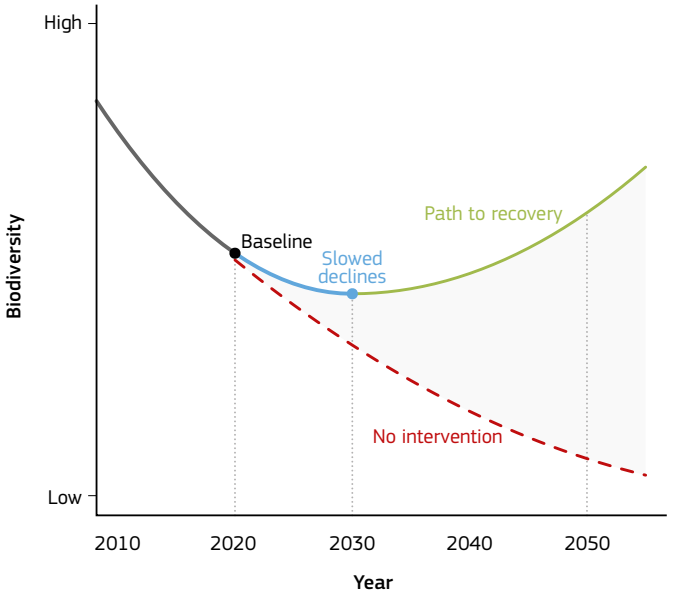


5.2 Bending the curve of biodiversity loss: the need for restoration

5.2.1 Priority areas for terrestrial ecological restoration

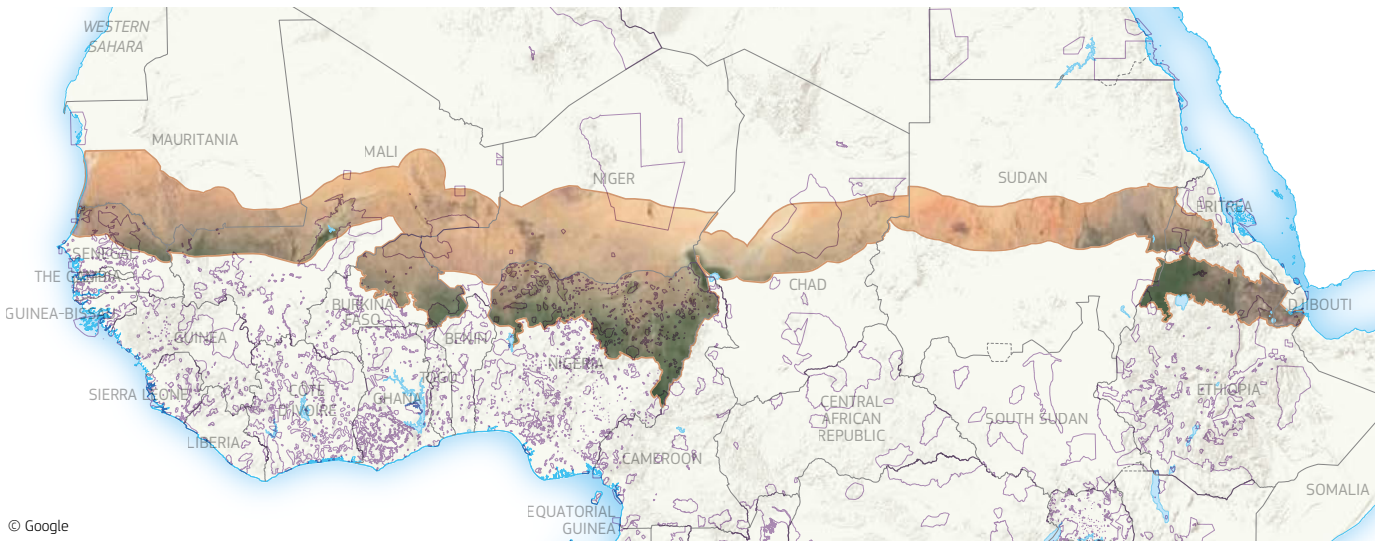
The Global Biodiversity Framework calls on parties to not just halt biodiversity decline, but to also improve the state of nature relative to current baselines. This ambition, known as 'bending the curve', will only be possible through targeted restoration interventions. Although restoration programs can affect biodiversity positively, rewinding ecosystems by reintroducing native species may be equally crucial for speeding up restoration.

