



Technology Executive Committee

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Twenty-fourth meeting

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Draft policy brief on approaches for strengthening coastal and ocean adaptation: integrating technology and nature-based solutions

Cover note

I. Background

1. As per activity 3 of the thematic area Innovation of its updated workplan for 2019–2022,¹ the TEC is to promote innovative approaches to deploy, disseminate and scale up adaptation technologies through the organization of Technology Day events. The Technology Day was launched officially in virtual format by the UNFCCC Executive Secretary during November Dialogue in 2020. The launch was followed by a thematic session on **climate-smart agriculture**, organized in collaboration with the FAO and Global Alliance on Climate-smart Agriculture (GACSA).

2. In 2021, the focused topic of the activity was on innovative approaches for strengthening **coastal and ocean** adaptation. A series of Technology Day events on this topic were organized by the TEC in collaboration with the IUCN, Friends of the Ecosystem-based Adaptation (FEBA) and Nairobi Work Programme (NWP) Expert group on Ocean.

3. Three Technology Day events were held in 2021 exploring, in sequence: i) promoting, learning and examples of integrating both technology and nature for adaptation; ii) opportunities for uptake and scaling; and iii) policy integration, finance, and capacity building:

(a) “Ecosystems and technology: Innovative approaches to strengthening coastal and ocean adaptation” - held in conjunction with the IUCN World Conservation Congress (September 2021);

(b) “National policy, local action: Scaling up integrated approaches to strengthen coastal and ocean adaptation” – held in the context of SBSTA informal event in the lead up to COP26 (October 2021); and

(c) “The best of both worlds: Uniting adaptation technologies and nature-based solutions to enhance coastal and ocean resilience” – held as a side event at COP 26 in Glasgow (November 2021).

4. In all events, panellists 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. Presentation and outcomes of these events are available in TT:CLEAR.²

5. Under the guidance of the taskforce on Innovation, a draft policy brief was prepared by the secretariat in collaboration with the partner organizations above, on innovative approaches for strengthening coastal and ocean adaptation, based on the outcomes of the Technology Day events and further research work, as necessary.

¹ See <https://bit.ly/32VIGrw>.

² https://unfccc.int/ttclear/events/2020/2020_event07.

II. Scope of the note

6. The annex to this note contains a draft policy brief on *Innovative Approaches for Strengthening Coastal and Ocean Adaptation: Integrating Technology and Nature-based Solutions*.

III. Expected action by the Technology Executive Committee

7. The TEC will be invited to consider the draft policy brief and provide comments on the draft, with a view for the task force on Innovation to finalizing it after TEC 24.

Annex

Draft policy brief

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

Why this brief?

To address the progressive challenges of climate change, it is becoming increasingly urgent to adopt innovative adaptation approaches such as those that integrate both technology and nature to enhance the resilience of ocean and coastal communities. This policy brief summarizes actions and recommendations for scaling up specific, innovative and integrated approaches to achieve multiple benefits for communities and nature. The findings are based on a series of events on integrated adaptation approaches organized by [UNFCCC Technology Executive Committee](#) (TEC), [Nairobi Work Programme](#) (NWP) Expert Group on Oceans, [IUCN](#) and [Friends of EbA](#) (FEBA) in 2021 as part of [Technology Day](#).¹

Key findings

Climate adaptation approaches that integrate technology and nature-based solutions are already being implemented in marine and coastal areas. These include early warning systems for extreme events, hybrid approaches such as restoration of coastal vegetation alongside engineered seawalls, grants and investments in nature-based infrastructure, technology to reduce harmful fishing approaches, and coastal hazard mapping. However, despite the pressing adaptation needs of coastal and island communities, knowledge, capacity and financing gaps prevent the widespread implementation and mainstreaming of these integrated approaches.

