European Commission

European Climate, Infrastructure and Environment Executive Agency

Nature-based Solutions:

How LIFE works with nature for people

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European Commission

Nature-based Solutions:
How LIFE works with nature for people

March 2026

Introduction

Climate change and biodiversity loss are two of the greatest challenges we face today. These twin crises are closely interconnected – climate change accelerates the decline of both habitats and wildlife, which in turn means nature is less able to cope with and adapt to the impacts of climate change. Therefore, addressing them requires joined-up policies and solutions.

The European Commission defines Nature-based Solutions as:

'Solutions that are inspired and supported by nature, which are cost-effective, simultaneously provide environmental, social and economic benefits and help build resilience. Such solutions bring more, and more diverse, nature and natural features and processes into cities, landscapes and seascapes, through locally adapted, resource-efficient and systemic interventions.'

https://research-and-innovation.ec.europa.eu/research-area/environment/nature-based-solutions_en

The LIFE Programme is the EU's funding instrument dedicated to environmental and climate action, supporting projects that contribute to the implementation of EU policies and legislation.

This brochure provides an overview of how the LIFE Programme is delivering Nature-based Solutions (NbS) to the challenges posed by climate change and biodiversity loss.

NbS benefit both nature and people.

NbS boost biodiversity and build ecological and climate resilience by preserving and restoring ecosystems such as grasslands, forests, wetlands, peatlands and seagrass meadows.

NbS also capture greenhouse gases (GHGs) such as carbon dioxide (CO_2) and methane from the atmosphere and store them in vegetation and soil.

At the same time, NbS are also highly effective for climate change adaptation and disaster risk reduction. Wetlands, coasts and forests help reduce our vulnerability to natural disasters such as floods, storms, sea level rises, droughts and wildfires, acting as natural barriers and shock-absorbers.

NbS can also support sustainable farming and forestry businesses, and improve air and water quality.

NbS are a priority for European policy as they are effective, sustainable responses to environmental challenges. The **European Green Deal** – the EU strategy for creating a sustainable, competitive, climate-neutral Europe by 2050 – underlines the importance of NbS for building climate resilience, protecting biodiversity and restoring ecosystems.

Against this background, the **Natura 2000 network** – Europe's largest coordinated network of protected areas – plays a key role by preserving critical habitats that act as natural buffers against floods, droughts and other climate-related risks. European policies and initiatives promote the integration of nature into planning and infrastructure to enhance resilience while supporting biodiversity conservation.

This brochure features LIFE projects which deliver cost-effective NbS to help the EU reach its climate and nature restoration objectives through:

1. **revitalising wetlands to prevent flooding;**
2. **restoring peatlands as important carbon sinks;**
3. **managing coastal zones to tackle the impacts of climate change;**
4. **getting closer to nature with climate-smart forestry;**
5. **benefitting both people and planet through agroforestry;**
6. **enhancing governance and funding.**

1. Revitalising wetlands to prevent flooding

Floodplains are essential for social, environmental and economic wellbeing. They cover 7% of Europe's land area and up to 30% of the terrestrial Natura 2000 network. However, 70-90% of floodplains across the EU **have been significantly degraded** by centuries of drainage for urbanisation and agriculture. NbS can successfully restore vital ecosystems and help protect Europe from floods, often at a lower cost than **conventional flood protection schemes**. Such measures also improve water quality, boost biodiversity, store carbon and increase recreational value, whilst retaining water which can then be used during droughts.

In Flanders, Belgium, the **Sigma Plan** was launched by the Flemish government after disastrous floods in 1976. It aims to improve flood protection by reinforcing dykes and controlling floodplains along the River Scheldt, while at the same time promoting natural habitats and recreational activities.

Two LIFE projects – **LIFE+SCALLUVIA** and **LIFE SPARC** – have been key to the success of the Sigma Plan, transforming the Scheldt Valley into a harmonious mix of flood protection, biodiversity conservation and leisure activities. The transformation brought about by these projects has resulted in the **Scheldt Valley being designated a national park** in October 2024, recognising the valley's unique mosaic of saline, brackish and freshwater zones, stretching up to 170 km inland.

