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OFFICE FRANÇAIS DE LA BIODIVERSITÉ

ADAPTING TO CLIMATE CHANGE: NATURE HAS THE SOLUTIONS

Life

artisan

THERE IS NO DOUBT:
HUMAN ACTIVITIES CONTRIBUTE TO THE EROSION OF BIODIVERSITY AND TO CLIMATE CHANGE

Biodiversity in danger and climate change: it's all linked

Biodiversity is vital for human populations because it provides many services: oxygen production, natural water purification, regulation of air and soil quality, carbon sequestration, pollination, etc. For nearly 200 years, human activities have been causing a decline in biodiversity at an unprecedented rate and also contributing to climate change. Recognised as one of the five main drivers of the loss of biodiversity according to IPBES[1], this climatic upheaval results in a cascade of impacts for local areas and disturbs ecosystems. Their degradation in turn leads to retroactive effects on the climate, which have serious consequences for the means of subsistence and quality of life of inhabitants and for the economy. Some of these effects are already perceptible.

Zoom: the five main drivers of biodiversity loss according to IPBES

- The destruction, fragmentation and artificialisation of natural habitats,
- The overexploitation or unsustainable management of natural resources,
- Climate change,
- Pollution of oceans, freshwater, soil and the air,
- The introduction and propagation of invasive alien species.

Global changes: local effects

In France, as elsewhere, the increasingly violent and frequent climate related risks (cyclones, droughts, floods, etc.), combined with the increased vulnerability of ecosystems (related to anthropogenic pressions) generate major socioeconomic impacts. Not only do they accentuate the erosion of local biodiversity, but they also affect the health of inhabitants, to the point of causing the loss of human lives:

> in towns and villages, the concentration of the heat during heatwaves affects the quality of life and health of inhabitants;
> in woodlands, increasing droughts create the conditions for fires and the degradation of vegetation, which leads to a loss of biodiversity and forestry revenues;
> in the mountains, the increased melting of ice causes flash floods and landslides. Local agricultural and touristic activities are therefore altered;
> on the coast, the rise in sea level and the intensity of storms erode the coastline, exacerbating the risk of submersion and endangering human populations;
> in the countryside, the rise in average temperatures and the irregularity of precipitation are impacting farmers' production and their economic model.

- In 2050, Metropolitan France will suffer 5 to 15 more days of heatwave compared to the period 1970-2000.
- By 2050, 50% of Metropolitan French forests will be subject to high fire risk.[2]

ADAPTING TO THE EFFECTS OF CLIMATE CHANGE: NATURE HAS THE SOLUTIONS

It is urgent to act to reduce our greenhouse gas emissions because each degree counts. But it is also important to start straight away to adapt local areas and economic sectors to climate change. This adaptation consists in taking measures to ensure that human societies are less vulnerable to climate change. To this end, an adaptation process can be based on nature and the multiple services that it provides. These processes are referred to as "Nature-based Solutions for climate change Adaptation Solutions" (NbaS). This concept is derived from "Nature-based Solutions" (NbS), defined by the International Union for the Conservation of Nature (IUCN) as being all "actions to protect, sustainably manage, and restore natural and modified ecosystems that address societal challenges effectively and adaptively, simultaneously benefiting people and nature"[3].

The multiple benefits of NbaS

> For biodiversity: NbaS consist in protecting, restoring or sustainably managing ecosystems (forests, hedges, wetlands, ocean, etc.) in order to enhance their resistance and their capacity to provide services.

> For local areas: NbaS take the form of actions at different scales (school playground, neighbourhood, town, coast, riverbanks, etc.) that reduce their sensitivity to climate change, increase their resilience and therefore make them attractive.
> For human societies: NbaS generate co-benefits, not only by helping them to adapt to climate change, but also by providing responses to issues regarding climate change mitigation, health, reducing vulnerability to natural hazards, food security or access to clean water supply.

[1] IPBES. First international assessment of biodiversity. 2019
[2] MTE, ONERC. Data concerning the period 1970-2000. 2021
[3] IUCN. Resolution WCC-2016-Res-069-EN8. 2016

FREQUENTLY ASKED QUESTIONS ABOUT NbaS

Who can head a NbaS project?

Any local authority, association, company, natural area management body or public institution working in the following fields : land-use planning, urban planning, climate, agriculture, forestry, fishing, water and natural area management, natural and health risk prevention, or any organisation wishing to be involved in adapting to climate change can head an NbaS project. The same project may bring together different types of stakeholders, whatever their size or status.

What is a "successful" NbaS?