This policy brief provides an overview of the value of integrated adaptation solutions and the challenges and opportunities to increasing their uptake and scaling, including through the use of interdisciplinary and cross-sectoral approaches based on partnerships; supportive policy and regulatory frameworks; sustained, innovative and accessible financing; and use of evidence-based targets. The key findings from this brief include the need to:

- **Collaborate on transdisciplinary research and mutual learning** to co-develop robust evidence and data on the role of natural assets, nature-based solutions and green-gray infrastructure for coastal and marine adaptation.
- **Address the barriers that restrict access to financing**, including perceptions of and risks associated with innovative and nature-based approaches, for scaling up and implementing integrated adaptation solutions.
- **Foster enabling policy and regulatory frameworks** for promoting uptake and implementation of integrated adaptation solutions in national and international climate strategies and local planning and regulations.
- **Build cross-sectoral partnerships** to exchange knowledge and ideas, develop innovative technologies, and bolster the business case for integrated adaptation solutions.
- **Expand co-production of localized adaptation solutions** that combine scientific, local and indigenous knowledge, engage diverse stakeholders, and distribute benefits equitably across and within communities.

¹ See Annex for details on the event series and background.

Background

Forty percent of the world's growing population and approximately 60% of the world's metropolises with populations of over 5 million people are located in coastal zones within 100 km of the coastline (UNFCCC 2020). Ocean and coastal areas abound with socio-economic activity and are important sources of food and water, renewable energy, health and well-being, cultural values, tourism, trade, and transport as well as habitats for immense biodiversity (IPCC 2019). Today more than 600 million people live in coastal zones that are less than 10 meters above sea level (UNFCCC 2020). Coastal communities and Small Island Developing States (SIDS) are increasingly prone to a combination of slow-onset climate impacts, including sea level rise, coastal erosion, warming ocean temperatures and ocean acidification, and fast-onset hazards such as storm surges and tropical cyclones. These climate impacts compound other challenges, such as unsustainable resource use and pollution, imperiling biodiversity and livelihoods. The need for effective adaptation strategies is clear and urgent.

Climate adaptation investments have been traditionally heavy on engineered infrastructure like levees and seawalls. However, the mounting climate risks facing island and coastal communities and ecosystems make it clear that business-as-usual approaches are not enough. Countries already recognize the importance of diverse approaches to adaptation. As oceans and coastal zones worldwide face an onslaught of climate change impacts, innovative approaches which break siloes will be crucial for enhancing the resilience of ecosystems and communities and meeting the goals of the Paris Agreement.

Diverse adaptation technologies and nature-based solutions have each advanced rapidly in recent years. 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.

“NbS is an umbrella term encompassing “actions to protect, sustainably manage, and restore natural or modified ecosystems, that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits” (IUCN 2020).

NbS can complement or serve as an alternative to other approaches for building climate resilience, including economic, social, infrastructural and technological means. While the term NbS is new, the concept of using biodiversity and ecosystem services to address development needs is not and is deeply rooted in local and indigenous practices.

Technological and ecosystem-based approaches to climate change adaptation already exist, but they need to be integrated to efficiently and holistically address the moving target of climate change and its impacts (Box 1). Integrated adaptation solutions can optimize not only for adaptation effectiveness but also cost, durability, sustainability, and co-benefits for people and nature.

Box 1: Integrating technology and nature into adaptation solutions: an innovative approach

A diverse array of technologies can be used for managing ocean and coastal zone risks.

Hard technologies, or hardware, refer to physical tools and infrastructure, such as seawalls and dykes; *soft technologies, or software*, refer to the processes, knowledge and skills required in using the technology, such as improvement of coastal risk and adaptive management efficiency; and *organizational technologies, or orgware*, refer to the ownership and institutional arrangements pertaining to a technology, such as coordinated cross-sectoral and regional planning. (UNFCCC 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: they can be more effective, cost-effective, sustainable, durable, attractive, and acceptable to local communities than hard, soft, organisational, or green approaches alone.

Innovation is not without risks – some well-intentioned actions could lead to maladaptation, inequitable allocation of resources, or loss of livelihoods. Implementing environmental and social safeguards appropriate for the local context is an important step towards avoiding maladaptation and the exacerbation of inequities in any adaptation strategy.