LIFE+SCALLUVIA restored alluvial forests and natural eutrophic lakes in the Kruibeke-Bazel-Rupelmonde area of the Scheldt Estuary. Reviving this valuable Natura 2000 site kick-started the return of species such as the European otter, spined loach and European bitterling, while populations of common kingfisher, little bittern, purple heron and bluethroat increased. The project also focused on promoting recreational activities and creating economic benefits by reducing flood risks in nearby urban areas.

LIFE SPARC created an additional 400 hectares (ha) of dynamic tidal zones and wetlands including reed beds and willow-tide forests, which benefit numerous species significant for biodiversity conservation. In this densely populated region close to the port of Antwerp, these zones also significantly reduce the risk of flooding from high water levels and storm surges.

2. Restoring peatlands as important carbon sinks

Peatlands – also known as bogs, mires or moors – are unique wetland ecosystems characterised by the accumulation of partially decomposed plant material: peat. Covering only about 3% of the Earth's land surface, peatlands harbour an astonishing variety of species and essential natural habitats. With their mixed ecosystems of bogs, fens and mires, peatlands are home to numerous plants, birds, amphibians and insects, many of which are endangered. Peatlands also help to purify water, store huge quantities of carbon and reduce flood risks.

Today, however, **only 10% of EU peatlands are in a good ecological condition**. The vast majority have been degraded by centuries of drainage, peat extraction and land conversion – releasing stored CO_2 and switching peatlands from carbon absorbers to carbon emitters.

Both **LIFE Peat Restore** and **LIFE MULTI PEAT** focused on the large-scale restoration and rewetting of degraded peatlands, enabling them to act as **carbon sinks** once more. The projects improved habitats and stabilised water flows, allowing native indicator species – species which provide information on the overall condition of an ecosystem – to recover, while preventing further carbon emissions. The rewetted peatlands now act as sponges, storing water during abundant rainfall and releasing it in times of drought.

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LIFE Peat Restore revived 5 300 ha of peatlands at 10 sites in Estonia, Germany, Latvia, Lithuania and Poland. The project blocked drainage ditches to rewet the peatlands and reintroduced peat-forming plants. It also gathered robust scientific data and evidence of the benefits of peatland restoration for use in developing national and EU policies.

LIFE MULTI PEAT built on these lessons to develop an EU-wide policy catalogue, a data portal and a policy development tool. Additionally, the project rewet 689 ha across Belgium, Germany, Ireland, the Netherlands and Poland – tracking GHG reductions and issuing carbon credit certificates – and experimented with farming on rewetted peatlands – known as **paludiculture** – as a sustainable alternative to draining peatland for agriculture.

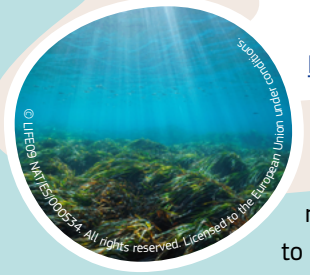
Other projects in this area: **LIFE WETLANDS4CLIMATE**, **LIFE PeatCarbon** and **LIFE IP PAF-WILD ATLANTIC NATURE**.

3. Managing coastal zones to tackle the impacts of climate change

Healthy coastal biodiversity and habitats protect us from storms and sea level rises, reduce shoreline erosion and regulate coastal water quality. They also give shelter to commercially important fisheries and endangered marine species, and provide food security for many coastal communities. These ecosystems are also now recognised for their important role in mitigating climate change, as they absorb and store significant amounts of coastal **blue carbon** – carbon sequestration by marine and coastal ecosystems – from the atmosphere and ocean.

However, with their fragile ecosystems, coastal zones are particularly vulnerable to urban expansion, uncontrolled tourism, over-fishing and intensive farming – all of which can lead to their rapid deterioration. Coasts and shores are further threatened by climate change impacts such as sea level rises and extreme weather.

Coastal NbS – such as restoring dunes, estuaries and seagrass meadows – are not only essential, they are also sustainable, cost-effective and resilient.