A "successful" NbaS is designed to adapt the local area concerned to the effects of climate change. It provides real benefits for biodiversity. The project is economically viable and sustainable over time. It is founded on participative, transparent governance processes and is integrated into public policies. An NbaS is a multifunctional, concrete action in the field for a given ecosystem that is adaptively managed in a constantly evolving climate context.

Is biodiversity really taken into consideration in NbaS projects?

One of the essential conditions for NbaS projects, from the moment they are designed, consists in integrating biodiversity. After an initial biodiversity status assessment, for example by producing an inventory of the habitats and species present within a municipality, the project heads must commit to conserving existing biodiversity and planning adaptations or management practices favourable for its development. Therefore, to ensure that an NbaS project really encourages an increase in biodiversity, it is essential to set up indicators to monitor trends and adapt the implemented actions according to the obtained results.

How are NbaS different from so-called "grey" solutions ?

With climate change, it is important to size grey solutions (such as dykes) or NbaS (such as a natural area for floodwaters to spread) in function of future climate projections (not just past occurrences of high waters). NbaS are alternative and/or complementary actions to grey solutions, based on the natural functioning of ecosystems. They reduce the vulnerability of an area confronted with climate hazards. They do so by giving back the space to nature, for example by leaving room for trees, enabling a river to spread into its floodplain or encouraging the development of vegetation to curb soil erosion. To compensate for the climate emergency, NbaS projects need to be implemented as soon as possible, while making sure that they are designed in the long term in order to provide a lasting response.

Agroforestry, ecological restoration, natural water retention measures, etc., nature-based solutions already exist. Why do we need a new concept?

While the implementation of NbaS is based, amongst other things, on known expertise and ecological engineering techniques (restoration of hedges, floodwater expansion areas, etc.), they provide an innovative response to the climate change and the loss of biodiversity. By acting for nature, they have the particular feature of simultaneously responding to both issues.

Are NbaS reconcilable with local economic development?

NbaS have above all been designed to conserve natural capital and better prepare local areas for the current and future effects of climate change. Setting up "green" solutions (NbaS) can therefore make local areas more resilient to climate instability while at the same time securing economic sectors that depend on them, such as tourism, agriculture, forestry, etc. In order to ensure its durability over time, the heads of an NbaS need to identify the socioeconomic issues of the area and reconcile them with the objectives of the project. They must then set up an analysis of the potential costs of the actions undertaken at different local scales and the benefits that would result from them.

NbaS RESPOND TO THE INTENSIFICATION AND MULTIPLICATION OF CLIMATE HAZARDS

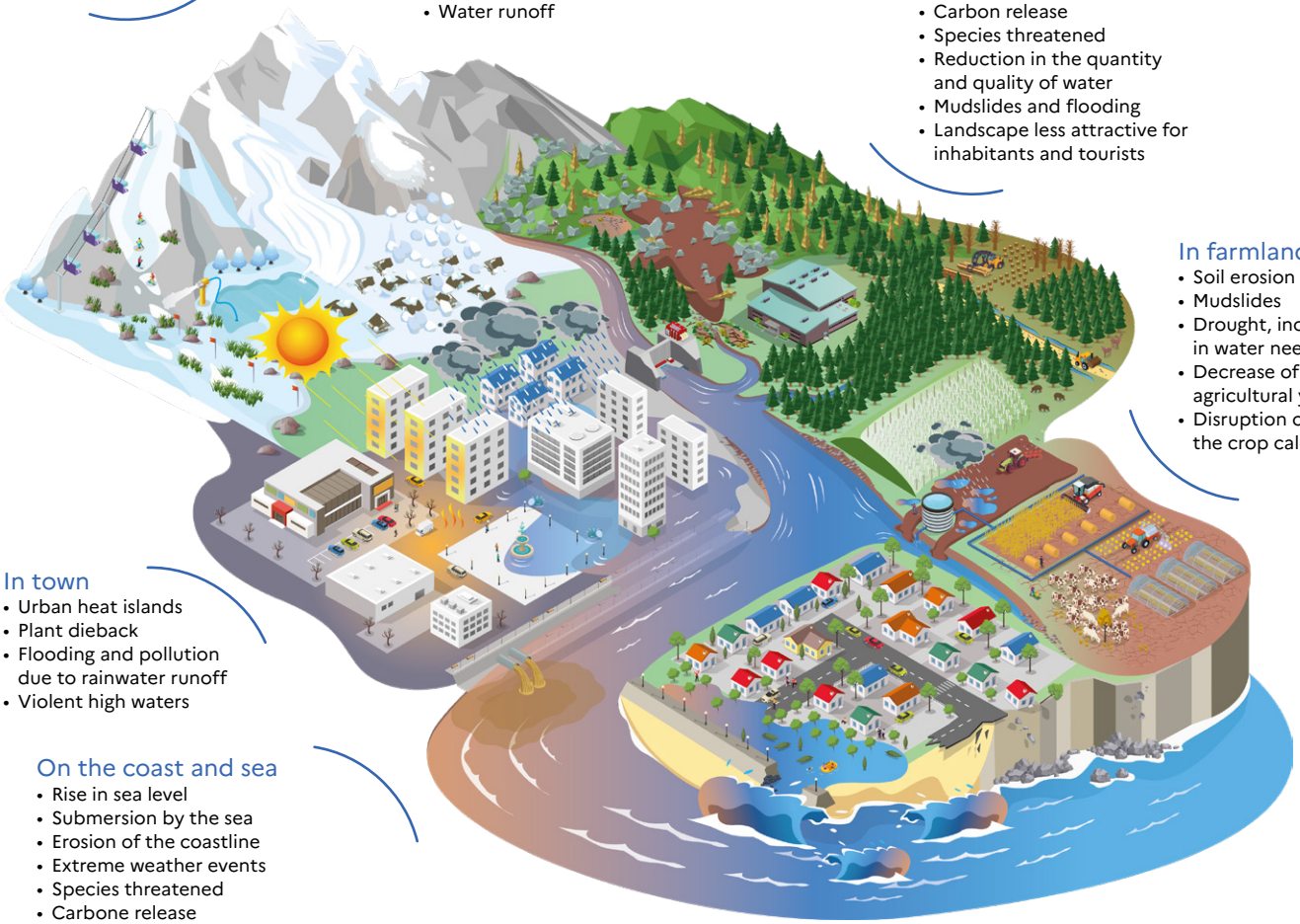
Faced with hazards...

