hurdles is language — many major international grants require proposals to be submitted in English, which is not the first language for a large number of practitioners and researchers. This linguistic barrier can hinder not only the clarity and persuasiveness of applications, but also the confidence of applicants, making it difficult for otherwise strong projects to secure funding.

Addressing this gap is essential to achieving equitable participation in the global conservation funding landscape. Targeted investments in grantsmanship training — especially programs tailored to non-native English speakers — can help level the playing field. These may include writing workshops, peer-review support networks, one-on-one mentorship programs, access to grant-writing consultants, and collaborative platforms where experienced and early-career professionals can co-develop proposals. Funders also have a role to play in promoting equitable access. Simplifying application procedures, accepting proposals in multiple languages, and offering pre-application guidance sessions can significantly broaden the pool of qualified applicants. Additionally, establishing regional hubs or partnerships with local institutions can help provide long-term, culturally relevant support for grant-seekers.

Some recommendations include:

- **Provide training in basic finance, accounting, and grantsmanship:**

To ensure that conservation initiatives are both effective and sustainable, it is essential to equip local communities and practitioners with foundational training in finance, accounting, and grantsmanship. These skills form the backbone of successful project management, enabling local actors not only to apply for funding but also to manage resources transparently, report accurately to donors, and make informed financial decisions that support long-term goals.

Too often, community-based organizations and grassroots initiatives are excluded from major funding opportunities due to a lack of formal financial literacy or experience with grant application processes. This creates a cycle of dependency on external partners and undermines local ownership. By building local capacity in budgeting, expense tracking, financial reporting, and proposal development, communities can take the lead in securing and managing their own funding, increasing both project autonomy and sustainability.

Training should be practical, context-specific, and accessible — offered in local languages and tailored to varying levels of experience. It should also go beyond one-off workshops, incorporating follow-up mentoring, peer learning, and opportunities to apply skills in real-time proposal development or financial planning exercises. Whenever possible, training should include both community representatives and local practitioners, ensuring that knowledge is embedded across organizational levels and roles.

This investment in financial and grantsmanship skills does more than strengthen individual projects — it builds a pipeline of locally rooted professionals who can confidently navigate donor landscapes, engage with policy processes, and contribute to long-term institutional development. In doing so, it helps shift the conservation funding model toward one that is more equitable, resilient, and grounded in local leadership.

– The UNEP Coordinating Body of the Seas of East Asia (COBSEA) provides grantsmanship training and support for scientists and practitioners in the Southeast Asia region.

- **Offer coaching clinics for grants:**

To improve the quality and competitiveness of funding proposals, it is vital to organize targeted coaching clinics that support practitioners, researchers, and community-based organizations throughout the grant-writing process. These clinics serve as practical, hands-on spaces where participants can receive tailored guidance, build confidence, and develop concrete proposals aligned with both community priorities and funder expectations.

Unlike one-time workshops, coaching clinics provide ongoing, iterative support — offering structured feedback, real-time writing assistance, and expert advice on crafting compelling narratives, defining measurable objectives, designing logical frameworks, and developing accurate budgets. They also help demystify the grant process by walking participants through common pitfalls, donor expectations, and review criteria.

To maximize accessibility and impact, clinics should be offered in local or regional languages where possible and include flexible formats — such as in-person sessions, virtual group meetings, and one-on-one mentorship. Clinics can be especially effective when timed to align with upcoming funding deadlines, enabling participants to work on live proposals with direct application.

Bringing together experienced proposal writers, former reviewers, funders, and peer mentors fosters a supportive learning environment that builds lasting skills. Clinics can also create opportunities for collaboration across organizations and disciplines, allowing participants to share knowledge, develop joint proposals, and strengthen regional conservation networks. By institutionalizing coaching clinics as part of a broader capacity strengthening strategy, funders and partners can help ensure that strong, community-driven ideas are not left unfunded due to technical weaknesses in applications.

– The Student and Early Career Chapter (SECC) of ICRS regularly hosts virtual webinars on this topic.

Credits: Cinzia Osele Bismarck / Ocean Image Bank

Credits: Renata Romeo / Ocean Image Bank

- **Organize workshops/webinars on navigating the proposal process and writing competitive proposals:**

Hosting targeted workshops and webinars is a powerful way to build the capacity of local stakeholders, practitioners, and community-based organizations to successfully navigate the often complex landscape of grant funding. These sessions should go beyond theory and provide step-by-step, practical guidance on the full proposal development cycle — from identifying appropriate funding opportunities and understanding donor priorities, to crafting compelling narratives, structuring logical frameworks, and developing accurate budgets.

To be most effective, workshops should be tailored to the experience level of participants and adapted to local contexts. This includes offering sessions in local or regional languages, using real-world examples from successful proposals, and addressing common challenges faced by under-resourced applicants in the Global South. Hands-on exercises — such as drafting problem statements, aligning objectives with funder goals, or peer-reviewing proposal drafts — help reinforce key skills and build confidence.

Webinars can complement in-person workshops by expanding reach and allowing for ongoing engagement, especially in remote or geographically dispersed regions. They also provide a platform to bring in global experts, experienced grantees, and funders to share insights, expectations, and lessons learned. Recordings and supporting materials (e.g., templates, checklists, and glossaries) can be archived in an open-access knowledge hub for continued reference.

- **Establish departments in funding agencies/universities to help with proposal writing:**

To build long-term capacity and increase the success rate of funding applications — particularly from underrepresented regions and early-career professionals — it is essential to institutionalize support for proposal writing within universities, research institutions, and funding agencies. Establishing dedicated units or departments focused on grant development can provide sustained, high-quality assistance to researchers, practitioners, and community partners navigating the proposal process.

These units should offer a comprehensive suite of services, including training in grantsmanship, one-on-one coaching, proposal review, budgeting guidance, translation support, and up-to-date information on funding opportunities. By providing these resources internally, institutions can lower barriers to entry, promote equity, and ensure that promising ideas are not overlooked due to a lack of proposal-writing experience or language barriers. Importantly, these units should be staffed by professionals with expertise not only in technical writing and finance, but also in cross-cultural communication and participatory development.