Life Posidonia Andalucia focused on the long-term protection and conservation of the important Posidonia seagrass meadows in southern Spain, home to a wide range of marine species. The project included a study of their economic, social and cultural benefits, and the significant impact on fisheries and CO_2 emissions when seagrass meadows degrade.

Dutch dune revival expanded and restored nearly 190 ha of sand dunes in three coastal Natura 2000 sites in the Netherlands. The project used innovative wind dynamic models to enlarge and strengthen the dunes, achieving remarkable results which far exceeded expectations, while providing valuable defences against sea level rises.

LIFECOASTadapt illustrates the benefits of using natural processes and ecosystems instead of hard engineering alone. The project tested several NbS along 500 km of sandy coast in southern Sweden, removing hard structures, replanting native dune species and eelgrass beds, creating wetlands and replenishing sandy beaches.

Lying just north of La Rochelle on the Atlantic coast of France, the Bay of Aiguillon is a national nature reserve covering 1 100 ha of salt marshes and 3 700 ha of mudflats. **LIFE Baie de l'Aiguillon** enhanced the bay's intrinsic natural value by restoring coastal habitats to act as flood defences and limit the negative impacts of mass tourism.

Another project in this area: **Amsterdam Dune project**.

Building on the work of **LIFE Ad'Apto**, **LIFE adapto+** develops a standardised method for nature-based, flexible coastal management with the involvement of local stakeholders. The project tests the approach in 15 pilot sites to demonstrate that ecosystem-based coastal protection can be the norm rather than the exception.

4. Getting closer to nature with climate-smart forestry

European forests are increasingly at risk due to climate change, making them ever more vulnerable to droughts, diseases, pests and wildfires. Despite these challenges, forests remain a crucial provider of **ecosystem services** by sheltering nature and wildlife, filtering water, producing oxygen, preventing soil erosion and storing carbon. They also help to prevent landslides and reduce flood risks while providing timber, fuel and space for recreation and wellbeing.

The **EU Guidelines on closer-to-nature forest management** promote multifunctional forests with complex and varied ecosystems which can store more CO_2 and generate sustainable revenues from timber and timber products. Many LIFE projects manage forests in a way that encourages rich biodiversity, economic viability and climate-resilience – an approach known as 'closer to nature' forestry (CNF). Such projects enhance the vitality and resilience of European forests by (re)creating healthy, diverse, well-connected ecosystems which help woodland species adapt to a changing climate.

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In Portugal, **LIFE LANDSCAPE FIRE** tested new, highly effective ways of preventing forest fires such as controlled burning and targeted livestock grazing which reduce the amount of flammable material and limit the spread and intensity of wildfires. A combination of recreated mosaic landscapes, invasive species control and vegetation management resulted in a reduced fire risk, greater resilience, less soil erosion and thriving native biodiversity. GHGs also fell by the equivalent of 20 million tonnes of CO_2 per year – roughly equivalent to the emissions of seven coal-fired power plants.

In the same project, farmers, shepherds and rural communities generated income from fire prevention strategies such as extensive livestock grazing, helping to revitalise rural areas and encouraging sustainable land management. Their approach earned them a nomination for the **LIFE Awards 2025** and many of these practices have been further adopted across Portugal and Spain.

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LIFE4Forest aimed to make CNF planning and management more straightforward in 220 forest locations, covering 4 850 ha. Using CNF in public forests transformed traditional single-species conifer stands and encouraged private forestry companies to do the same. The team also trained forest managers in the economics of CNF conversion, introducing and promoting new ways to monitor growth, yield, health, biodiversity and carbon storage in CNF conifer forests.

