ISSUES BRIEF

Nature-based climate solutions

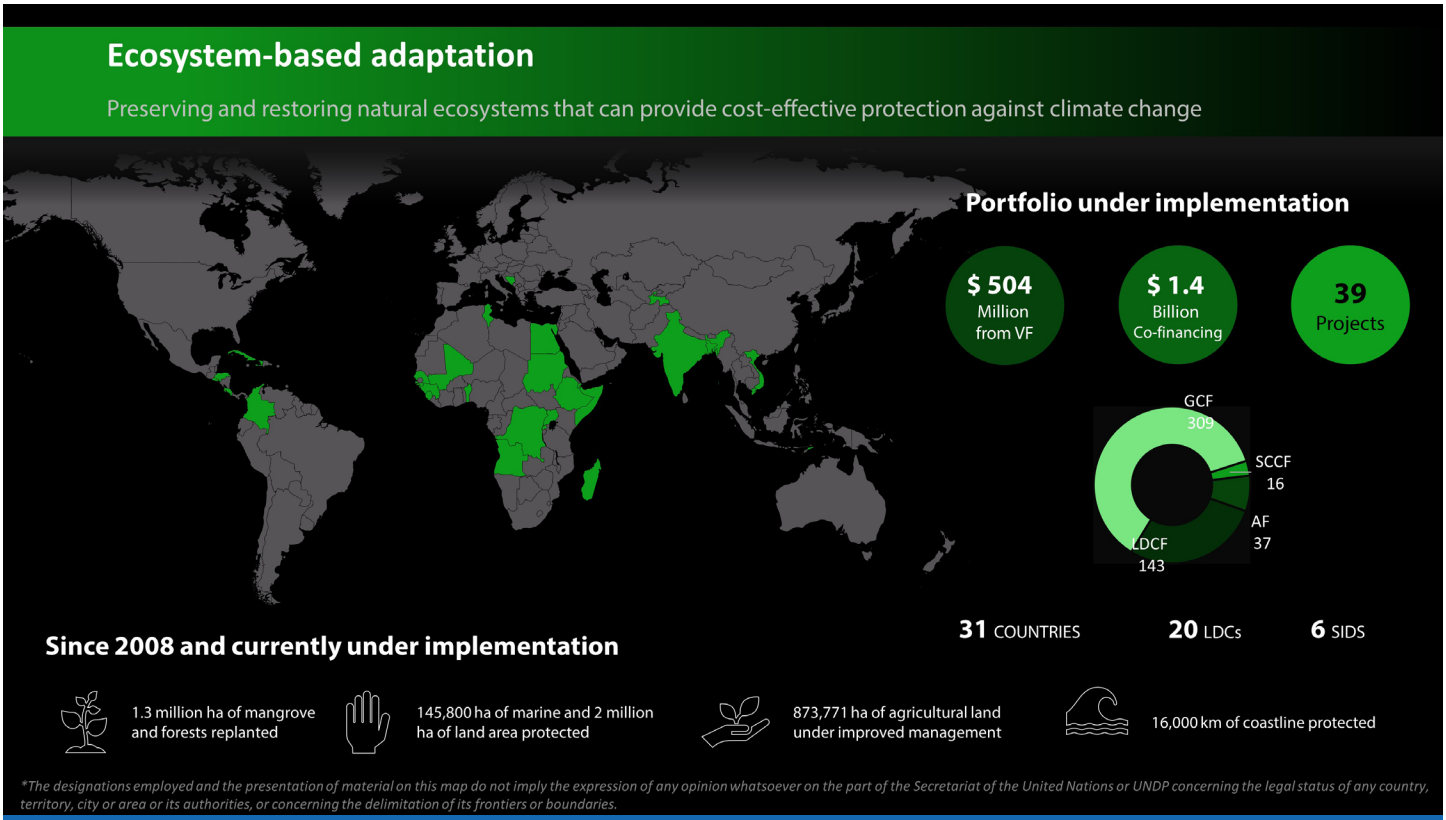
October 2020

The conservation, rehabilitation and climate-informed management of biodiversity and ecosystems increases resilience to climate change and provides low-cost and long-term solutions to protect lives, livelihoods and infrastructure, and advance progress toward the Sustainable Development Goals.