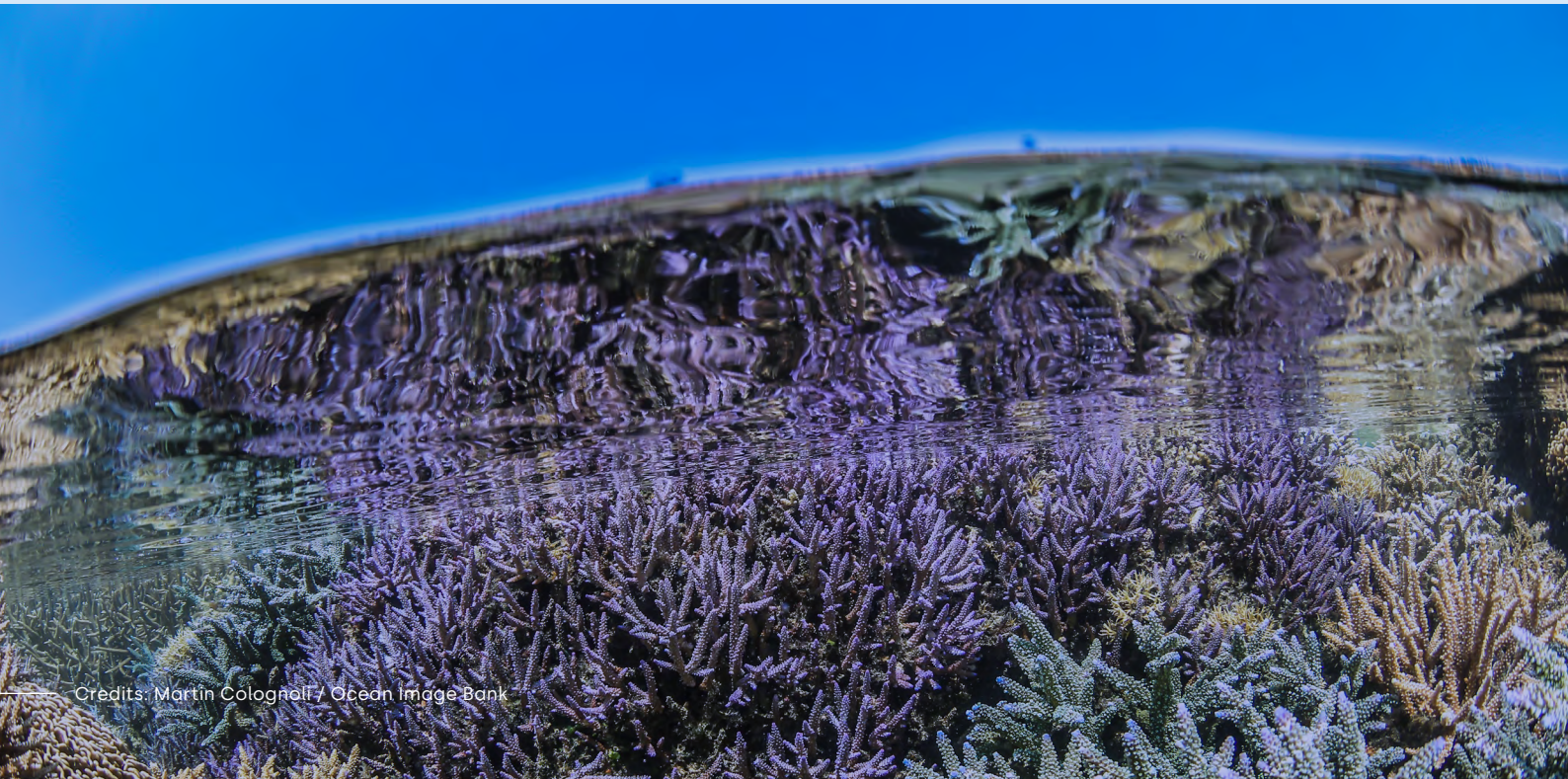
- **Accept proposals written in different languages:**

Encourage funders to accept proposals in multiple languages, ensuring accessibility and inclusivity for non-English speakers, especially in under-represented communities. Language can be a significant barrier for scientists in the Global South, particularly when English, the dominant language of science, limits access to research, training, and funding. To promote greater inclusivity, it is essential to encourage the use of local languages for abstracts, training materials, and grant writing whenever possible. Providing the option for these materials to be presented in other languages ensures that scientists in non-English-speaking regions can participate fully in the global conservation dialogue. This approach helps remove language barriers, allowing local researchers to communicate their findings effectively, access training, and more equitably secure funding. By fostering multilingualism in scientific communication, we can create a more equitable and accessible platform for scientists worldwide, ensuring that expertise from the Global South is not overlooked and can contribute to meaningful, locally-driven conservation efforts.

- **Provide mentorship to revise proposals before submission:**

Establishing structured mentorship programs to support proposal refinement is a powerful way to enhance the quality and competitiveness of grant applications, particularly for early-career researchers, practitioners, and community organizations. Leveraging existing networks — such as ICRS, CRC, and regional conservation alliances — can facilitate access to experienced mentors and create a supportive environment for skill development and peer learning. These mentorship programs should connect applicants with seasoned professionals who can provide critical feedback on drafts, help align proposals with funder expectations, and offer strategic advice on structure, language, and technical content. This process not only improves proposal quality but also builds applicants' confidence and capacity for future submissions.

– ICRS currently has a mentorship program that could be leveraged towards achieving this goal.



Credits: Martin Colognoli / Ocean Image Bank

Credits: Anett Szaszi / Ocean Image Bank

3. Success stories

Case study 1

An innovative, science-based approach for scalable, community-driven coral reef restoration

By REEFolution Trust, Kenya

The REEFolution Trust is pioneering a transformative approach to coral reef restoration by integrating science, innovation, capacity development and local community engagement. Through its structured four-pillar blueprint, the organization not only enhances marine biodiversity but also empowers coastal communities by enhancing ocean literacy and sustainable livelihood opportunities (CS1: Figure 1). This case study explores REEFolution's comprehensive framework that combines conservation efforts with socioeconomic development.

CS1: Figure 1. REEFolution Trust coral scientists ("Reef Rangers") discussing the importance of coral reefs to villagers of Shimoni, Kenya.

Pillar 1: Coral restoration

At the heart of REEFolution's mission is large-scale coral restoration (CS1: Figure 2). Utilizing the coral gardening technique, the organization cultivates coral fragments in nurseries before out-planting them onto artificial reef structures. On average, REEFolution propagates and transplants over 10,000 coral fragments annually within a 0.5-hectare community-managed restoration area. To enhance structural complexity and maximize habitat restoration, REEFolution has tested various artificial reef designs. While the initiative has achieved significant success in reef rehabilitation, challenges such as coral bleaching events continue to pose threats. Nevertheless, the organization remains committed to researching adaptive strategies to mitigate the impacts of climate change on coral restoration.

CS1: Figure 2. Acroporid corals growing on a metallic frame in REEFolution Trust's coral nursery (Shimoni, Kenya).

Pillar 2: The Reef Ranger Program

A cornerstone of REEFolution's success is the Reef Ranger Program, which equips local community members and students from local Kenyan universities with extensive training in coral reef restoration (CS1: Figure 3). Participants gain knowledge in coral biology, ecosystem services, and marine conservation education along with species identification for both benthic and fish populations. The program also covers essential skills such as swimming, snorkelling, free diving, and PADI Open Water certification, along with specialized training in restoration techniques. It also includes hands-on experience in coral restoration, both on land and in the open ocean. Graduates of the program are employed as full-time Reef Rangers, ensuring a direct livelihood pathway while simultaneously alleviating human pressures on the reef. By engaging local communities in conservation efforts, REEFolution fosters a sense of ownership and responsibility towards marine resources, ensuring long-term sustainability of restoration efforts.