Parties to the Kunming-Montreal Global Biodiversity Framework agreed not only to preserving existing biodiversity, but also to improving it in upcoming decades. This concept has become known as 'bending the curve' of biodiversity loss. Target 1 of the Framework aims to use integrated spatial planning "to bring the loss of areas of high biodiversity importance, including ecosystems of high ecological integrity, close to zero by 2030", while Goal A of the Framework calls for "substantially increasing the area of natural ecosystems by 2050". These lofty ambitions will only be possible through targeted ecological restoration. Target 2 of the Framework appeals to parties to "ensure that by 2030 at least 30% of areas of degraded terrestrial, inland water, and coastal and marine ecosystems are under effective restoration". Therefore, identifying the area where restoration will have the biggest impact will be a major policy priority in upcoming decades.



✂️ Bending the curve of biodiversity loss. The Kunming-Montreal Global Biodiversity Framework aims to bring the loss of areas of high biodiversity importance close to zero by 2030 (Target 1) and substantially increasing the area of natural ecosystems by 2050 (Goal A). Source: Own illustration.

The feature map shows parts of Africa that are potentially available for restoration, which includes croplands and cultivated grasslands¹. The colours show how each site ranks globally as a restoration priority based on a combination of three criteria: (1) the potential increase in carbon storage from returning the land to its native vegetation cover, (2) the reduction of extinction risk for mammals, birds and amphibians if land is returned to natural habitat, and (3) the opportunity costs of foregoing the production of agricultural commodities.



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In Africa, sites of highest restoration priority tend to coincide with global biodiversity hotspots. These include the Guinean Forests of West Africa as well as the Moist Forests of eastern Madagascar. The Albertine Rift and the Ethiopian Highlands in East Africa – areas with high endemism – also rank highly in terms of restoration priority. It should be emphasised, however, that lower ranking sites are still candidates for restoration. Large parts of the Sahel and Southern Africa would still benefit from restoration, though the relative ecological improvement or agricultural costs would probably be higher compared to other parts of the continent.

Restoration activities can take many different forms. They can be small afforestation projects that culture native trees in nurseries to revegetate patches of degraded forests. Or they can be mega programmes that cover several countries with multiple social and environmental objectives. The largest of these mega-programmes is the Great Green Wall Initiative². This initiative promises to be the world's largest and most ambitious environmental restoration scheme by targeting an 8000km corridor of degraded land across eleven countries between Senegal in the west and Djibouti in the east. As if holding back the southward expansion of the Saharan Desert is not enough, the Great Green Wall Initiative also aims to improve people's livelihoods, enhance social and ecological resilience to climate change, and establish partnerships between Sahelian states³.

Economic modelling of the Great Green Wall Initiative found that investing in land restoration would require at most 10 years to break even, ultimately leading to a 20% return on investment on average⁴. These returns would include direct-use provisioning ecosystem services (e.g., food, fodder, timber, non-timber products) as well as indirect-use ecosystem services (e.g., carbon sequestration, air quality regulation). These benefits were, however, spread unevenly across the Great Green Wall footprint.



Ecosystem restoration can improve habitat for wildlife, but wildlife can also improve ecosystem restoration. Perhaps the best example of the positive impact of rewilding is Gorongosa National Park, Mozambique. This area was naturally rich in megafauna, but decades of civil war between 1977 and 1992 drove most species to the edge of extirpation. Since 2004, the Gorongosa Project sought to re-establish the mammal community by removing hunting pressure and reintroducing mega-herbivore species like buffalo, wildebeest, and elephant⁵. Within a decade of rewilding, scientists found signs that the mammals were dispersing more seeds from a greater variety of plant species⁶. Similarly, research showed how the returning herbivores suppressed the highly invasive shrub, *Mimosa pigra*, improving the ability of the ecosystem to withstand the negative impacts of invasive species⁷. By simply following their natural feeding patterns, wild species speed up ecological recovery much faster than people could mechanically or chemically.