Innovative Approaches

Overview of innovative approaches

Innovative adaptation approaches can include:

- **Ecosystem-based adaptation (EbA) and disaster risk reduction (Eco-DRR)** 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 include the restoration and conservation of coastal and marine ecosystems such as mangroves, coral reefs and tidal marshes, which provide numerous economic, social, and environmental benefits to communities.
- **Hybrid or mixed approaches** are landscape adaptation approaches that combine engineered and nature-based approaches, with a broad emphasis on sustainable development in densely populated coastal zones (UNFCCC 2020). Hybrid approaches can include green-gray or blue-gray infrastructure, which integrate “green/” / ”blue” ecosystem structures and functions with “grey” infrastructure. Some examples include living shorelines, constructed wetlands, or salt marsh restoration combined with dykes. Hybrid approaches are often multi-sectoral, interdisciplinary efforts which offer multiple benefits for nature and people. Case studies and guidance can be found in ‘[The Practical Guide to Implementing Green-Gray Infrastructure](#)’, the ‘[International Guidelines on Natural and Nature-Based Features for Flood Risk Management](#)’ and the ‘[Engineering with Nature Atlas](#).’
- **Early warning systems** (EWS) monitor conditions in order to forecast, detect, and help communities respond to emergencies and changes in the local environment. Indigenous ecological knowledge and ancestral ways of knowing can be incorporated into local EWS to improve their accuracy, increase participation of community members, and enhance communication. Remote sensing and environmental data collection also contribute to EWS.
- **Cross-sectoral approaches** like integrated coastal zone management (ICZM), marine spatial planning (MSP), [Source-to-Sea \(S2S\) management](#), [Ridge to Reef](#), and marine protected areas (MPAs) bring together diverse stakeholders for comprehensive landscape-level planning.
- **Coastal hazard and flood risk mapping** analyze factors including topography, water levels, tides, storm surge, erosion, and protective features to model risks to coastal communities and inform management decisions.

Examples of innovative approaches

The ‘Technology Day’ event series highlighted that a broad suite of innovative approaches are already being applied and scaled up across different countries. Examples noted by various experts and practitioners, and from the wider literature, include:

- The U.S. Army Corps of Engineers (USACE) [Engineering with Nature \(EWN\)](#) initiative uses a collaborative and cost-effective practice to infrastructure development that combines engineering with natural processes to deliver economic, social and environmental benefits. EWN approaches have been implemented to manage flood risk, adapt to sea level rise, restore marshland and aquatic habitats, maintain navigation channels, and protect against hurricanes and other coastal hazards.
- [Rijkswaterstaat](#) has implemented a governance framework in the Netherlands with mandatory periodic inspections of sea walls and storm surge barriers. Innovative initiatives include [Room for the River](#), which has restored natural floodplains to better manage peak river discharges, and the [Sand Motor](#) initiative, a pilot project for natural coastal protection against storm surges that also provides habitat restoration and recreation and which was designed with heavy stakeholder engagement.
- The [Pilot Program for Climate Resilience](#) (PPCR) is a flagship initiative under the [Climate Investment Funds](#) (CIF), with a USD 1.2 billion portfolio of adaptation projects across 28 countries, including investments in technological infrastructure and NbS in coastal areas in several countries. CIF finance has been used to pilot

flood-resilient crop varieties in coastal areas and to establish a network of agribusinesses for enhancing the resilience of smallholder farmers.

- The [‘Rebuild by Design’](#) project is a series of offshore ‘living breakwaters’ on the southeast shoreline of Staten Island, New York, that provide habitat for marine life while providing a buffer against wave damage, flooding and erosion. Conceived as part of the Hurricane Sandy recovery, this initiative has been replicated internationally by the United States Agency for International Development (USAID), the Swedish International Development Cooperation Agency (SIDA) and The Rockefeller Foundation, developing the [Global Partnership for Resilience](#) based on the Rebuild by Design competition model and collaborative approach.
- The [Copernicus Climate Change Service \(C3S\) for European Storm Surge](#) provides high quality climate data on storms in European coastal seas. The data generated will create awareness on changes in storminess and its impact due to climate change and will support long-term decision-making processes for a variety of coastal sectors and issues.
- Pilot projects in Palau are exploring ways to preserve culturally and economically significant taro cultivation in the face of saltwater intrusion from increasing sea level rise, including testing salt-tolerant taro varieties and trials for upland cultivation. [Palau’s taro fields](#) contribute to food security, help maintain matrilineal land inheritance customs and protect coral reefs by trapping sediment.
- Implementing selective fishing techniques and improving fishing gear, reducing vulnerability and enhancing the resilience of artisanal fisheries in Peru, strengthening ancestral knowledge with modern technological systems such as early warning systems for flooding and harmful algal blooms.
- Constitutional mandates provide for conservation of nature, such as the protection of the Sundarbans mangroves in Bangladesh, which shelter nearby communities from sea level rise and disasters. A new [Regional Office of the Global Centre on Adaptation](#) (GCA) has been established in Dhaka, Bangladesh, focusing on scaling up NbS to enhance infrastructure resilience.