Credits: Ewout Geerten Knoester

CS1: Figure 3. Two Reef Rangers recently trained by REEFolution Trust's coral reef scientists to propagate adult corals in a local coral nursery in Southern Kenya.

Pillar 3: Research and development

REEFolution employs a collaborative research approach, working closely with Wageningen University and local institutions to advance ecological and social science research. Studies focus on the effectiveness of restoration techniques, coral resilience, and cost-effective methodologies for scaling up restoration efforts. These insights help refine restoration techniques and inform broader conservation policies.

Pillar 4: Education and awareness

Recognizing the importance of ocean literacy, REEFolution has implemented an education program targeting school children and community members (CS1: Figure 4). The program is designed to foster an early appreciation for marine ecosystems and the need for conservation. Schools in coastal regions benefit from tailored conservation education curricula, equipping young learners with knowledge about marine biodiversity, sustainable practices, and the ecological significance of critical coastal ecosystems.

In addition to schools, REEFolution engages with local tour operators and ocean users to promote sustainable marine tourism and responsible ocean stewardship. By integrating environmental education into the broader community, the program ensures a long-lasting cultural shift towards marine conservation.

CS1: Figure 4. REEFolution Trust volunteers (left) explaining their budget-friendly coral reef restoration approaches to local women of Shimoni, Kenya.

Impact and future prospects

By integrating scientific research with community-driven conservation efforts (CS1: Figure 5), REEFolution Trust has demonstrated a scalable and sustainable model for coral reef restoration. The initiative has not only rehabilitated degraded reef ecosystems but also provided employment, education, and long-term resilience for coastal communities. Moving forward, REEFolution aims to expand its restoration sites, enhance adaptive techniques to counteract climate-induced stressors, and continue strengthening community involvement in marine conservation. By fostering an inclusive and science-based approach, REEFolution Trust is setting a benchmark for coral restoration efforts worldwide, ensuring a healthier and more resilient future for marine ecosystems and the communities that depend on them.

CS1: Figure 5. Villagers of Shimoni, Kenya partaking in active coralp reef restoration.

Case study 2

Effectively engaging coastal communities in coral reef conservation and restoration

By Kenya Marine and Fisheries Research Institute, Kenya

Kenya Marine and Fisheries Research Institute (KMFRI) has partnered with The Nature Conservancy (TNC-Africa), the North Rangeland Trust (NRT), Kenya Wildlife Service, Coastal County governments, Kenya Fisheries Service (KeFS), and local community groups (CS2: Figure 1) to establish community-led coral reef restoration projects along the Kenyan coast. This community-led approach actively engages coastal communities in coral reef restoration activities, recognizing that the people who depend on coral reefs for their livelihoods are best positioned to contribute to and sustain restoration efforts.

Community-driven coral reef restoration in Kenya integrates local knowledge, training, and gender and youth inclusive participation. Local communities identify degraded reefs, set restoration objectives, establish nurseries, transplant and monitor corals.

CS2: Figure 1. Dr. Juliet Karisa (near-center in blue) along with local scientists, stakeholders, and concerned citizens who have taken an active role in conservation and restoration of reefs along Kenya's Swahili Coast.

So far, KMFRI and its partners have successfully initiated and established three coral reef restoration projects using this approach. Each project emphasizes gender and youth representation, ensuring that both local women (CS2: Figure 2) and men, as well as early-career scientists, play a crucial role in restoration efforts. By integrating diverse voices and expertise, these initiatives promote inclusivity, sustainability, and long-term impact.

CS2: Figure 2. A local woman from a Western Indian Ocean village prepares to deploy artificial structures in a local coral nursery.

Demonstrating community-led coral reef restoration process in Kenya

Community-led coral reef restoration initiatives typically begin when a local community group formally requests technical support and guidance to implement restoration activities. These initiatives are often carried out within marine closures, designated conservation zones established within community-managed resource use areas.

Restoration efforts within these closures play a crucial role in facilitating and accelerating ecological recovery by enhancing coral cover and overall reef resilience. The process prioritizes community involvement to ensure long-term stewardship and sustainability of restored reef ecosystems.

Community engagement and sensitization

Once a request for technical assistance is received, KMFRI, in collaboration with partner organizations, conducts targeted education and awareness sessions within the community. These sessions aim to enhance understanding of coral reef restoration, emphasizing that restoration should be considered a last resort in marine ecosystem management. The sensitization process ensures that community members comprehend the primary threats to coral reefs, such as destructive fishing practices, climate change, and pollution, providing an informed approach to conservation interventions.

Capacity development and training

Increasing capacity among local stakeholders is essential for the long-term success of coral reef restoration efforts. Training programs incorporate a blend of in-person village-level awareness meetings and online learning modules. Participants are carefully selected based on their ability to engage in both digital and hands-on training environments. The curriculum covers critical aspects of coral reef restoration, including site selection, restoration methodologies, monitoring techniques, and best practices.

To date, we have trained more than 100 community members including local communities, marine scientists, and conservation practitioners, in coral reef restoration techniques (CS2-Figure 3).

These training sessions have also facilitated the identification of resource use patterns within co-management areas and assessed stakeholder influence on marine resource governance. Participants were drawn from key community groups in north and southern parts of Kenya, including Members of Beach Management Units (BMUs), government agencies like Fisheries Department and Kenya Wildlife Service Wardens and Rangers, NGO employees, and others.

CS2: Figure 3. Villagers of coastal Kenya preparing to survey local coral reefs and, when necessary, propagate corals as part of local coral reef restoration efforts led by KMFRI.

Online training sessions

So far, we have been using training materials from TNC's Reef Resilience Network. A targeted online training program was developed for regional coral reef restoration practitioners, focusing on planning and best practices. The training equipped participants with knowledge of standardized restoration protocols and best practices, ensuring alignment with global reef restoration strategies.

A key outcome was the development of a structured reef restoration plan to guide ongoing and future restoration efforts within locally managed marine areas. Certification in restoration protocols was awarded, further enhancing regional expertise and promoting collaborative restoration networks across the Western Indian Ocean region.

Baseline assessments

We supported local communities in Lamu to conduct extensive coral reef surveys to establish baseline information and have consensus on the state of reefs (CS2: Figure 4), and did a prioritization of sites for restoration. We identified key reef sites with high hard coral cover, including Iweni (41%), Shimo La Tewa (34%), Muhindi (27%), Sagafu, and Kitwani (24%). Among these, Iweni stood out with the highest coral recruit density, over 1.800 recruits per 100 m², while Shimo La Tewa recorded the highest number of large coral colonies at 124 per 100 m². In parallel, we conducted fish abundance and diversity assessments, recording 96 fish species from 25 families.