Human, economic and social development relies on the health of natural systems. Ecosystems can significantly reduce the impact of floods, catastrophic storms and serious droughts, and can offset vast amounts of the world's CO2 emissions. It powers industries, provides fresh water supply, food, shelter and reliable sources of incomes.

The rate at which current development pathways damage and destroy natural capital, biodiversity and ecosystems is putting Earth's flora and fauna at risk and is exacerbating climate change impacts across the globe affecting those most vulnerable to climate change. We are fast-losing nature's capacity to regulate an inhabitable climate and systems that support our life on Earth. Case in point: in 2019, over 4.5 million forest fires worldwide larger than one square kilometer, were registered. Over 90 per cent were caused (either intentionally in the name of development and agri-business, or accidentally) by humans. A vicious cycle is created whereby deforestation increases CO2 emissions, fueling climate change and worsening droughts, which in turn increases the risk of fire.

Ecosystem-based adaptation (EbA) provides multiple benefits in terms of poverty alleviation through livelihood opportunities, carbon storage and biodiversity conservation. It is one of the most effective pro-poor approaches to climate change adaptation by way of enhancing the adaptive capacity of the most vulnerable communities – especially women, the elderly and children – as well as the resilience of ecosystems and their services (fresh water, food security, climate regulation, etc.) through restoration of natural capital and biodiversity conservation, restoration and/or regeneration measures. Ecosystem-based approaches, such as support to wetlands and mangrove protection or reef regeneration, often represent low-cost solutions to grey adaptation measures such as sea walls. Failure to act on



Overview continued

rehabilitation is costing our global economy as much as US$20 trillion a year in lost ecosystem goods and services. Across coral reef coastlines, coral reefs reduce the annual expected damages from storms by more than US$4 billion.

For successful EbA, sound understanding of ecosystems and their role in adaptation to and mitigation of climate change impacts is critical. First, climate observations and projections must be studied to understand their impact on local ecosystems and ecosystem services and then ecosystem-based solutions can be proposed. EbA measures often have CO2 mitigation and sequestration potential, support regenerative agriculture, increased fish stocks, restoration of degraded areas, increase tree coverage, protection of wetlands and mountain ecosystems that prevent floods and increase water absorption, the restoration of coastal ecosystems that serve as a natural buffer against ever-more-powerful storms for disaster risk reduction.

UNDP's comparative advantage

UNDP builds on over 20 years of experience supporting climate change adaptation programmes that increase the resilience of vulnerable communities, ecosystems, and ecosystem services to climate change by implementing ecosystem-based adaptation and other nature-based solutions. These solutions help countries achieve multiple SDGs (food security, poverty alleviation, life on land, life on water, climate action), and are efficient measures to accelerate the ambition of NDCs, particularly in mega-biodiverse, forest-rich, and island countries. Nature-based solutions cut across various sectors – including finance, energy, agriculture, forestry and resource extraction, among others – and UNDP's capacity to broker connections, particularly across countries with the capacity and know-how to attract climate finance, and integrate nature-based solutions into other human development and economic activities, provides a unique advantage and opportunity for streamlined approaches.

Challenges

One of the main challenges in the effective implementation of nature-based climate solutions is the inconsistency in methodologies for:

- **Measuring the impacts of the EbA interventions**, in terms of increased level of resilience and adaptive capacity
- **Economic valuation of ecosystem services** and quantifying the resilience dividend of nature, particularly relevant to attract the participation of private financial institutions, insurers and the private sector.

Another challenge in taking the implementation of EbA and nature-based climate solutions to scale is the alignment of the human, financial, economic, industrial and infrastructure risks and losses caused by human-induced environmental degradation – including exacerbation of climate change and climate- induced disasters- with medium- to long-term political and business strategies.

As long as governments, communities or companies continue to plan for short-term gains, the medium- to long-term potential of nature-based solutions to significantly reduce CO2 emissions and elevate quality of life and resilience of humans, will remain largely untapped. EbA calls for a new framework on how populations work with their ecosystems for their survival to climate change.

Main areas of work

• **Integrating ecosystem services** and climate-informed biodiversity rehabilitation/ regeneration as part of national and sub-national resilience strategies or development plans, including NAPs and NDCs.

• **Protecting coastal communities, f**isheries and marine ecosystems including coral reefs from climate change impacts, particularly disaster risks through nature-based solutions, such as mangrove restoration, coral reef rehabilitation, and marine protected areas.