In Overseas France
- Erosion of the coastline
- Submersion by the sea
- Degradation of mangroves and coral reefs
- Drought
- Flooding
- Reduction in the quantity and quality of water

In the mountains
- Reduction in the quantity of snow
- Melting glaciers
- Gravity-related risks (avalanches, rockslides, etc.)

In aquatic habitats
at watershed scale
- Violent high waters and floods
- Water runoff

In woodlands
- Increased drought and heatwave effects
- Biomass dieback
- Modification of the fire regime
- Compacting and erosion of soils
- Difficulties for natural regeneration and planting
- Carbon release
- Species threatened
- Reduction in the quantity and quality of water
- Mudslides and flooding
- Landscape less attractive for inhabitants and tourists



In farmland
- Soil erosion
- Mudslides
- Drought, increase in water needs
- Decrease of agricultural yields
- Disruption of the crop calendar

In town
- Urban heat islands
- Plant dieback
- Flooding and pollution due to rainwater runoff
- Violent high waters

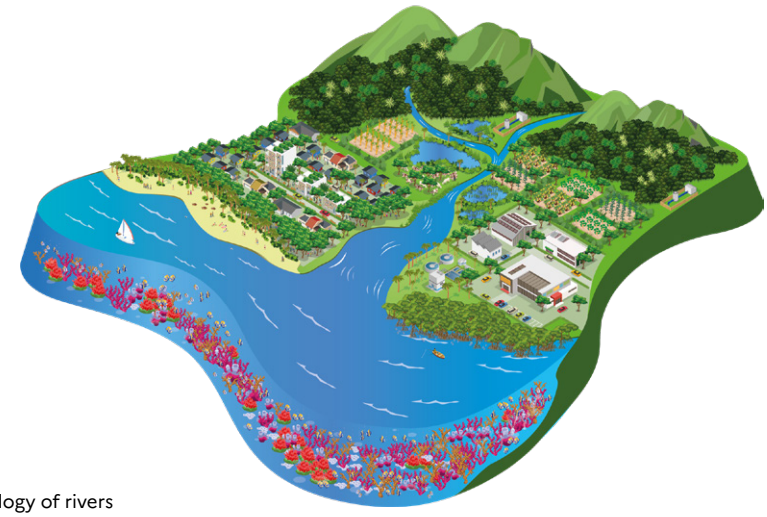
On the coast and sea
- Rise in sea level
- Submersion by the sea
- Erosion of the coastline
- Extreme weather events
- Species threatened
- Carbone release
- Decline in fish stocks

TO CONTAIN MORE DESTRUCTIVE FLOODS
- Restore the functioning of rivers and wetlands (water meadows, marshes, former meanders, etc.) in order to enable them to fulfil their role as natural areas for the spreading of floodwaters.
- Facilitate better infiltration of water and limit runoff upstream of watershed (hedges, fascines, etc.).

