

INNOVATIVE APPROACHES FOR STRENGTHENING COASTAL AND OCEAN ADAPTATION: INTEGRATING TECHNOLOGY AND NATURE-BASED SOLUTIONS

International Union for Conservation of Nature (IUCN), the Friends of Ecosystem-based Adaptation (FEBA) Network, the United Nations Framework Convention on Climate Change (UNFCCC) Technology Executive Committee (TEC) and the UNFCCC Nairobi Work Programme (NWP) Expert Group on Oceans

THE JOINT POLICY BRIEF AND EVENT SERIES

To respond to knowledge gaps in implementing innovative adaptation strategies, the UNFCCC Technology Executive Committee (TEC), Nairobi Work Programme (NWP) Expert Group on Oceans, IUCN and Friends of Ecosystem-based Adaptation (FEBA) organized a series of events on integrated adaptation approaches in 2021 as part of 'Technology Day.' Panelists representing diverse expertise from civil society, financial institutions, the private sector, academia, together with national government representatives discussed innovative approaches to deploy, disseminate and scale up adaptation technologies in particular sectors to enhance the resilience of oceans and coastal ecosystems and communities to climate change. This event series explored, in sequence: i) Promoting, learning and examples of integrating both technology and nature for adaptation outcomes; ii) Opportunities for uptake and scaling; and iii) Policy integration, finance, and capacity building.

IUCN, FEBA, UNFCCC TEC and NWP are launching a policy brief at the upcoming Ocean and Climate Dialogue in June 2022 that is based on the outcomes of the joint event series. The policy brief will include the identification of a broad array of challenges and recommendations for improving upscaling of innovative adaptation approaches that integrate technology and nature-based solutions.

"Technology Day" Event Series	
6 September 2021 (IUCN World Conservation Congress, Marseille)	Ecosystems and technology: Innovative approaches to strengthening coastal and ocean adaptation
13 October 2021 (informal SBSTA event in the lead up to COP26)	National policy, local action: Scaling up integrated approaches to strengthen coastal and ocean adaptation
8 November 2021 (side event at COP26, Glasgow)	The best of both worlds: Uniting adaptation technologies and nature-based solutions to enhance coastal and ocean resilience

Upon publication, the policy brief will be available at: <https://unfccc.int/ttclear/coastalzones/>

GAPS, CHALLENGES AND OPPORTUNITIES

Despite the many potential advantages and benefits of integrating technology and NbS for adaptation, gaps and challenges persist that hinder widespread implementation of actions. Various transitions are needed in order to scale up integrated adaptation solutions.

From siloed approaches to transdisciplinary, cross-sectoral, and partnership-driven approaches

Breaking silos between actors – including practitioners, government decision-makers, the private sector, and Indigenous peoples and local communities – is critical for achieving successful integrated adaptation solutions. To accomplish this, diverse stakeholders must engage in transdisciplinary approaches and mutual learning beyond the project level and embed integrated adaptation solutions across sectors including (but not limited to) agriculture, aquaculture and fisheries, tourism, water security, urban planning, and environment and disaster risk management.

From restrictive regulations to supportive policy and regulatory frameworks

Implementation of integrated adaptation solutions can be hampered by restrictive regulatory and legal frameworks, ranging from local land-use regulations and building codes to national climate policies, funding mechanisms, and engineering guides and standards. Creating space for adaptive policies and strengthening enabling regulatory frameworks, as well as supporting new regulations, while ensuring adherence to environmental and social standards, can greatly facilitate the funding, approval, and implementation of integrated adaptation solutions.

From inadequate, project-based funding to sustained, innovative and accessible financing

Funding for integrated adaptation solutions is constrained by real and perceived risks and trade-offs, and overcoming these barriers involves developing financial strategies and engaging the public, finance and insurance sectors to reduce or distribute risks. Public, private, and blended finance can play a crucial role in de-risking investment in integrated adaptation solutions and enable flexibility in implementation through concessional capital and loans, grants, guarantees, political risk insurance and other mechanisms such as technical assistance.