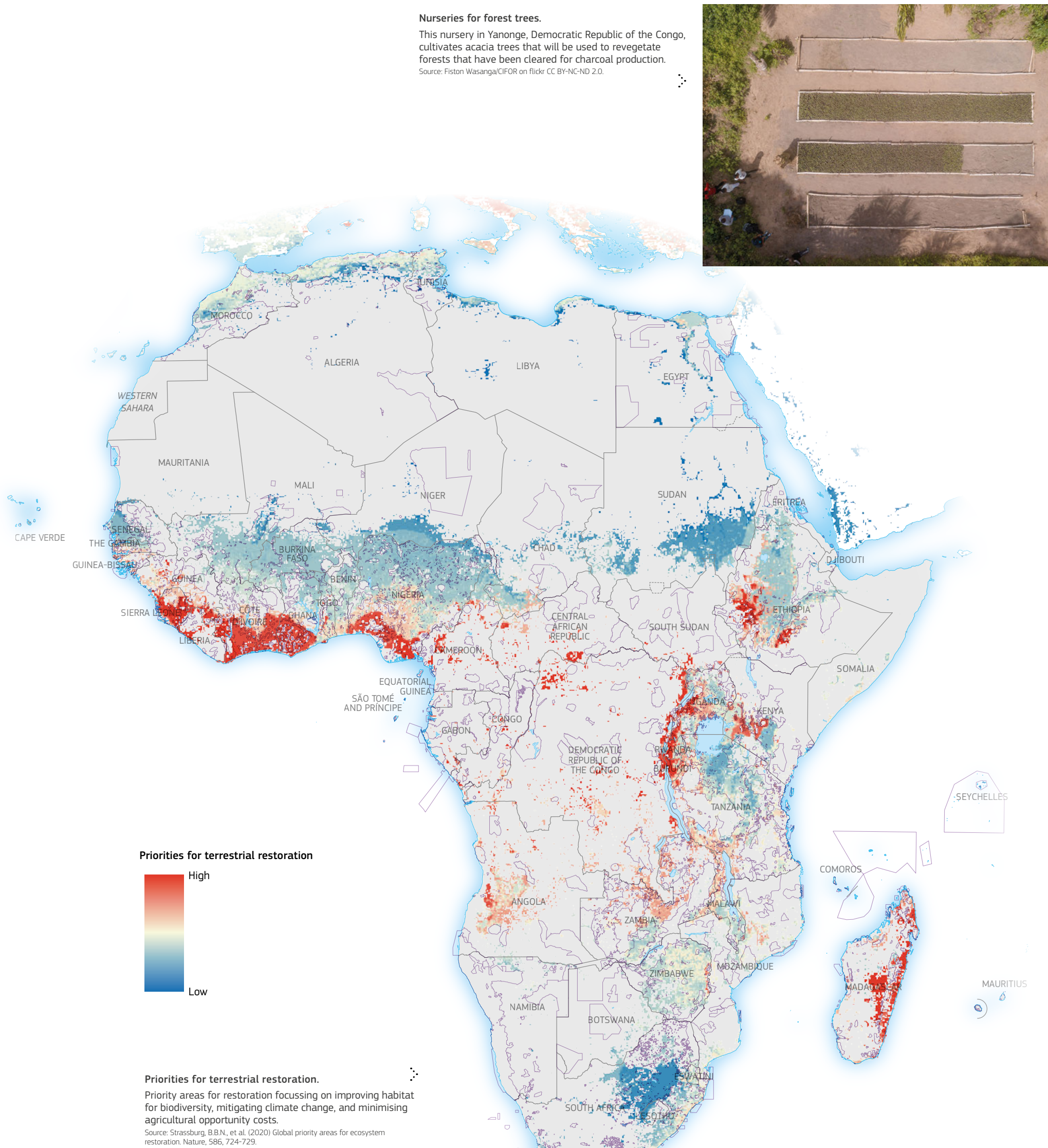


✂️ Gorongosa National Park, Mozambique. After being depleted by years of civil war, large mammals have been systematically reintroduced to Gorongosa National Park. Their reintroduction has re-established natural seed dispersal and eradicated invasive shrubs. Source: Brian Dell on Wikimedia Commons CC0 1.0.

The next few decades will entail changing the focus from preserving nature, to actively enhancing it. Spatially explicit prioritisations will be important to identify places where restoration is ecological effective without being prohibitively expensive. Strategic rewilding will become more important for revitalising natural ecological processes and speeding up restoration, demonstrating the importance of basic ecological research. Importantly – as shown by the Great Green Wall Initiative – restoration is not just about ecological improvement. Through Africa, researchers and policy officers will have to be creative in finding ways of using ecological restoration as a tool for social and economic development.