• **Harnessing finance from private sector,** insurers, and financial institutions and de-risking investments for enhancing ecosystem services at scale to adapt to climate change impacts.

• **Building socio-ecological resilience to reduce climate change induced migration** - including income and livelihood security, food sovereignty and disaster risk reduction.

• **Halting or reversing land degradation and desertification** through sustainable land management practices, including ecosystem restoration and protection.

• **Promote sustainable productive landscapes** – including for resilient commodities – through regenerative agriculture measures, agro-forestry, climate- informed protected areas, and integrated water resource management.

• **Improving water management capacity,** including targeted reforestation and forest rehabilitation in degraded landscapes and wetlands.

Successes and key programmes

• **Water resource protection in Costa Rica.** UNDP is supporting targeted restoration of key areas for water resource protection in rural communities. The project has conducted extensive research to identify plant and tree species which can better adapt to projected climate change, in five different ecosystem landscapes, with the aim of protecting aquifers and other water resources for vulnerable communities. The GEF SCCF-funded project is also carrying out the reforestation and vegetative cover restoration activities.

• **Water management in Colombia.** UNDP is supporting wetland restoration in the climate vulnerable area of La Mojana (Depresion Montesina). UNDP is working with national and local officials to improve and incorporate hydrological modelling of the wetlands for enhanced decision making and is providing support in efforts in the restoration of 41,532 ha of wetland through community restoration plans for water management in the face of flooding and drought. Both the Adaptation Fund and GCF-funded projects have looked to incorporate ecosystem based services for climate resilient livelihood alternatives to local communities including productive home gardens, seed banks, fisheries, sustainable agriculture and silvo pastoral systems. These projects have been focused on restoring the adaptive capacities of communities by rescuing local practices for working with their environment and local climate.

Photo: UNDP Colombia

COVID-19

COVID-19 has come to demonstrate the consequences of natural habitat degradation and biodiversity destruction. The pandemic has also laid bare the vulnerability of our economic structure and value chains, as well as deep and persistent inequalities. Nature-positive and climate-resilient economic opportunities can be placed the center of recovery packages. Prioritizing jobs and livelihoods which are climate-informed and nature-based – such as degraded land restoration, mangrove planting and restoration, reforestation for improved water availability, regenerative agriculture, coral reef conservation and restoration, etc. – is vital for our and future generations. Only by partnering with nature and empowering women and youth who are being hardest hit by this pandemic, we will be able to secure a shock-resilient development.

Successes continued

• **Restoring mangroves in Cuba.** This Adaptation Fund-financed project focused one of Cuba's most vulnerable regions due to climate change-associated sea level rise, intense tropical storms, saltwater surges and flooding that impact vital farm irrigation and drinking water sources. The project restored 1,400 ha of mangroves, established 1,500 ha of red mangrove, and restored and enriched 4,300ha of woodlands. The project's true effects will take time (mangroves planted in 2014 are 4-5 feet high today and take 10-15 years to mature), but rehabilitative actions have resulted in emerging protective benefits against flooding and reduced erosion and saltwater intrusion rates.

• **Forest landscape restoration in El Salvador.** UNDP is supporting El Salvador in managing extreme climate variability in the South Ahuachapán region by investing in the restoration and protection of key ecosystems to help the mountainous landscape adapt and build resilience to the impacts of climate change (floods, landslides, drought, erosion). Solutions include investments in agroforestry, silvo pastoral systems, and the recovery of mangroves and riparian forests to allow for landscape recovery and for the incorporation of community and regional livelihood opportunities while working with local authorities for improved governance systems and informed decision making. The AF-funded project will result in the reduced exposure of 30,211 people to extreme weather (droughts and flood from sudden precipitation).

• **Costal resilience in Timor L'este.** The objective of the GEF-LDCF-financed project is to strengthen the resilience of coastal communities through the introduction of nature-based approaches to coastal protection. Issues of coastal areas are complex and cross-sectoral. As mangroves are a vital natural defense to the impacts of climate change, extensive mangrove protection and re-afforestation are supported through the project while also addressing community pressures (such as the felling for fuelwood) by introducing alternative mangrove-supportive livelihoods and improving public awareness about the important role of mangroves in coastal protection. Degraded coastal watersheds, particularly upland areas exert pressures on the coastline through excess sedimentation, increased runoff and flash flood causing more erosion and prolonged inundations. Such broader landscape processes for greater coastal protection are also being addressed.