Gaps, Challenges and Opportunities

Despite the many potential advantages and benefits of integrating technology and nature-based solutions for adaptation, gaps and challenges persist that hinder widespread implementation of actions. They include the siloing of single disciplinary approaches to problem-solving, as opposed to interdisciplinary approaches; the traditional allocation of investments to engineered, grey infrastructure, particularly in coastal zones; and lack of wide acceptance of integrated solutions.

From siloed approaches to interdisciplinary and cross-sectoral approaches based on partnerships to strengthen the means of implementation

Often, there are limited opportunities for learning exchanges and dialogue between different actors, including practitioners implementing adaptation initiatives, local and regional government decision-makers, the private sector, and most importantly, the indigenous and local communities that must be prioritized for adaptation actions. Breaking silos across these actors, and across various disciplines and sectors, is a first step towards achieving integrated adaptation solutions that can realize multiple benefits for people and nature. To achieve this, diverse stakeholders must engage in interdisciplinary approaches and mutual learning beyond the project level and embed integrated adaptation solutions across sectors including (but not limited to) agriculture and fisheries, tourism, water security, urban planning 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 norms and guidelines. Creating space for adaptive policies and strengthening enabling regulatory frameworks – 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

Within the context of climate adaptation finance, investments have traditionally been allocated to conventional engineered/grey infrastructure rather than nature-based and integrated solutions. Despite the cost-effectiveness of nature-based solutions for adaptation as a strategy to tackle climate change, so far only 5% of global climate finance flows are spent on adaptation, and only 1.4% of this on 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; there is urgent need for enhanced political drive to direct substantial investment toward green-gray adaptation approaches (Global Green-Gray Community of Practice 2020).

Investments in integrated adaptation solutions are constrained by real and perceived risks and tradeoffs, and overcoming this barrier involves developing financial strategies and engaging the finance and insurance sector 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. The diversification and accessibility of climate finance would help the most vulnerable and facilitate local interventions to achieve national adaptation objectives.

From lack of standardized monitoring to evidence-based targets

Lack of long-term monitoring and evaluation programs and standardized reporting frameworks for integrated adaptation solutions results in inconsistent and inadequate markers of progress. More concrete, evidence-based targets embedded in long-term, participatory monitoring, evaluation and learning programs will enable the full measurement of benefits that integrated adaptation solutions may yield for society and for nature, while maximizing benefits and limiting trade-offs.

Accelerating the uptake and scaling of innovative approaches

Experts and practitioners agree that many of the tools needed for upscaling the innovative approaches discussed above are already widely available but require sufficient data and technical and financial capacity to implement, including collaborative partnerships with multiple stakeholders and enabling policy, legal and regulatory frameworks. For example, several cost-benefit analyses and decision support tools have been developed to assess different adaptation options, but they may rely on data that are unavailable or require specialized technical skills (Chevallier et al. 2019).

Political leadership is also needed to upscale the implementation of these approaches, while environmental and social safeguards should be strengthened to avoid maladaptation, respect rights, and enhance local adoption and acceptance of these approaches (CBD 2019).

National and international climate resilience frameworks will be more impactful if they are translated to the local level by providing access to resources – technical, legal, policy, and more – to support community-led implementation. Such local-level implementation, engaging local stakeholders throughout the process, must also be flexible and adaptable to local and regional circumstances, including ecosystems, cultures, institutions and economies. For example, restoration of coastal vegetated areas could include native species selected by indigenous peoples and monitored through participatory mechanisms (Lee et al. 2021).

Further, synergies between climate mitigation and adaptation through combined interventions should be considered to enhance the co-benefits and impacts of the innovative approaches.