✂️ The Great Green Wall Initiative. The world's largest and most ambitious environmental restoration scheme targets an 8000km corridor of degraded land in the Sahel, across eleven countries between Senegal in the west and Djibouti in the east. Source: United Nations Photo on Flickr CC BY-NC-ND 2.0.

✂️ The Footprint of the Great Green Wall Initiative. This footprint is the most recent delineation that combines the original 15 km wide corridor for the Great Green Wall with the subnational administrative boundaries indicated by national plans and/or Great Green Wall project areas. Source: FAO & African Union (2021) Africa Open D.E.A.L.: Open Data for Environment, Agriculture and Land & Africa's Great Green Wall. Food and Agriculture Organization of the United Nations.



Nurseries for forest trees. This nursery in Yanonge, Democratic Republic of the Congo, cultivates acacia trees that will be used to revegetate forests that have been cleared for charcoal production. Source: Fiston Wasanga/CIFOR on Flickr CC BY-NC-ND 2.0.

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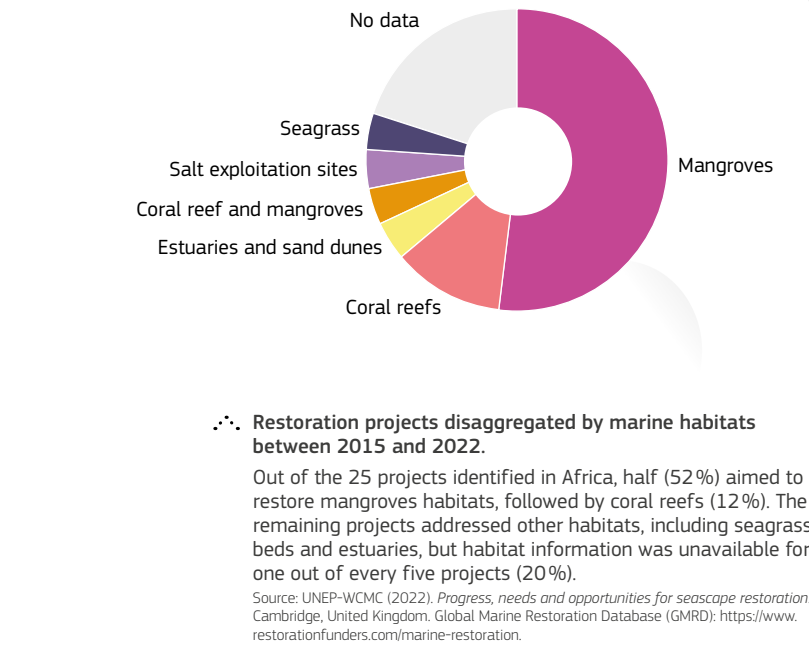
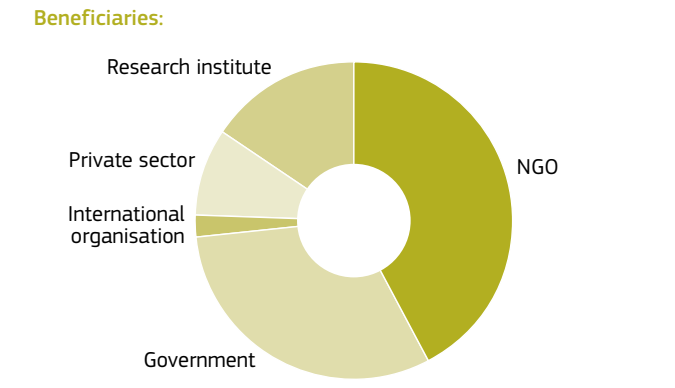
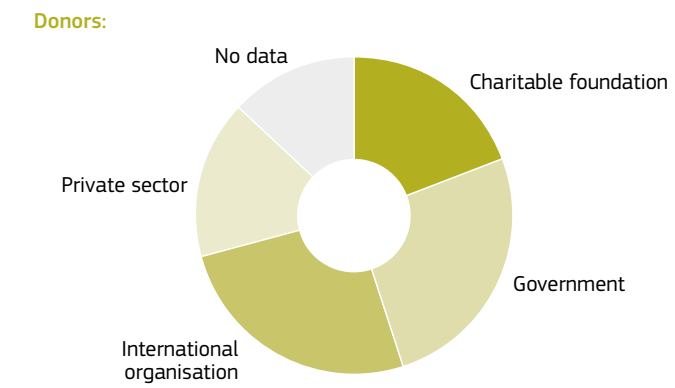
5.2.2 Progress on marine and coastal ecosystem restoration