After analysis, we selected nine coral taxa for restoration based on availability and ease of transplantation. These included *Porites rus*, *Pocillopora* spp., *Acropora* spp., *Galaxea* spp., branching *Porites* spp., massive *Porites* sp., *Platygyra* spp., *Echinopora* spp., and *Favites* spp. To support restoration, we adopted two main methods: (i) nursery beds for transplantation onto artificial and natural substrates and (ii) direct transplantation of coral fragments onto natural substrate. Mid-water table nurseries and tree nurseries were set up, while rectangular concrete blocks were deployed to attract fish and cylindrical structures designed to attract lobsters.

Credits: Juliet Karisa

CS2: Figure 4. Community members of Lamu, Kenya constructing budget-friendly structures for deployment in local coral nurseries.

With the plan in place, we proceeded to construct and deploy cost-effective artificial structures (CS2: Figure 5). Over 17 days, longer than our initial 10-day estimate due to labor-intensive activities, we successfully deployed 12 table nurseries, 3 tree nurseries, 16 rectangular concrete blocks, and 16 cylindrical concrete units, all providing critical habitats for corals, fish, and lobsters. Once the structures were in place, we stocked 719 coral fragments sourced from donor sites like Iweni. The composition included *Acropora* (27%), branching *Porites* (40%), *Pocillopora* spp. (9%), *Porites rus* (10%), massive *Porites* spp. (5%), *Galaxea* spp. (7%), *Platygyra* spp. (1%), *Echinopora* spp. (2%), and *Favites* spp. (0.2%). These fragments were placed in nurseries, artificial structures, and natural substratum, ensuring a diverse and resilient foundation for coral regrowth.


Credits: Juliet Karisa

CS2: Figure 5. A KMFRI-trained Kenyan villager assisting in local coral reef monitoring, conservation, and restoration efforts.

Throughout this process, we worked closely with local fishers and community members, relying on their deep knowledge to identify degraded reefs in urgent need of restoration. Women played a crucial role in this phase, bringing unique ecological perspectives. We established a monitoring team of local community members (CS2: Figure 6) and KMFRI staff to support monitoring activities to ensure long-term impact.

Looking ahead, we are working to scale-up restoration efforts and integrate them into local livelihoods and establish a skill-base of restoration experts.

By recognizing and amplifying the contributions of women and youth, we are laying the foundation for a more sustainable and inclusive marine conservation movement, one that empowers coastal communities to protect their reefs for generations to come.

Credits: Juliet Karisa

CS2: Figure 6. A KMFRI-trained Kenyan villager assisting in local coral reef monitoring, conservation, and restoration efforts.

Case study 3

Leveraging research expeditions to educate communities of small-island developing state (SIDS) on the importance of coral reefs

By Khaled bin Sultan Living Oceans Foundation, USA/Fiji

The Khaled bin Sultan Living Oceans Foundation (KSLOF) has made significant strides in education and capacity development in Fiji through its Global Reef Expedition (GRE) and ongoing projects. During the GRE mission to Fiji's Lau Province, KSLOF reached over 1,460 students and community members across ten islands with coral reef education seminars delivered in both English and Fijian. While on the GRE, KSLOF recognized a critical need for coral reef education at the community level, especially across generations, to build a deeper understanding of marine ecosystems and strengthen long-term conservation efforts. These seminars not only raised awareness of reef ecology but also sparked tangible action among students and reinforced the importance of intergenerational knowledge sharing (CS3: Figures 1-2).

CS3: Figure 1. KSLOF education coordinator Amy Heemsoth (standing in white shirt) working alongside three Fijian marine biologists (also in white shorts) to educate local villages on coral reef biology, value, and even more advanced topics like survey methodology and data collection.

More recently, in the Beqa Lagoon Seascape, KSLOF has been advancing coral reef monitoring while also growing local capacity by equipping community members with the skills and tools needed to conduct scientific assessments themselves. In partnership with the Pacific Blue Foundation, KSLOF is supporting a Fijian-led pilot study in Rukua Village using CoralNet, a machine-learning tool for analyzing coral imagery that was, in fact, trained in part by the enormous quantity of coral reef benthic imagery collected during the GRE. This work is helping develop cost-effective, scalable reef monitoring protocols for locally managed marine areas (tabu), while empowering local stakeholders to take ownership of their conservation efforts. These initiatives are part of KSLOF's Science Without Borders®: Conserving the Tropics program, aligning with SDG 14 and the UN Ocean Decade to help small island communities sustainably manage and protect their marine resources.

CS3: Figure 2. KSLOF education coordinator Amy Heemsoth teaching students of Fiji's Lau Province about coral reefs, which are vital to their livelihood.

Case study 4

Restoration and protection of Vaan Island

Gulf of Mannar, India

Vaan Island, one of the most ecologically significant islands in the Gulf of Mannar Biosphere Reserve on India's southeast coast, is a low-lying coral reef island shaped by dynamic coastal and oceanographic processes (CS4: Figure 1). Historically stabilized by its protective fringing reef, the island's integrity was severely compromised by extensive coral mining during the 1960s and 1970s.

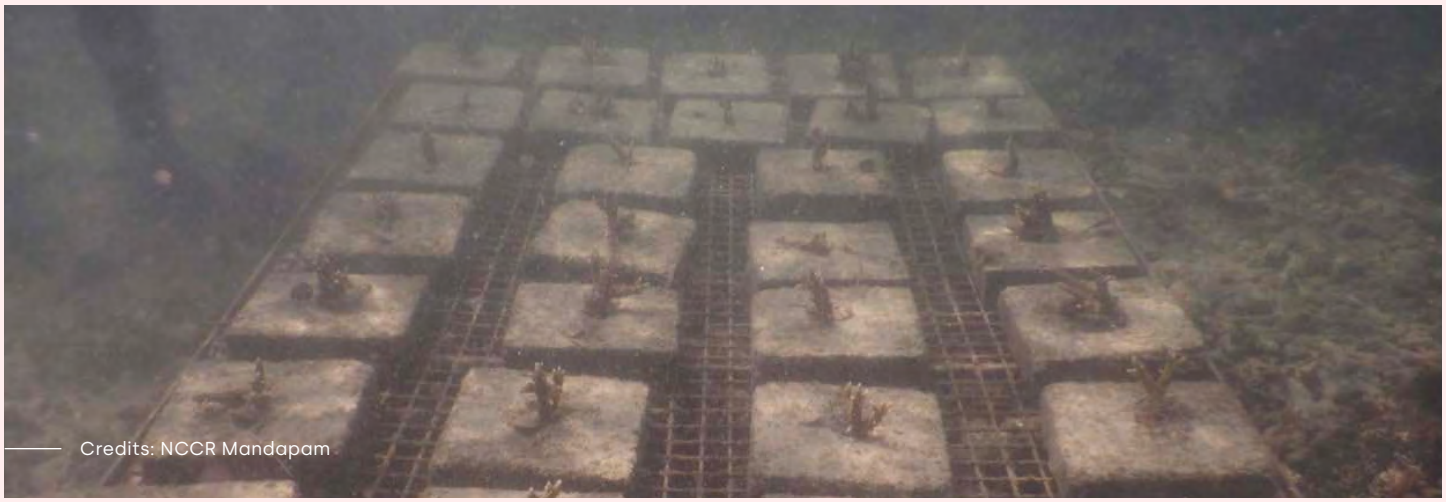
This unsustainable extraction weakened the reef structure, disrupted sediment dynamics, and accelerated erosion, leading to a dramatic decline in the island's area from 20.08 hectares in 1969 to just 2.33 hectares at low tide and 1.53 hectares at high tide by 2015.