From lack of evidence-based decision-making to standardized targets and monitoring frameworks

Lack of long-term monitoring and evaluation programs and standardized reporting frameworks for integrated adaptation solutions results in inconsistent and inadequate markers of progress. Embedding more concrete, evidence-based targets in long-term, participatory monitoring, evaluation and learning programs and generative evidence of results over time is fundamental to giving confidence to and attracting more investors, thus better incentivizing integrated adaptation solutions.

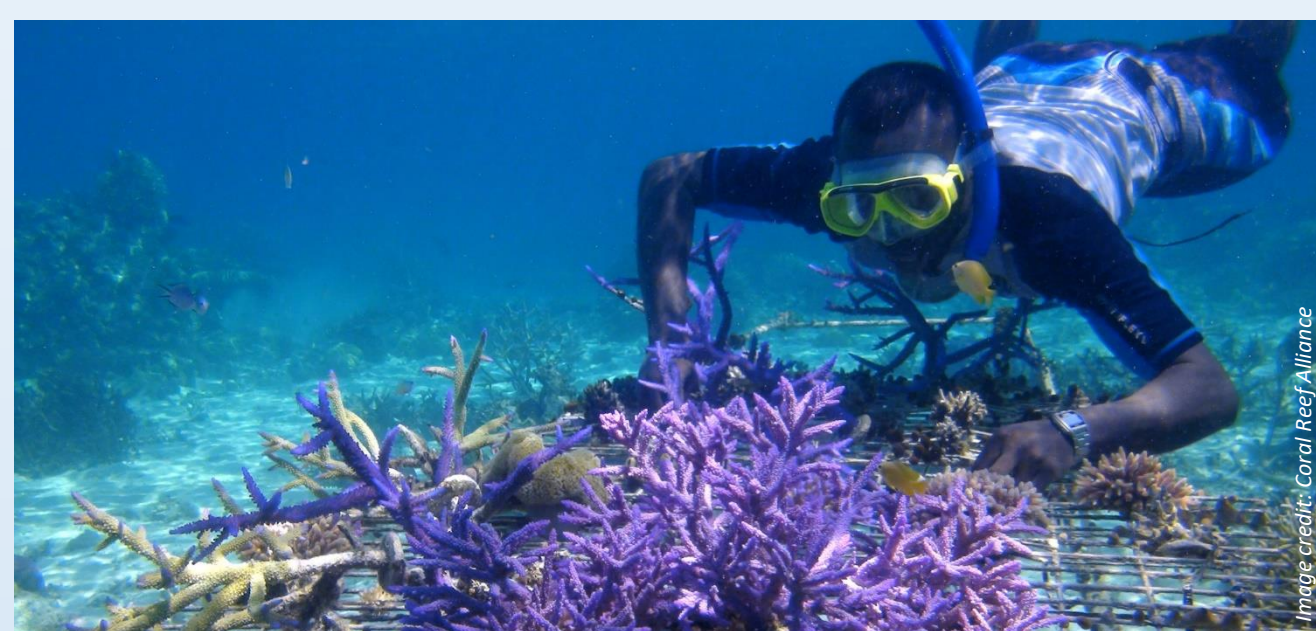
THE NEED FOR INNOVATIVE APPROACHES

Forty percent of the world's growing population and approximately sixty percent of the world's urban areas with populations of over five million people are located in coastal zones within 100 kilometers of the coastline (UNFCCC 2020). Ocean and coastal areas are hubs of socioeconomic and societal activity and play a critical role in supporting and protecting communities and infrastructure, including through mitigation of storm surge and wave energy, erosion reduction, sediment capture, food provision, and carbon sequestration.