Restoring coastal and marine habitats is essential to counteract the decline in marine biodiversity, ecosystem functioning, and the reliable supply of nature's contributions to people. According to the Global Marine Restoration Database, approximately 25 marine and coastal restoration projects were carried out in Africa over the period 2015–2022, accounting for over 10% of global marine and coastal restoration efforts.

Under the UN Decade on Ecosystem Restoration, restoration is “the process of halting and reversing degradation, resulting in improved ecosystem services and recovered biodiversity... [encompassing] a wide continuum of practices, depending on local conditions and societal choice”¹. Restoration projects can involve a variety of actions, such as boosting fish populations, cleaning polluted sites, and conserving wildlife or plants using active or passive measures².

Restoring coastal and marine habitats is crucial for reversing the decline in marine biodiversity, ecosystem functioning, and the reliable supply of nature's contributions to people. These contributions include climate change mitigation, safeguarding coastal livelihoods, coastal protection, and healthy fish stocks. It is becoming more apparent that coastal and marine restoration is crucial for ecological resilience and adaptation. In the past decade, the number of marine restoration projects has increased significantly, as restoration efforts are integrated into international policies and investment strategies around the globe. Restoring coastal marine habitats is crucial for supporting multilateral environmental agreements like the Paris Agreement, the 2021–2030 UN Decade on Ecosystem Restoration, and the Kunming-Montreal Global Biodiversity Framework's ambition to restore 30% of degraded ecosystems by 2030.

Scaling up restoration efforts will depend on refining the way the scientific community prioritises marine and coastal areas, and how these priorities can be supported through novel funding mechanisms³. The UN Environment Programme's World Conservation Monitoring Centre (UNEP-WCMC) produced a report with an accompanying database to identify large seascape-scale projects². The report and database offer a high-level analysis of marine restoration projects carried out from 2015 to 2022. The results from this database are shown in the feature map, demonstrating how restoration projects occur throughout the continent, but are concentrated in the Western Indian Ocean. The database aims to enhance the UN Decade on Ecosystem Restoration's rapidly expanding knowledge base to support evidence-based restoration decisions.



Share of donors and beneficiaries of marine and coastal restoration projects between 2015 and 2022.