Credits: Ramesh Ramachandran

CS4: Figure 1. Aerial view of Vaan Island, Gulf of Mannar, India.

To counteract the risk of submergence and restore ecosystem functionality, the Government of India, through the National Adaptation Fund for Climate Change (NAFCC), and the Government of Tamil Nadu, under the State Coastal Zone Development Fund, implemented a large-scale ecosystem-based coastal adaptation project between 2015 and 2019.

As part of this initiative, 10,600 multipurpose artificial around the island to attenuate wave energy, stabilize sediments, and promote ecological regeneration. Post-deployment monitoring revealed measurable ecological and geomorphological recovery, with the island's area expanding from 2.33 to 3.0 hectares at low tide, bathymetric surveys indicating a rise in bottom elevation on the northwest flank as depths decreased from 2.5 m to 0.5 m, and artificial reef structures rapidly colonized by epibenthic organisms, including hard corals (CS4: Figure 2).



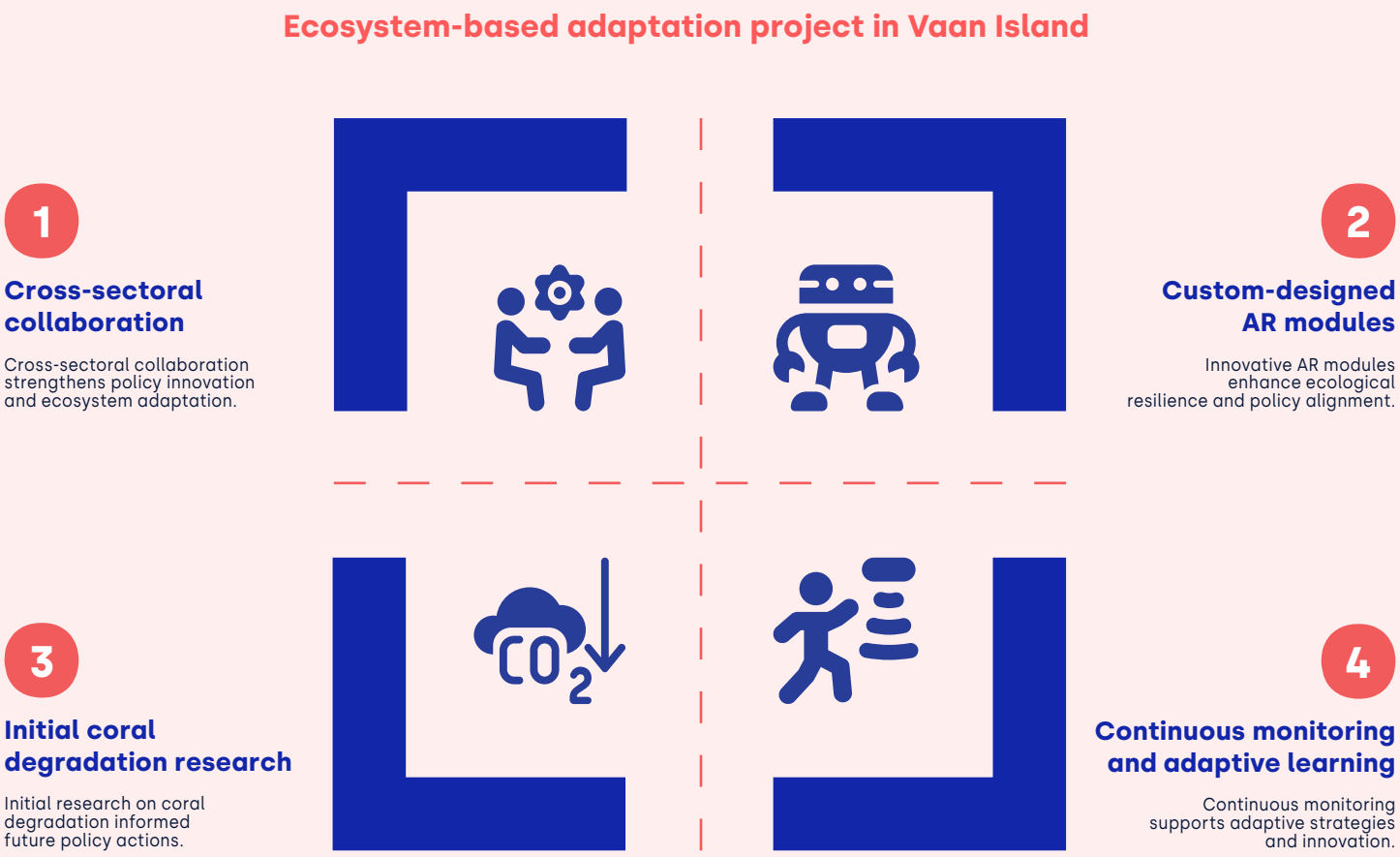
CS4: Figure 2. Scleractinian corals growing on artificial structures deployed around Vann Island (Gulf of Mannar, India). Credits: NCCR Mandapam.

This regeneration process facilitated the establishment of coral refugia, with 37 coral species from 16 genera recorded on the modules, while fish biomass and diversity increased, benefiting small-scale artisanal fishers and enhancing coastal food security. Additionally, seagrass restoration was undertaken to support the recovery of the broader ecosystem (CS4: Figure 3).

CS4: Figure 3. Scientists sort seagrass before transplanting it to the reef.

The success of this project stems from a major barrier identified during the CORDAP workshop: the difficulty in translating science into policy and action; at Van Island, marine scientists from the Suganthi Devadason Marine Research Institute (SDMRI) provided empirical evidence of coral degradation that directly shaped intervention strategies and catalyzed climate-financed action at both national and state levels. It also exemplifies engineering innovation and nature-based solutions through the design and deployment of artificial reef modules that enhance wave attenuation, sediment accretion, and coral colonization in high-energy reef environments. Continuous post-deployment monitoring has tracked ecological and geomorphological recovery, supporting an adaptive learning approach that aligns with the roadmap's call for long-term monitoring and restoration strategies. Institutional collaboration played a crucial role, with cross-sectoral partnerships between scientific institutions, state agencies, and national climate finance mechanisms reinforcing policy innovation in ecosystem-based adaptation and strengthening national climate resilience frameworks.