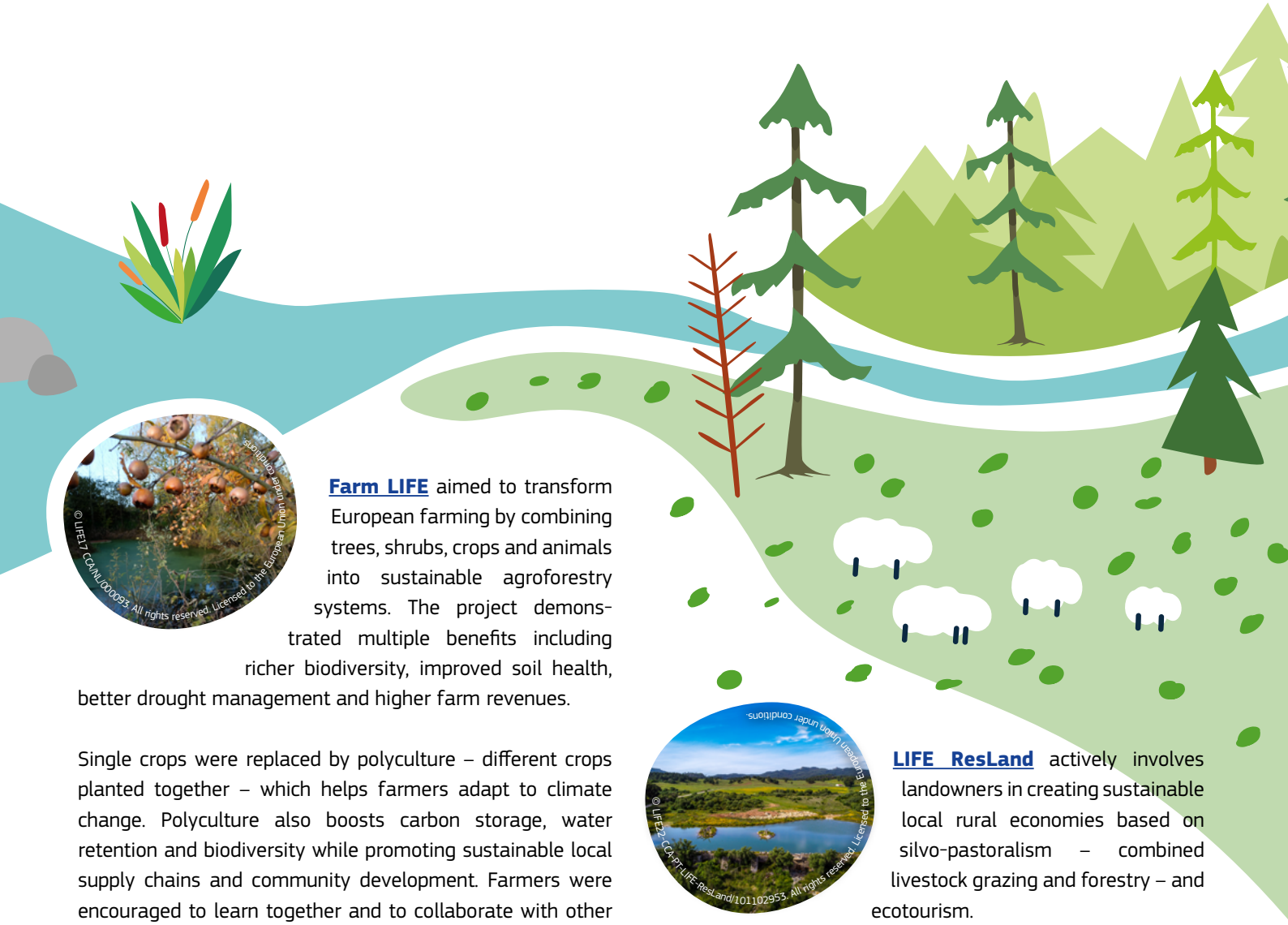
Other projects in this area: **LIFE ADAPT-ALEPPO**, **LIFE RedBosques Clima**, **LIFE CLIMATE FOREST** and **LIFE CLIMARK**.

5. Benefitting both people and planet through agroforestry

Agroecology and agroforestry are two powerful NbS which combine sustainable farming with biodiversity conservation and ecosystem services. They contribute to saving water, improving soil health, increasing carbon stored in soil and preventing soil erosion. They also promote food security, climate resilience and richer biodiversity on mixed agricultural landscapes that offer habitats for wildlife and pollinators.

Agroecology ensures a regenerative use of natural resources and ecosystem services by applying ecological principles to agriculture, and addresses the need for socially equitable food systems.