TO REDUCE HIGHER SUMMER TEMPERATURES IN TOWN
- Create urban cool islands by planting trees and other plants to reduce the temperature thanks to shade and evapotranspiration. Green roofs and walls also help to insulate housing.
- Manage the circulation of water by making soils more permeable (drainage ditches, school playgrounds, ground area around the tree trunks, etc.). Reopen culverted rivers to create attractive urban cool islands and encourage urban biodiversity.

TO LIMIT THE IMPACT OF MORE VIOLENT STORMS ON THE COASTLINE
- Restore and conserve coastal wetlands, such as lagoons, and dune cordons to fight against erosion and to reduce flood peaks.
- Conserve, restore and sustainably manage seagrass beds, corals, mangroves and other coastal woodlands to maintain marine biodiversity and ensure fishing resources.

... let's rely on nature



In Overseas France

- Restore coastal ecosystems
- Permeabilise and vegetate towns
- Develop agroforestry systems
- Set up ecological restoration actions for riverbanks and wetlands (mangroves, etc.)
- Protect coral reefs and seagrass beds
- Develop projects based on phyto-purification
- Reduce pressures on habitats and social inequalities

In aquatic habitats

at drainage basin scale

- Restore the natural morphology of rivers
- Protect and restore wetlands, ponds, peat bogs, etc.
- Implement ecological engineering to stop erosion over the watersheds
- Develop fields for floodwaters to spread out
- Protect and restore riparian vegetation
- Restore transitional waters (lagoons, estuaries)

In the mountains

- Conserve water resources
- Stabilise soils and snow
- Restore mountain terrain

In woodlands

- Improve genetic diversity
- Promote sustainable forestry practices
- Preserve functional soils
- Implement a patchwork of habitats to confront fires
- Enhance infiltration of water to confront droughts
- Conserve good ecological status of habitats

In farmland

- Improve ecological soil management (increase organic matter, decrease chemical inputs)
- Promote infiltration of rainwater (rethink labour methods)
- Diversify crops
- Promote agroecological infrastructures (hedges, grass strips, permanent grasslands, etc.)

In town

- Promote nature in cities
- Create urban cooling islands
- Improve infiltration of rainwater where it falls
- De-permeabilize and revegetate schoolyards and other spaces

On the coast and sea

- Return polderised land to the sea
- Restore dune cordons or coastline morphology
- Maintain and restore coastal and hinterland habitats
- Conserve, restore and sustainably manage seagrass beds, corals and mangroves

TO MITIGATE THE EFFECTS OF LONGER DROUGHTS

- Manage water resources by facilitating the infiltration of rainwater by planting hedges and choosing agroecological practices in line with climate trends.
- Conserve permanent grasslands.
- Diversify crops to increase resistance to pests and maintain yields.

TO REDUCE GRAVITY-RELATED RISKS

- Block mudslides, landslides, rockfalls and avalanches by restoring woodlands on the slopes.
- Conserve dead wood to catch falling rocks, while at the same time providing the right conditions for the species that it hosts: mosses, fungi, insects, reptiles, etc.

TO RESTRICT EXTREME AND REPEATED FIRES

- Manage forests more sustainably by favouring a variety of species and using the most appropriate local tree varieties to reduce the volume of combustible material.
- Maintain open habitats through more eco-friendly techniques such as patchwork-style manual brushwood clearing, or conservation grazing.
- Apply grazing practices that limit the spreading of the forest and provide conditions for more varied fauna and flora.

THE **LIFE ARTISAN PROJECT**

The Life ARTISAN* integrated project was drawn up to develop synergy between adaptation to climate change and the conservation of biodiversity.

It is based on an action strategy implemented at local, regional and national level, in both Metropolitan and Overseas France, whose aim is to encourage the emergence of NbS projects to adapt local areas to the consequences of climate change.

60% funded by the European Commission and co-financed by the French State, Life ARTISAN is run by the French Biodiversity Agency (OFB), assisted by 27 associated beneficiaries.

*Increase the Resilience of Territories to climate change by Encouraging Nature-based Adaptation Solutions.

BENEFICIARIES OF THE **LIFE ARTISAN PROJECT**

LOCAL

REGIONAL

NATIONAL

* not beneficiaries but partners

To contact the project coordination team: artisan@ofb.gouv.fr

To find out more about the project:

Website: https://ofb.gouv.fr/le-projet-life-integre-artisan

X: @LifeARTISAN_

LinkedIn: Trophées Life ARTISAN

Documentation page: https://ofb.gouv.fr/le-projet-life-integre-artisan/documentation-life-artisan

French Adaptation to Climate Change Resource Center : www.adaptation-changement-climatique.gouv.fr

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Le climat change, adaptons-nous avec la nature

For further information on Life projects:
www.ecologie.gouv.fr/programme-europeen-financement-life

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