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

**THE JOINT POLICY BRIEF AND EVENT SERIES**

To respond to knowledge gaps in implementing innovative adaptation strategies, the UN Environment Executive Office (UNEP), the National Development Programme (NWP) Expert Group on Oceans, IUCN and Friends of ESA (FBEA) organized a series of events on integrated adaptation approaches in 2021 as part of “Technology Day”. Panels representing diverse expertise from civil society, financial institutions, the private sector, academia, together with national government representatives discussed innovative approaches to shaping, disseminating and up-scaling adaptation technologies in particular sectors to enhance the resilience of oceans and coastal ecosystems and communities to climate change. This event explored, in sequencer: (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.

**THE REALITY**

Fourty 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 coasts (UNEP 2022). Coastal and ocean areas are hubs of socioeconomic and spatial 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, protein, and carbon sequestration. Coastal areas are also highly vulnerable to the impacts of climate change. More than 100 million people reside in coastal zones that are less than 10 meters below sea level (UNEP 2022), leaving many coastal communities and Small Island Developing States (SIDS) particularly vulnerable to a combination of climate change impacts, including sea level rise, coastal erosion, warming ocean temperatures and enhanced storm surges, all 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 traditionally been heavily on engineered infrastructure such as levees and seawalls. However, while this infrastructure provides protection, it is expensive, often failure, and can create unintended negative impacts. Such business-as-usual approaches on their own are not sufficient or the face of the accelerating climate risks facing coastal communities and ecosystems.

**INNOVATIVE ADAPTATION APPROACHES WHICH INTEGRATE TECHNOLOGY AND NATURE-BASED SOLUTIONS (NBSS) CAN OFFER NON-OFFSET, MULTIPLE-BENEFIT SOLUTIONS, WHILE BETTER ADDRESSING CLIMATE RISKS FOR LONG-TERM RESILIENCE OUTCOMES.**

**HOW BECOMING INTEGRATED?**

Diverse adaptation technologies have advanced rapidly in recent years. Meanwhile, in progress to recognizing that ecosystems and biodiversity are both at risk, and crucial, for addressing global challenges, the concept of the Nature-based Solutions (NBS) has risen in prominence in the international policy agenda. The increasing impacts of climate change present a missing target, business-as-usual and status-quo 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, and nature-friendly, and attractive to local authorities and other stakeholders; and can contribute to a wider range of solutions.

**RECOMMENDATIONS**

Policy-makers, international organisations, finance institutions, the private sector, research institutes and academia, national governments (UNOs), IUCNs, non-governmental organisations (NGOs), and local communities and vulnerable groups, including youth, women, and Indigenous peoples, at all stages of planning, design, implementation and adaptation investment.

- Integrated adaptation solutions should be embedded into climate-related policies as well as other sectors, such as agriculture, fisheries, tourism, water management, 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 and private, and the government can play a crucial role in facilitating investment in integrated adaptation solutions.
- A robust evidence base is essential for supporting, 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 exchanges to improve understanding of the institutional, financial and technological trade-offs that underpin the delivery of climate change adaptation solutions.

The policy brief will include tailored recommendations for different actors.

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**EXAMPLES OF INNOVATIVE APPROACHES**

Innovative adaptation approaches include:

- **Ecosystem-based adaptation (EBA) and disaster risk reduction (Eco-DDR):** are areas 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-DDR approaches are centered 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 surges, tsunamis, and other forms of agricultural productivity. In addition to climate change benefits, EBA and Eco-DDR 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 (UNEP 2022). Hybrid approaches, such as green-gray infrastructure, are often multi-sectoral, interdisciplinarily efforts that integrate “green” ecosystem structures and functions and “gray” infrastructure. Some examples include floating shorelines, constructed water-ways treatment wetlands, or salt marsh restoration planted with dikes. Hybrid approaches can also extend the tolerances of gray infrastructure while supporting multiple ecosystem services, 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 analyses together with local conditions (e.g., population density), and can utilize and incorporate Indigenous ecological knowledge to improve accuracy, increase response, and protect local communities and ecosystems.

- **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 integrated approach to planning and management of coastal and marine areas.

- **Coastal hazard and flood risk mapping:** analysis factors including topography, water levels, tides, storm surge, erosion, ecosystem condition and protective features to model risks to coastal communities and inform decision-makers.

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**OPPORTUNITIES UNDER UNEP AND OTHER ORGANISATIONS**

Building on the new mandates from Glasgow, the following are opportunities under the UNEP ECOSYSTEM programme that will strengthen the resilience of coastal settlements and ocean ecosystems:

- The Glasgow Shrimp Oil Werk Programme (GOiSP) on the Global Goal on Adaptation (GGa) and adaptation action plans could support the implementation of adaptation actions through National Adaptation Plans (NAPs). National Determined Contributions (NDCs) and other communications. The GOiSP could also be integrated into the adaptation action plans. The GOiSP could be supported by the UNDP and GEF to catalyze specific guidance to help identify sources of support, including financial, technical and capacity-building assistance.
- The World Bank Climate Change Fund provides a platform for a wide range of climate financiers to support exchange and promote policies and coherence in the mobilization of climate finance.
- The Santiago Network catalyzes technical assistance for awareness, minimizing risks and safeguarding less developed countries.

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

- The UN Decade of Ocean Science for Sustainable Development (2021-2030) the UN Decade on Ecosystem-Based Adaptation (2021-2030):

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**The joint Goal Brief and Event Series**

- 3 October 2021 (virtual)
- 14 October 2021 (virtual)
- 26 October 2021 (virtual)
- 16 November 2021 (virtual)

**Contact:** IUCN, FBEA, UN Environment WCPFC Network and NWP Expert Group on Ocean.