Agroforestry is a land use system in which trees are grown in combination with agriculture on the same land.



Farm LIFE aimed to transform European farming by combining trees, shrubs, crops and animals into sustainable agroforestry systems. The project demonstrated multiple benefits including richer biodiversity, improved soil health, better drought management and higher farm revenues.

Single crops were replaced by polyculture – different crops planted together – which helps farmers adapt to climate change. Polyculture also boosts carbon storage, water retention and biodiversity while promoting sustainable local supply chains and community development. Farmers were encouraged to learn together and to collaborate with other interested partners to solve practical challenges and create opportunities for effective climate-smart agriculture.

LIFE ResLand actively involves landowners in creating sustainable local rural economies based on silvo-pastoralism – combined livestock grazing and forestry – and ecotourism.

The project helps the Sintra-Cascais Natural Park in Portugal to become less prone to forest fires by creating mosaics of forest and grazing land which naturally control the amount of flammable vegetation. The project also aims to protect regionally and nationally local breeds of goats, donkeys and horses, and to demonstrate that silvo-pastoralism provides essential low-cost benefits for both nature and people.

Other projects in this area: **LIFE AgroForAdapt**, **LIFE SILFORE** and **LIFE-AFaktive**.

6. Enhancing governance and funding

NbS provide resource-efficient solutions to multiple environmental problems, but they need coordination and support to realise their full potential. Networks, guidance, tools, technical support and adequate funding must be established and coordinated at European, national and regional levels. Such support enables sustainable, scalable NbS projects that align climate adaptation, biodiversity, water and land use across policies, sectors and territories.

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LIFE strategic integrated projects (SIPs) aim to address such challenges. In France, for example, **LIFE IP ARTISAN** provides a toolkit to mainstream NbS and strengthen climate resilience through national coordination and policy integration. The project helps institutionalise NbS and adds value by accelerating and embedding climate resilience and ecosystem-based adaptation across policies and practices.

Nature-based Solutions: the future

The health of Europe's nature and wildlife continues to deteriorate, despite strong protection from the **EU Birds and Habitats Directives**. Many protected species and habitats – in the Natura 2000 network and beyond – are under threat, along with the ecosystem services they provide.

The **2030 EU Biodiversity Strategy** aims to arrest this decline by looking beyond Natura 2000 to 'a truly coherent Trans-European Nature Network' which will significantly increase protected terrestrial, freshwater and marine ecosystems to cover 30% of EU territory. The 2024 **EU Nature Restoration Regulation** – another important step towards realising the European Green Deal – sets an ambitious target of restoring 20% of the EU's land and sea areas by 2030, and all ecosystems in need of restoration by 2050.

At the same time, Europe has the ambitious goal of reaching zero CO_2 emissions by 2050 enshrined in its **Climate Law** but it will also have to face inevitable consequences from climate impacts already visible and exacerbating in the near future as evidenced by the **European Climate Risk Assessment.** For this reason, the Commission is preparing a new, ambitious **Integrated European Framework for Climate Resilience**.

Despite requiring long-term commitment and patience, NbS offer significant environmental, economic and social returns – as evidenced by numerous LIFE projects over the past three decades. NbS help EU Member States achieve their climate mitigation, adaptation and nature restoration targets while reducing the negative effects of extreme climate events. They demonstrate that aligning nature and climate policies are central to the success of the European Green Deal and the Natura 2000 network. Crucially, LIFE projects are living proof that NbS are an efficient and cost-effective way to ensure a resilient, equitable and liveable future for us all.

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The LIFE Programme is the EU's funding instrument dedicated to environmental and climate action, supporting projects that contribute to the implementation of EU policies and legislation. This brochure provides an overview of how the LIFE programme is delivering Nature-based Solutions to the challenges posed by climate change and biodiversity loss. The brochure highlights the achievements of 14 EU-funded projects, according to the following themes: revitalising wetlands to prevent flooding; restoring peatlands as important carbon sinks; managing coastal zones to tackle the impacts of climate change; getting closer to nature with climate-smart forestry; benefitting both people and planet through agroforestry; and enhancing governance and funding.

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