Although direct community engagement was limited due to legal protections restricting fishing around the island, the project generated broader socioeconomic benefits by increasing fish biomass in surrounding waters, supporting artisanal fishers, and enhancing coastal resilience by strengthening the island's function as a natural storm buffer. The Vaan Island project ultimately presents a systems-level, government-led coral restoration model (CS4: Figure 4) rooted in scientific research, supported by engineering innovation, and embedded within national climate adaptation frameworks. It stands as a compelling example of climate-resilient coral reef restoration with significant potential for scaling integrated interventions globally.



CS4: Figure 4. An effective, integrative, cross-sectoral model for adaptive coral reef conservation and restoration. Credits: Ramesh Ramachandran.

Case study 5

Private sector leadership in marine conservation: innovation, responsibility, and community Impact

By Rockland Distilleries, Sri Lanka

Engaging the private sector in marine conservation is essential for scaling up restoration efforts, driving innovation, and ensuring long-term sustainability. Businesses have the resources, influence, and capacity to implement large-scale solutions, making their involvement a crucial complement to government and community-led initiatives. Rockland Distilleries (RDL) and their collaborating volunteer organisations (Earthlanka Youth Network and Young Biologists' Association) exemplifies how corporate responsibility can translate into meaningful environmental action, tackling pollution, enhancing ecosystem resilience, and fostering community engagement. RDL has actively contributed to the achievement of Sustainable Development Goal 14: Life Below Water, with a particular focus on Targets 14.1, 14.2, 14.5, 14.7, 14.8, and 14.A, addressing marine pollution, ecosystem management, conservation of coastal and marine areas, sustainable marine resource use, capacity-building and support for scientific research.

RDL has taken significant steps to reduce marine pollution, particularly by addressing ghost nets and non-biodegradable waste along Sri Lanka's coastlines. These targeted cleanup efforts (CS5: Figure 1) not only prevent direct harm to marine life but also contribute to broader ecological restoration.

Credits: Palinda Perera

CS5: Figure 1. Volunteers help collect debris at the beach in Sri Lanka, in a project facilitated by RDL.

Beyond pollution control, the company also invested in engineering solutions such as artificial reef installations, reef health assessments and coral restoration projects (CS5: Figure 2), demonstrating how private sector innovation can support ecosystem recovery. While challenges such as invasive species (Perera and Gamage, 2025), environmental disruptions and theft have impacted some efforts, RDL's adaptive approach highlights the importance of long-term monitoring and flexibility in conservation work. Members of RDL, in collaboration with the Marine Environment Protection Authority (MEPA) Sri Lanka, contributed to the revision of the National Oil Spill Contingency Plan (NOSCOP), expanding it into the National Oil and Hazardous and Noxious Substances Spill Contingency Plan (NOHSCP). This revision aims to enhance national preparedness and response mechanisms to mitigate the impacts of maritime accidents (such as the MV X-Press Pearl Ship accident) on Sri Lanka's marine ecosystems.

CS5: Figure 2. Volunteers help collect debris at the beach in Sri Lanka, in a project facilitated by RDL. Photo Credit: Palinda Perera.

Education and community involvement are also central to RDL's initiatives. By integrating ocean literacy programs and collaborating with fishing communities, the company fosters greater awareness and long-term stewardship of marine resources. Its advocacy for Extended Producer Responsibility (EPR) and Extended Consumer Responsibility (ECR) further highlights the role businesses can play in driving systemic change and promoting sustainable practices

These efforts illustrate the immense potential of private sector engagement in marine conservation. By leveraging scientific research, technological innovation, and community collaboration (CS5-Photo 3), businesses can play a pivotal role in protecting and restoring ocean ecosystems. Strengthening partnerships between conservation organizations, governments, and the private sector will be key to achieving lasting, large-scale environmental impact.

CS5: Figure 3. RDL facilitating local volunteer divers to remove Abandoned Lost or otherwise Discarded Fishing Gear (ALDFG) fromp reef habitats.

4. Plan of action for agencies and organizations

While this roadmap includes a range of recommendations to address the key challenges identified during the workshop, certain actions must be led by funding agencies and implementing organizations. These actions have the potential to create transformative and lasting change across coral reef conservation and restoration efforts in the Global South.

We propose grouping these recommendations into three broad categories: Funding, Platforms, and Training.

Funding

Agencies and organizations should adopt more inclusive and sustainable funding models by:

- **Establishing grants for exchange and internship programs**

Support professional development through international exchanges and internships to build regional expertise and foster collaboration.

- **Funding infrastructure and technology acquisition**

Create dedicated grant mechanisms to support the development of local facilities and the procurement of essential research and restoration technologies.

- **Supporting science communication and marketing**

Allow science communication costs to be integrated into broader project budgets, or develop dedicated grant lines for communication and outreach.

- **Allocating funding for long-term monitoring and baseline data collection**

Provide sustained funding streams to support long-term ecological monitoring and the development of robust baseline datasets, which are essential for measuring restoration success.

- **Developing comprehensive leadership programs**

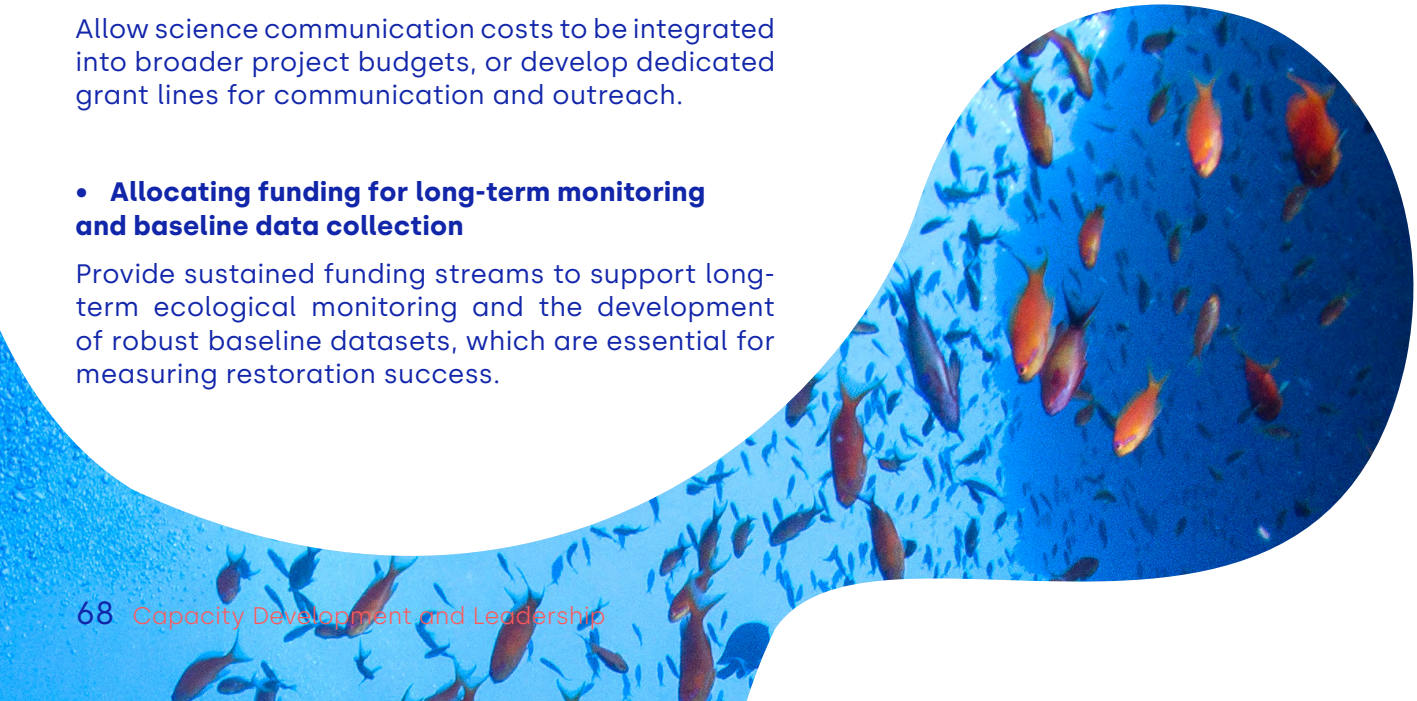
Fund multi-modal leadership programs that combine virtual and in-person components to build local champions equipped to lead coral conservation initiatives.