• **Coastal afforestation and community-based adaptation in Bangladesh.** The GEF-financed project aims to support communities living in coastal afforestation/reforestation sites to adopt resilient livelihoods, introduce regulatory reform and fiscal incentive structures that incorporate climate change risk management, and train volunteers to enhance the understanding of climate risks, disaster preparedness and the benefit of the coastal forest for climate risk mitigation. To date, the project has begun reforestation activities, established a mangrove nursery that is raising over half a million mangrove seedlings, introduced new concepts on agriculture-based options like the cultivation of saline-tolerant rice, provided training on options for livelihood diversification through the introduction of livestock and fisheries options, and supported early warning systems.

• **Wetlands preservation in Uganda.** Financed by the Green Climate Fund, and supported by UNDP, the Uganda wetlands project is working to restore an estimated area of at least 760 square kilometres of degraded wetlands and associated catchments, while improving the lives of at least 500,000 people living in 20 districts in the Eastern and South Western areas of Uganda, which have experienced the highest levels of wetland degradation and climate change impacts. The project is employing a three-pronged approach including: restoration of wetlands and associated catchments, improved agricultural practices and alternative livelihood options in the wetland catchment areas, and strengthening access to climate and early warning information to farmers.

Photo: UNDP Cuba

Innovation and looking ahead

UNDP strives to improve its service offer in the space of nature-based climate solutions and EbA. Below are some areas of innovative work that we are engaging on:

• **Harnessing private sector capital and/or catalyzing additional finance.** A wealth of lessons learned is now available from UNDP's pioneering portfolio, thanks to partnerships with the Global Environment Facility and the Adaptation Fund, amongst other donors and partners. These projects should serve as building blocks for transformational investments in natural capital and biodiversity to promote climate-resilience, crowding-in private finance and other innovative financial mechanisms, including partnering with insurance companies to quantify resilience dividends of nature.

• **EbA in green commodities.** UNDP is partnering with financial institutions and commodity companies to develop programmes that promote deforestation-free and climate-resilient commodities production and linking economic value chains. Examples include a partnership with the Dutch Development Bank and GCF for deforestation-free and climate-resilient beef and soy production, strong results from an Adaptation Fund-financed project in Guatemala that promoted climate-resilient business, along with a project in Peru on Amazon landscapes, and a project on food systems, land use and restoration in Indonesia.

• **Regenerative agriculture.** This practice is achieved by the following principles: no tillage, eliminate the use of pesticides and artificial fertilizers, crop diversification and increasing carbon in topsoil. It also includes managed grazing. Regenerative agriculture promotes the regeneration of soil fertility, microbial diversity and overall health of the soil ecosystem and ecosystem services and is expected to yield emissions mitigation, adaptation, and biodiversity benefits. This practice is linked to addressing food security, climate-induced rural migration and poverty alleviation.

• **Climate-informed protected areas.** UNDP has a large global portfolio on protected areas, however often-times climate observations, impacts, trends and projections have not been analyzed to ensure that these protected areas are "climate-proofed". With tools such as the UN Biodiversity Lab and other interactive online platforms, UNDP can work to fill this gap. This tool could be enhanced by overlapping climate scenarios to the biodiversity and socio-economic filters, which include protected areas mapping. Examples to date include resilience projects in Mexico and Peru.

• **Valuation of ecosystem services. T**his is a key area of work which should be mainstreamed across the EbA portfolio, for efficient design and implementation of projects. EBA requires information on local ecosystems and their services particularly as they relate of managing climate impacts such as extreme weather, precipitation extremes, water availability and management, coastal protection and disaster risk reduction. Valuation of ecosystems services and linking these to resilience indicators such as avoided loss will allow EbA solutions to be mainstreamed as adaptation solutions. Example come from Ecovalor in Cuba.

• **Use of appropriate and innovative technology.** Emerging technologies and approaches, such as drones, blockchains, tags, GIS, high-speed cameras, mobile apps, etc., are increasingly used as tools to enable accurate and precise outcomes in EbA initiatives, including in land-use planning, afforestation, ecosystem restoration, livelihood promotion, etc., and transforming the way projects are managed. UNDP will design more innovative and multifaceted projects that adopt these emerging technologies and approaches.