Coastal areas are also highly vulnerable to the impacts of climate change. More than 600 million people reside in coastal zones that are less than 10 meters above sea level (UNFCCC 2020), leaving many coastal communities and Small Island Developing States (SIDS) particularly vulnerable to a combination of slow-onset climate impacts, including sea level rise, coastal erosion, warming ocean temperatures and ocean acidification, and fast-onset hazards, including extreme weather events such as storm surges and tropical cyclones (Mycioo et al 2022). These climate impacts are further exacerbated by parallel challenges of ecosystem degradation, unsustainable resource use, and pollution, which reduce the capacity of coastal ecosystems to serve as a buffer against storm surges and tropical cyclones and to ensure food security. The need for effective adaptation strategies is clear and urgent.

Climate adaptation investments have been traditionally heavy on engineered infrastructure such as levees and seawalls. However, while this infrastructure provides immediate protection, it can often be expensive to build, maintain, and replace, and can create unintended negative impacts. Such business-as-usual approaches on their own may not be sufficient in the face of the accelerating climate risks facing coastal communities and ecosystems.

Innovative adaptation approaches which integrate technology and Nature-based Solutions (NbS) can offer cost-effective, multiple-benefit solutions, while better addressing climate risks for long-term resilience outcomes.



WHY INTEGRATED ADAPTATION SOLUTIONS?

Diverse adaptation technologies have advanced rapidly in recent years. Meanwhile, in response to growing recognition that ecosystems and biodiversity are both at risk from, and crucial for, addressing global challenges, the concept of Nature-based Solutions (NbS) has risen in prominence in the international policy agenda.

"Nature-based Solutions are actions to protect, conserve, restore, sustainably use and manage natural or modified terrestrial, freshwater, coastal and marine ecosystems, which address social, economic and environmental challenges effectively and adaptively, while simultaneously providing human well-being, ecosystem services and resilience and biodiversity benefits" (UNEP/EA.5/Res.5).

Integrated technological and nature-based approaches to climate change adaptation already exist in practice around the world, but they need to be mainstreamed and scaled in order to address climate hazards facing coastal and ocean areas.

Despite the high potential impact and cost-effectiveness of nature-based solutions for adaptation, to date only 5% of global climate finance flows are spent on adaptation, with only 1.4% thereof utilizing nature-based solutions for adaptation (WRI 2021, UNEP 2021). At the same time, an estimated USD 94 trillion will be spent on infrastructure globally over the next 20 years; enhanced political drive could direct substantial investment toward green-gray adaptation approaches (Global Green-Gray Community of Practice 2020).

As the increasing impacts of climate change present a moving target, business-as-usual and siloed approaches will be insufficient. **Integrating nature and technology into adaptation solutions can lead to multiple benefits for communities and for nature: they can be more effective, cost-effective, sustainable, durable, attractive, and acceptable to local communities than hard, soft, organisational, or green approaches alone.**



EXAMPLES OF INNOVATIVE APPROACHES

Innovative adaptation approaches can include:

- **Ecosystem-based adaptation (EbA) and disaster risk reduction (Eco-DRR)** are types of nature-based solutions that use biodiversity and ecosystem services as part of an overall adaptation strategy to help people to adapt to the adverse effects of climate change and to reduce disaster risks. EbA and Eco-DRR approaches are centred on the conservation, sustainable management, and restoration of ecosystems, such as rehabilitation of mangroves, seagrass meadows, coral reefs and tidal marshes, to reduce the vulnerability of human communities to the impact of climate-related hazards such as storm and flood damage, coastal erosion, salinization of freshwater resources, and loss of agricultural productivity. In addition to climate adaptation benefits, EbA and Eco-DRR approaches can offer numerous economic, social, and environmental co-benefits, such as carbon sequestration and enhanced fish stocks.
- **Hybrid approaches** combine ecosystem-based and engineered adaptation approaches with a broad emphasis on sustainable development in densely populated coastal zones (UNFCCC 2020). Hybrid approaches, such as green-gray infrastructure, are often multi-sectoral, interdisciplinary efforts which integrate "green" ecosystem structures and functions with "gray" infrastructure. Some examples include living shorelines, constructed water quality treatment wetlands, or salt marsh restoration paired with dykes. Hybrid approaches can also extend the lifespan of gray infrastructure while supporting co-benefits such as regulating water quality, supporting fisheries, and sequestering carbon.
- **Early warning systems (EWS)** monitor environmental and other conditions to forecast, detect, and help communities prepare and respond to emergencies and changes in the local environment. Early warning systems can be developed using remote sensing together with in situ environmental data collection, and can utilise and incorporate Indigenous ecological knowledge to improve accuracy, increase participation of community members, and enhance communication.
- **Cross-sectoral approaches** such as integrated coastal zone management (ICZM), marine spatial planning (MSP), Source-to-Sea (S2S) management, Ridge to Reef, ecosystem approach to fisheries/aquaculture, and marine protected areas (MPAs) bring together diverse stakeholders for a comprehensive and integrated approach to planning and management of coastal and marine areas.
- **Coastal hazard and flood risk mapping** analyze factors including topography, water levels, tides, storm surge, erosion, ecosystem condition and protective features to model risks to coastal communities and inform management decisions.



RECOMMENDATIONS

Policymakers, international organizations, finance institutions, the private sector, research institutes and academia, non-governmental organizations (NGOs), UNFCCC bodies and processes, and other UN bodies and ongoing processes all have a role to play in accelerating the uptake and scaling of innovative adaptation solutions. The recommendations include:

- Integrated adaptation solutions should be embedded into climate-related policies as well as other sectors, such as agriculture, fisheries, tourism, water security and disaster risk management.
- Governance and technical capacities of relevant national and local management institutions need to be strengthened to enable the adoption and effective implementation of integrated adaptation solutions.
- Public, private and blended finance can play a crucial role in facilitating investment in integrated adaptation solutions.
- A robust evidence base, supported by strong monitoring, evaluation and learning frameworks, is needed on the effectiveness, viability and multiple benefits of integrated adaptation approaches.
- Diverse stakeholders must engage in cross-sectoral exchange to improve enabling environments, access to funding, knowledge exchange and technology transfer, particularly through communities of practice and innovative partnerships such as the Global Green-Gray Community of Practice.
- It is critical to actively pursue meaningful participation of and leadership by local communities and vulnerable groups, including youth, women, and Indigenous peoples, at all stages of design, planning, implementation and monitoring of adaptation interventions.

The policy brief will include tailored recommendations for different actors.

OPPORTUNITIES UNDER UNFCCC AND OTHER UN PROCESSES

Building on the new mandates from Glasgow, the following are opportunities under the UNFCCC process to facilitate actions that strengthen the resilience of coastal settlements and ocean ecosystems:

- The Glasgow Sharm-El Sheik Work Programme (GlaSS) on the Global Goal on Adaptation (GGA) aims to enhance national planning and implementation of adaptation actions through National Adaptation Plans (NAPs), Nationally Determined Contributions (NDCs) and adaptation communications.
- The COP26 outcomes establish a recurring Ocean and Climate Change dialogue to be held by the Chair of the Subsidiary Body for Scientific and Technological Advice (SBSTA) starting in June 2022.
- The SBSTA 52-56 outcomes invited the NWP to develop relevant sector-specific guidance to help identify sources of support, including financial, technological and capacity-building.
- The Standing Committee on Finance provides a platform for a wide range of climate finance stakeholders to exchange information and promote linkages and coherence in the mobilization and delivery of climate finance.
- The Santiago Network catalyzes technical assistance for averting, minimizing and addressing loss and damage in vulnerable developing countries.

There are also opportunities to promote coherence with other UN processes, such as:

- The UN Decade of Ocean Science for Sustainable Development (2021-2030)
- The UN Decade on Ecosystem Restoration (2021-2030)
- The Sendai Framework for Disaster Risk Reduction (2015-2030)