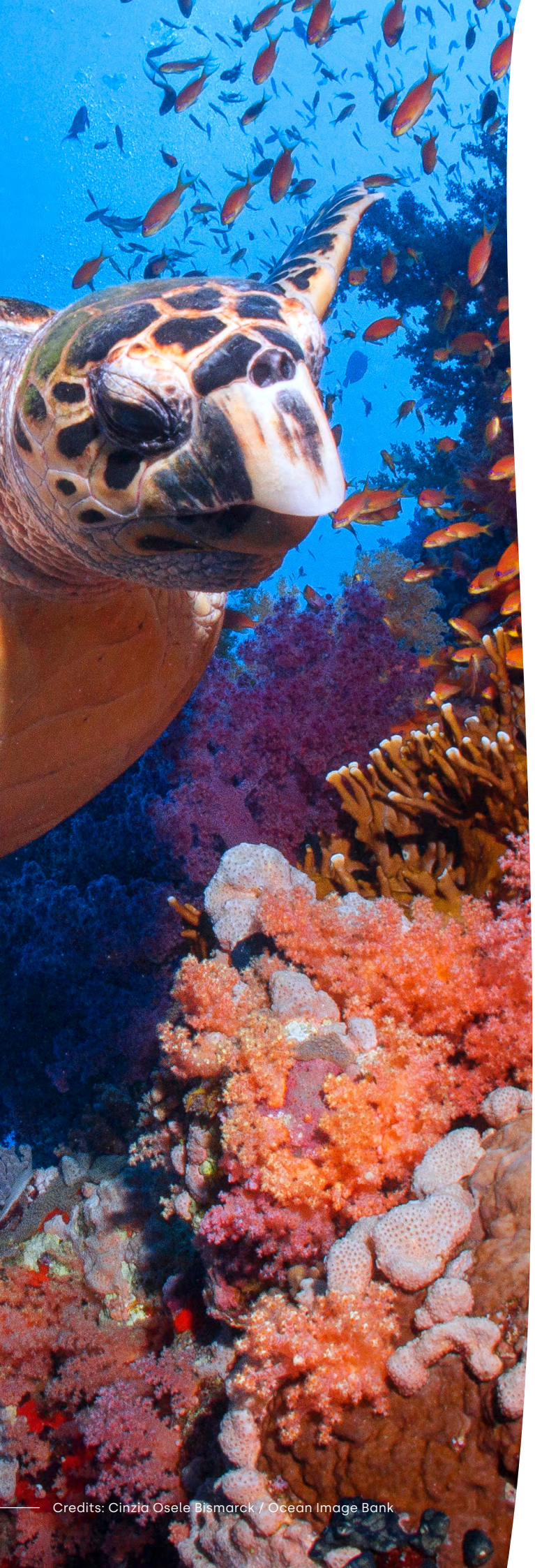
- **Including publication costs in grant budgets**

Ensure that open-access publication fees are eligible expenses to promote wider dissemination of research findings.

- **Accepting grant applications in multiple languages**

Increase inclusivity and accessibility by allowing submissions in multiple languages and recruiting a diverse pool of reviewers to evaluate proposals fairly.





Credits: Cinzia Osele Bismarck / Ocean Image Bank

Platform

To support ongoing learning, knowledge sharing, and coordination:

- **Establish a centralized learning and collaboration platform**

Create a comprehensive digital hub that provides:

– Free, certified training programs (see Box 2)

– Educational materials and case studies

– A shared data repository

– Listings of open funding opportunities

– Virtual mentorship programs

– Community fora for sharing best practices and challenges

This platform would foster a culture of peer learning and collaboration while bridging information gaps across regions.

Training

Strengthening the skills and knowledge base of individuals and institutions through:

- **Grantsmanship training programs**

Offer tailored courses by career stage and grant type, and create mentorship opportunities that connect past grantees with new applicants.

- **Project management training**

Provide courses on strategic planning, budgeting, financial management, resource mobilization, and engagement with donors and private sector partners (see Case Study #5: Success Stories).

- **Webinars on policy engagement**

Offer practical training on how to communicate with policymakers, prepare briefings, and tailor messages for different decision-making audiences.

- **Science communication and marketing training**

Deliver short courses or webinars focused on how to effectively communicate scientific results to diverse audiences, including the public, funders, and media.

5. Summary table of recommendations

Note that in the right-most column, we have only chosen representative organizations; this is not meant to be an exhaustive list, nor should it be construed as a formal endorsement of any agency listed.

Priority area	Challenge	Recommendations	Example of organizations working on this
Human capacity development	Standardized training and accreditation	• Standardized certification • Establish regional standards and support career growth • Create a unified platform for capacity building	– Global Coral Conservation and Restoration Practitioner Training Academy (Box 2) – RRN and TNC: Certification for coral reef managers – MAR-RRN: Region-specific restoration strategies & training – CRC and CRF: Centralized web platform for coral restoration resources – Coral Sea Foundation has tutorials and training resources – WIOMSA provides grants and training
	Ocean literacy across sectors, stakeholders, and local communities	• Support regional educational initiatives • Facilitate stakeholder engagement • Prioritize communication strategy	– KSLOF: Coral reef biology and ecology educational modules – MAR-RRN: Trains young professionals in reef conservation – RRN and TNC: Online courses, webinars, and toolkits – Coral Sea Foundation trains communities in Micronesia and its website has tutorials and training resources – CRF: Dive/snorkel program for the public
	Personnel Training	• Establish mentorship programs • Foster the next generation of experts • Deliver targeted training • Create a collaborative knowledge hub	– ICRS Mentorship Program – Pew Marine Fellows: Mentorship & funding – RRN and TNC: Online training – UN Nippon Foundation Fellowship: Trains government officials & mid-level professionals