Recommendations for actions and further work

Policymakers, international organizations, finance institutions, the private sector, research institutes and academia, local communities, and UNFCCC bodies and processes all have a role to play in accelerating the uptake and scaling of innovative approaches that integrate technology and nature into adaptation solutions. While all actors must move beyond siloes and seek collaborations with diverse stakeholders, there are key actions each set of actors can take to advance these approaches.

Recommendations for policymakers including national and local governments:

- **Integrated adaptation solutions can be embedded into climate-related policies as well as other sectors, such as agriculture, tourism, water security and disaster risk management.** This includes scaling up into the formulation and implementation of NDCs and NAPs, coastal risk reduction measures under the Sendai Framework, national blue economy initiatives, marine fisheries management, coastal and marine protected areas, development planning, and pandemic recovery. The mainstreaming of integrated adaptation solutions will also require inter- and intragovernmental coordination and integration.
- Policies should **prioritize the most vulnerable communities, societal groups and ecosystems.** Further work is needed to strengthen gender considerations, including gender-responsive adaptation planning; meaningfully include local and indigenous communities; and support the involvement of youth group constituencies in the development of adaptation strategies.
- Policies need to be translated to **localized adaptation action**, including creating an enabling environment for delivering implementation finance. This includes the **careful consideration of synergies and trade-offs between implementation of adaptation actions, social and environmental safeguards, and long-term monitoring, evaluation and learning.**

Recommendations for public and private finance institutions:

- **Public, private and blended finance can play a crucial role in facilitating investment in integrated adaptation solutions.** The public sector can strengthen enabling conditions by engaging local financiers and banks, addressing concerns over risk, providing guarantees, and familiarizing them with new approaches. The private sector can support by engaging in risk reduction, demonstrating the value of innovative approaches (e.g., through pilot projects), and translating ecosystem services into company modelling and processes. For example, in the Philippines, the private sector is developing operational business models and recommendations for integrating EbA across different sectors and engaging in strategic dialogues for developing a long-term strategy for private-public partnerships (JBF Centre 2021).
- The accessibility and sustainability of finance, especially for communities most affected by climate change, must be improved. Vulnerable coastal and island populations, such as SIDS, urgently need access to international climate finance for adaptation. Financial institutions should support the longer-term costs of adaptation actions beyond initial investments and operating costs including for ongoing monitoring, evaluation and learning. To do so, actors could consider a range of financing instruments beyond grants, including equity, loans and private sector investments in the blue economy (GIZ 2018).

Recommendations for non-governmental and community-based organizations:

- National and international non-governmental organizations (NGOs) as well as community-based organizations (CBOs) should seek 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.** For example, the [‘My Mangrove Planting Project’](#) in Sri Lanka focuses on youth engagement in climate adaptation initiatives through mangrove conservation and restoration as a thematic area under the Global Youth Forum on Climate Change (Karunarathne 2021).
- NGOs and CBOs should **seek partnerships** with one another as well as with other diverse stakeholders – ranging from academia to the private sector, practitioners, donors and policymakers – to improve enabling environments, access to funding, knowledge exchange and technology transfer. For example, the [Nature-based Infrastructure Global Resource Centre](#) brings together key partners to establish a business case for Nature-Based Infrastructure (NBI), including data, training, and sector-specific valuations based on innovations in systems thinking and financial modelling.

Recommendations for academia and research institutes:

- Research focused on diverse adaptation technologies will **help build a robust evidence base on the effectiveness, viability and multiple benefits of integrated adaptation approaches**. This requires collaborations across disciplines, including the social sciences and humanities, physical and environmental sciences, engineering, and economics, as well as resources to undertake the work.
- Researchers should **collaborate with stakeholders through communities of practice** and diverse project consortia to ensure innovations are inclusive, legitimate, and relevant and consider local needs and conditions. An environment should be created to foster knowledge and technology co-creation processes based on the open and equitable dialogue between scientific, local and indigenous knowledge systems.
- Researchers could also work with **academia and educational institutes** to share and disseminate knowledge on innovative approaches that integrate technology and nature into adaptation solutions.