According to the Global Restoration Database, African marine ecosystem restoration projects were funded by a variety of donors, primarily governments, international organisations, charitable foundations, and private entities. Several projects received funding from multiple sources. Beneficiaries were mostly NGOs, governments, and research institutes, though 60% of projects involved collaboration between multiple organisations.

Source: UNEP-WCMC (2022). *Progress, needs and opportunities for seascape restoration*. Cambridge, United Kingdom: Global Marine Restoration Database (GMRD). <https://www.restorationfunders.com/marine-restoration>.

Atlantic Ocean coast:

Indian Ocean coast:

Coral Reef Restoration

The United Nations launched two major initiatives for the decade 2021 to 2030: the Decade on Ecosystem Restoration and the Decade on Ocean Science for Sustainable Development. Central to the UN Decade on Ecosystem Restoration are initiatives to restore ecosystems to enhance food security, address climate change, and protect crucial habitats. Concurrently, the Decade on Ocean Science for Sustainable Development seeks to bolster ocean science to support sustainable management, aligning with the 2030 Agenda for Sustainable Development.

In 2020, UNEP published the report on Coral Reef Restoration as a Strategy to Improve Ecosystem Services⁴. This report guides practitioners, managers, and decision-makers on how to evaluate coral reef restoration at local, regional, and global levels. Coral reef restoration involves various actions, such as translocating nursery-grown corals onto reefs to stimulate coral growth. Coral reef restoration supports tourism and local fisheries by improving ecosystem function, resilience, and adaptation to local and global threats⁴.

Numerous global and regional commitments support initiatives like the Coral Research and Development Accelerator Program, the Coral Reef Breakthrough, and the International Coral Reef Initiative, which all contribute to conserving coral ecosystems^{5,6}. Through these kinds of initiatives, the coral reef restoration community can expand and collaborate with practitioners, scientists, managers, policymakers, and the private sector. Their collective goal is to enhance ecosystem services, to promote tourism and bolster coastal resilience.



The Reef Rescuers project.

Nature Seychelles' Reef Rescuers project – launched in 2010 and funded by USAID, GEF, and now the Adaptation Fund – addresses the damage caused by coral bleaching by actively restoring corals at selected sites around the Praslin and Cousin Island Special Reserve. To date, the project has raised around 64 000 corals in underwater nurseries, and successfully outplanted over 37 000 corals. A major milestones of the project was constructing Africa's first large scale land-based nursery (named ARC: Assisted Recovery of Corals), which introduced the cutting-edge techniques of microfragmentation and coral reproduction. The project also contributed to research, international scientific collaboration, public outreach, and training to more than 100 local and international coral restoration stakeholders.

Source: Nature Seychelles/ Hugo Bret with permission, all rights reserved.

Community-developed mangrove restoration

A holistic socio-ecological approach to marine and coastal restoration can identify synergies between human societies and nature. Exchanging knowledge between communities, researchers, decision-makers, and practitioners can foster behavioural shifts towards responsible use and stewardship of coastal ecosystems⁷. Coupled social and ecological restoration initiatives rely on a wide array of knowledge, including from local communities. For instance, mangrove habitats are crucial for local livelihoods and integrating local ecological knowledge with scientific research can slow mangrove loss and ensure sustainable positive outcomes⁸.



Community-led mangrove restoration in Madagascar.

The mangrove forests of south-western Madagascar are the focus of one of the world's largest community-driven mangrove carbon conservation projects. The project, Tahiry Honko ('preserving mangroves' in the local Vezo dialect), aims to establish a sustainable, long-term payment for ecosystem services programme in the Velondriake Locally Managed Marine Area. Conserving, reforesting, and using over 1 200 hectares of mangroves sustainably can avert the release of over 1 300 tonnes of carbon dioxide. By selling verified carbon credits, the project seeks to combat deforestation and degradation. Revenue will bolster local marine protected area management, community development, healthcare, and education. In doing so, the project will engage with and empower almost 900 smallholder families.

Source: Philippa Clark/Blue Ventures, with permission, all rights reserved.

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