Priority area	Challenge	Recommendations	Example of organizations working on this
Integrative Collaborations	Growing technical capacity of local communities	• Identify and address training gaps • Promote community-driven conservation • Integrate local knowledge	– Restore with Resilience (Hawaii): Community coral restoration days – Laamaseelu Masveriyaa (Maldives): Fisher training & market access – CoralWatch, REEF, Reef Check, Eyes of the Reef, Pala Dalik: Citizen science for coral reef monitoring – LMMA Network: Community-led marine conservation across regions
	Translating science into information for communities	• Enhancing accessibility • Different languages • Community engagement • Digital outreach	– AGRRA & HRHP: Coral reef "report cards" for managers & officials – Ocean Agency, Coral Reef Alliance, NOAA: Infographics, videos, & report cards – RRN and TNC: Translated resources & training for reef managers – REEFolution & SECORE: "Coral Heroes" comic in Ki(swahili) – One People One Reef: Integrates traditional knowledge with marine sciencei in Micronesia
	Stakeholder involvement	• Map stakeholders' roles and responsibilities pre-during-, and post-project • Assess stakeholder expectations and motivations • Conduct an assessment of community training • Co-design the project with the community	– RRN and TNC: Stakeholder mapping training for marine management

Priority area	Challenge	Recommendations	Example of organizations working on this
Project managemet	Capacity to continue the project after the funding cycle has ended	• Create contingency plans to adapt to unexpected challenges • Establish sustainable finance mechanisms and support community enterprises • Develop business planning for local initiatives to ensure sustainability • Identify and empower local champions for long-term project sustainability	– Blue Finance Initiative: Sustainable finance for marine conservation – LMMA Network: Supports ecotourism and sustainable fisheries – Blue Ventures: Trains local leaders in marine management – Coral Sea Foundation: trains Indigenous women in Australia and Melanesia to create leaders
	Project planning	• Provide training on project management • Establish strategic planning for effective conservation	– RRN and TNC: Training on planning, MEL, and communication for reef resilience
	Integration of local communities	• Co-Design with communities from the start • Promote community education and active participation • Include salaries for trained community members and create alternative livelihood opportunities • Build capacity by offering training while valuing and incorporating traditional knowledge	– Living Oceans Foundation: Multilingual educational content for students – REEFolution: Community-driven restoration (see Success Stories-case study#1) – One People One Reef: Co-designs conservation with Micronesian communities

Priority area	Challenge	Recommendations	Example of organizations working on this
Facilities, tools, research, and innovation	Infrastructure	• Create mechanisms to fund infrastructure • Partner with other labs, agencies, and establish consortiums with other facilities • Develop manuals for locals to build low-cost, affordable field labs	– CORDAP: Funding ReefSeed (AIMS, Australia) and a mobile spawning lab from the University of Derby (UK)
	Access to technology and innovation	• Support networking, capacity development, and open-access • Facilitate access and sharing of technologies • Integrate technology in conservation projects • Encourage collaboration between facilities	– CORDAP, SECORE and CRC: Launching web portal for coral tech exchange (see Box 3.) – MERMAID: Platform for standardizing reef data collection – CORDAP: Supports open-access publication for funded projects
	Access to ecological baseline data	• Support funding for basic monitoring • Develop data-sharing guidelines • Implement citizen science projects to collect baseline information	– iNaturalist: Used for citizen science campaigns – PADI Project Aware: SCUBA industry ally in coral conservation – CoralWatch, REEF, Reef Check, Eyes of the Reef, Pala Dalik: Citizen science for coral health

Priority area	Challenge	Recommendations	Example of organizations working on this
Policy and Governance	Translating science into policy	• Establish two-way communication between scientists and policy-makers • Develop an effective communication strategy • Hire a dedicated facilitator for cross- sector communication • Produce policy briefs from research results	– ICRS Science-to-Policy: Provides recommendations for coral conservation policy AGRRA & HRHP: Reef report cards with accessible information for managers and officials
	Forging better scientist-government relationships	• Create opportunities for team-building and informal interactions • Establish formal platforms for discussions and idea exchange • Promote multi-disciplinary projects • Co-design projects with decision-makers • Include experts with policy and environmental experience and offer training opportunities • Hold regular meetings with government officials • Learn key portions of the overall government agenda • Develop a knowledge-sharing platform	– CRC and CRF: Developing a centralized web networking platform (late 2025 release) – AGRRA: Uses data dashboards to present complex data simply

Priority area	Challenge	Recommendations	Example of organizations working on this
Funding	Longevity of funds	• Develop a business model for sustainability • Tap into broader funding opportunities • Encourage private sector partnerships • Establish partnerships with established organizations • Develop national coral restoration frameworks	– GFCR: Invests in projects to develop sustainable business models for coral reefs
	Misalignment of grant goals with project needs	• Integrate multidisciplinary teams in project development • Co-design pre-proposal grants with the community • Ensure context-specific requirements for grants • Conduct baseline surveys to understand community needs • Release time for practitioners to focus on engagement • Allocate funds for science communication and marketing • Allow flexibility in grant application process	– GEF SGP: Supports local projects addressing environmental issues while improving livelihoods – CORDAP: Funds open-access publications & public outreach for project success stories – ICRS Science Communication Grant: Supports policy briefs, infographics, & media engagements
	Insufficient grantsmanship	• Provide training in basic finance, accounting, and grantsmanship • Offer coaching clinics for grants • Organize workshops on navigating the proposal process and writing competitive proposals • Establish departments in funding agencies to help with proposal writing • Accept proposals written in different languages • Provide mentorship to revise proposals before submission	– ICRS SECC: Webinars on proposal writing – ICRS Science Communication Grant: Grants for science communication

6. Broader considerations and conclusions

Building lasting capacity for coral restoration in the Global South requires sustained investment in local expertise, infrastructure, and inclusive knowledge-sharing networks. While external support and international collaborations play a vital role, long-term success depends on empowering local communities, researchers, and policymakers with the tools and resources needed to lead conservation efforts independently. This includes not only financial and technical support but also fostering an enabling environment where traditional and scientific knowledge are integrated, and decision-making is driven by those most directly affected by coral reef degradation. Strengthening regional networks and facilitating direct access to global scientific and policy platforms will ensure that restoration efforts are both context-specific and scalable.

Moving forward, it is critical to prioritize equitable partnerships that recognize and respect local leadership while fostering international cooperation. Training programs, mentorship initiatives, and innovative funding mechanisms should be designed to reduce dependency on short-term external aid and instead build self-sustaining restoration frameworks. By investing in local capacity, bridging knowledge gaps, and advocating for stronger policy integration, we can enhance the resilience of coral reef ecosystems and the communities that depend on them. This roadmap serves as a call to action for governments, research institutions, and conservation organizations to commit to a long-term vision that places local capacity-building at the center of coral restoration in the Global South

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