Recommendations for practitioners:

- Civil engineers, architects, natural resource managers, landscape and habitat restoration experts and other practitioners should engage in **cross-sectoral exchange of knowledge and best approaches through communities of practice and innovative partnerships**. Knowledge exchanges could occur through participation in interdisciplinary networks such as the [Global Green-Gray Community of Practice](#).
- It is critical to **meaningfully engage diverse local stakeholders, including local communities, Indigenous peoples, youth, women, and marginalized groups**. Participatory consultations and integration of local and Indigenous knowledge may take more time upfront but will contribute to the sustainability and effectiveness of and local support for interventions, increasing the likelihood of long-term provision of adaptation benefits and the preservation of cultural knowledge and products.

Opportunities under the UNFCCC process

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.

- One of the objectives of the [Glasgow Sharm-El Sheik Work Programme](#) (GlaSS) on the [Global Goal on Adaptation](#) (GGA) is to enhance national planning and implementation of adaptation actions through the process to formulate and implement national adaptation plans and through nationally determined contributions and adaptation communications. This work program thus presents an important opportunity to demonstrate contributions to the GGA through national implementation of integrated adaptation approaches, innovative information services and climate services.
- The [COP26 outcomes](#) invites relevant work programs and constituted bodies under the UNFCCC to consider how to integrate and strengthen ocean-based actions in their existing mandates and workplan. The outcomes also introduce a recurring forum through the an annual ‘ocean-climate’ dialogue held by the Chair of the [Subsidiary Body for Scientific and Technological Advice](#) (SBSTA), from June 2022 to discuss strengthening ocean-based climate action, creating impetus for the uptake and scaling of integrated adaptation solutions.
- [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. This outcome provides an opportunity to follow up on some of the recommendations with the NWP thematic expert group on oceans. Parties have opportunities to integrate this guidance in the context of formulating and implementing national adaptation plans and in their NDCs. NAPs and NDCs are critical entry points for Parties to communicate their national priorities and needs, influencing the level of resources attached to adaptation actions.
- The [Santiago Network](#) catalyzes the technical assistance of relevant organizations, bodies, networks and experts, for the implementation of relevant approaches for averting, minimize and addressing loss and damage at the local, national and regional level, in developing countries that are particularly vulnerable to the adverse effects of climate change.

Opportunities to promote coherence with other UN processes

- The [UN Decade of Ocean Science for Sustainable Development](#) (2021-2030) provides a framework to facilitate and convene partnerships of diverse stakeholders around common ocean science priorities, leverage investment for ocean research, and strengthen the enabling environment for ocean science including transfer of marine technology and capacity development. Innovative collaborations for integrated adaptation solutions are critical for contributing to a comprehensive understanding of ocean communities and ecosystems, mobilizing of resources, and increasing uptake and mainstreaming at the science-policy interface.
- The [UN Decade on Ecosystem Restoration](#) (2021-2030) aims to prevent, halt and reverse the degradation of ecosystems across the globe. Restoring oceans and coasts will require reducing pressure on those ecosystems as well as making both ecosystems and communities more resilient in the face of global change, from sustainable fisheries to reducing waste and pollution, protecting urban coastal ecosystems, and conserving and restoring coral reefs, mangroves and wetlands. Integrated adaptation approaches will be required to meet these goals sustainably and cost-effectively while providing multiple benefits to coastal and island communities. Adaptation solutions that integrate nature-based solutions and technology can also contribute to the [implementation of the Sendai Framework for Disaster Risk Reduction](#) by addressing underlying drivers of risk from unsustainable resource use and ecosystem degradation while incorporating the innovative tools of adaptation technologies.

Annex

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 EbA](#) (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 ii) Policy integration, finance, and capacity building. In this policy brief, the outcomes of this unique sequential event series are summarized, including 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 Sep 2021 (IUCN World Conservation Congress, Marseille)	Ecosystems and technology: Innovative approaches to strengthening coastal and ocean adaptation
13 Oct 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 Nov 2021 (side event at COP26, Glasgow)	The best of both worlds: Uniting adaptation technologies and nature-based solutions to enhance coastal and ocean resilience

To learn more about the event series and outcomes of the events, visit the [‘Technology Day’](#) and [FEBA](#) event pages.

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List of reviewers: to be added

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