Connecting with the big picture

• **Accelerating the ambition of NDCs.** Ecosystem-based adaptation and nature-based solutions will be key to support countries in accelerating the ambitions of NDCs. Nature-based solutions can deliver one third of the cost-effective CO2 mitigation needed through 2030. Increasing nature-based solutions in the NDCs can contribute to improving livelihoods and reducing inequality, securing food and water, improved resilience and disaster risk reduction (directly contributing to climate adaptation), and biodiversity conservation, in addition to the evident climate mitigation benefits.

• **The Super Year for Biodiversity and New Deal for Nature.** Nature-based solutions integrate well into actions on biodiversity. With high-level events on oceans and biodiversity slated for 2020, there's a strong opportunity to further advance the ambition of nature-based climate actions.

• **Reaching the SDGs.** These solutions not only provide chances to end poverty and hunger, but also provide support to the SDGs on good health and well-being, clean water, innovation, sustainable cities, and life below water and on land. It pays particular attention to rural areas thus helping bridge the rural -urban divide by linking them through ecosystem-based services and benefits.

• **Redd+ and the climate change mitigation potential of forest management.** Nature-based solutions relies on the rehabilitation and restoration across various forest landscapes while incorporating indigenous populations and forest communities in keeping with REDD+ goals and objectives. As such, these measures account for achieving "Bonn Challenge" targets and for land-based targets to be included within their REDD+ plans and commitments.

Partnerships

UNDP will work to strengthen its existing partnerships while forging new and strategic ones to accelerate achievement of the SDGs. It will continue to support governments in their effort to address climate change impacts by integrating EbA into their relevant national plans and policies, where possible. UNDP will convene different partners, ranging from government, other UN agencies, civil society organizations, research institutes, private sector, etc., at events of different levels (national, regional, international) to support cross fertilization of ideas and good practices on EbA initiatives.

Existing

- **GEF, AF, and GCF- funded Ecosystems and Biodiversity focal area programming**

New and emerging areas of partnerships

- **Development Financial Institutions.** UNDP is partnering with financial institutions such as FMO (Development Bank of the Netherlands) and commodity companies to develop programmes that promote deforestation-free and climate-resilient commodities production (ie. Paraguay FMO project, with GCF finance).
- **UNDRR.** With the aim of aligning national adaptation and disaster risk reduction strategies, UNDRR has sought collaboration with UNDP to promote this work in recognition of UNDP's large on-the-ground adaptation portfolio. It is imperative to take into account EbA measures into these strategies, particularly in regards coastal adaptation for DRR. A regional conference is being organized by UNDP, UNDRR, UN Environment and other actors for the Caribbean region in June 2020 for this purpose.
- **UN Environment.** UNDP and UN Environment were two of the main pioneers of EbA measures in the context of GEF programming. In this regard, there is a wealth of knowledge accumulated by both agencies which should be tapped into and systematized into standardized methodologies, toolkits, and knowledge products for the benefits of adaptation, biodiversity and climate change practitioners worldwide.

Photo: UNDP Uganda

Impact

Photo: UNDP Colombia

“I have guavas, lemons, oranges, tangerines, coconuts, passion fruits, chilies, eggplants, yuccas, yams and rice. We raise the areas under cultivation so that they are not flooded. Alternatively, we make circular gardens by digging ring-like ditches. The arable part is in the centre, elevated and protected from the water. In this way, the soil conserves humidity during the dry season.” - Zoila Guerra, Colombia

Colombia piloted ecosystem-based adaptation approaches following the devastating floods of 2010 with a UNDP-supported Adaptation Fund-financed project designed to put sustainable ecosystem management at the centre of disaster risk reduction by promoting healthier watersheds, protecting communities from floods and supporting poor rural populations to overcome water scarcity during prolonged dry seasons.

Building on the successes of the pilot, a project funded by the GCF is continuing this work. Among its various efforts to promote climate-resilient agriculture, the project works with local communities to identify and reintroduce native crops that had fallen into disuse despite being more resistant to erratic rainfall and high temperatures.

To ensure long-term resilience and sustainability, the project is also developing community-managed seedbanks. To date, more than 80 native species have been recovered in the districts of Ayapel, San Marcos, and San Benito Abad in La Mojana. As a direct result of improved access to a greater variety of plants and seeds, the food on families’ table is more diverse, supporting improved nutrition, food security and health.

Ongoing work is also serving to catalogue the best practices used to develop seedbanks, with one such seedbank slated to be replicated in a project in El Salvador.