Building coastal resilience

Nature-based Solutions for climate justice and adaptation

care

Our warm thanks to CARE Climate Justice Center and to all the stakeholders and experts interviewed.

Research and Report lead: Mathilde Henry / henry@carefrance.org

Author: Lisa Boehm

Research consultants: Lamine NDOUR and Claire STRAGIER

Design: Céline Lequeux
Cover picture: CARE Denmark
Back picture: CARE France / Guillaume Bassinet

June 2025

Building coastal resilience

Nature-based Solutions for climate justice and adaptation

Introduction

Oceans cover 71% of the Earth's surface and play a major role in addressing climate change. They absorb around 30% of human-induced CO_2 emissions and capture over 90% of the excess heat generated by global warming. Yet, they are severely affected by climate change and are undergoing a steady loss of biodiversity due to the overexploitation of their resources. Nearly 40% of global population currently live in coastal areas (United Nations, 2017).

Coastal populations are on the frontlines of the devastating impacts of climate change: sea level rise, intensified natural hazards, coastal erosion, biodiversity loss, and increasing pollution. In the face of these threats, there is an urgent need to act and to implement adaptation solutions on a global scale, before it is too late. Oceans, considered global commons governed by the United Nations Convention on the Law of the Sea adopted in 1982, require collective and coordinated international management. While the entire global population depends on the health of oceans and their biodiversity, adapting coastal communities to climate change remain a major challenge for the years to come. To achieve climate justice, it is essential to recognize the differentiated vulnerabilities across coastal areas. Capacities for adaptation —whether financial, technical, or human— vary widely between territories, yet the core challenges remain the same: to promote and implement sustainable, equitable, inclusive solutions, built on knowledge-sharing and expertise, in response to human pressures on coastal ecosystems and biodiversity. Among these solutions, Nature-based Solutions must be fully recognized and financed as integral component of climate and biodiversity adaptation policies, both multilaterally and at the national level. To date, Nature-based Solutions[0] remain only marginally mobilized in adaptation efforts. Their integration is still limited to a few specific sectors, with weak and fragmented demand hindering the development of a structured supply chain (ADEME, 2022[1]). Despite their significance, Nature based Solutions receive a disproportionately small share of climate finance. In 2022, approximately $200 billion was allocated to Nature based Solutions, representing only 37% of the estimated annual investment needed to meet global climate and biodiversity goals by 2030. Public funding constituted 82% of this amount, while private investment accounted for just 18% (UNEP, 2023[2]; Nature 4 Climate, 2024[3]). It is within this context that the present study was conducted. It is based on an in-depth review of scientific literature and 30 qualitative interviews carried out in France and Senegal. These interviews included researchers, experts, local government officials, and small-scale ocean-based economic actors, such as artisanal fishers, women, shellfish farmers, and seafood processors. France and Senegal were selected to show that, despite different levels of income and exposure, both countries face similar diagnoses—coastal erosion, livelihood threats, inadequate support—and often converge on locally driven, nature-based solutions. The aim is to shed light on the conditions necessary for the effective implementation of Nature-based Solutions for coastal adaptation—drawing on cross-cutting perspectives between territories and knowledge systems.

0. Why did CARE France choose to use the term Nature-Based Solutions? The distinction between Nature-Based Solutions (NbS) and Ecosystem-Based Adaptation (EbA) is the subject of ongoing political and scientific debate, particularly in climate and biodiversity arenas such as the UNFCCC and the Convention on Biological Diversity. To learn more about our choice to use the term Nature-Based Solutions and about the differences between Ecosystem-Based Adaptation and Nature-Based Solutions, see page 23 of this report.
1. ADEME. (2022). 2021 *Annual Report – 52 stories of transition*. Agence de la transition écologique.
2. United Nations Environment Programme. (2023, December 9). *Global annual finance flows of $7 trillion fueling climate, biodiversity, and land degradation crises.*
3. Nature4Climate. (2024, February 13). *Nature-based solutions receive only 37% of the financing needed to reach global climate goals.*

Coastal areas under threat: caught between human impact and climate change

The intensification of cyclones, rising sea level, coastal erosion, shoreline retreat, soil salinization, deforestation, marine biodiversity loss, pollution, an the rapid urbanization of coastal areas represent major threats to the planet—particularly for populations who depend directly on coastal and marine ecosystems. Today, more than 680 million people live in coastal zones—a number projected to reach one billion by 2050 (IPCC, 2019[4]). Anthropogenic pressures, combined with the effects of climate change, are negatively impacting the livelihoods and income-generation activities of these populations, worsening food insecurity and forced migration. Coastal erosion, in particular, results in the loss of arable land, the destruction of infrastructure, and increased flooding, putting at risk the safety and living conditions of millions, especially women and girls, who are disproportionately affected by the consequences of climate change[5]. It was selected as a central focus of this study because it is both one of the most visible and immediate impacts of climate change on coastal communities, and one where Nature-based Solutions —such as mangrove restoration or dune stabilization—have proven particularly relevant and underutilized. Already widespread and largely driven by human activities such as dam construction and sand extraction, coastal erosion is expected to intensify in the coming years as climate change impacts grow.

Thinking adaptation: solutions and barriers

It is essential to rethink climate change adaptation to reduce the vulnerability of directly impacted populations. Alongside mitigation, adaptation has become a central pillar in the fight against climate change—particularly since the 2015 Paris Agreement[6]. Research is increasingly focused on identifying the most effective short, medium, and long-term adaptation strategies. Today adaptation is integrated into nearly all national climate action plans and strategies around the world. Despite growing calls for sustainable approaches, most adaptation strategies still rely heavily on «hard» infrastructure—such as sea walls, drainage channels, and flood barriers. According to the IPCC Sixth Assessment Report (AR6), this remains the dominant form of response globally, particularly in coastal areas, despite mounting evidence of its limitations (IPCC, 2022, Chapter 3[7]). The report also highlights that nature-based and hybrid approaches remain underutilized, even though they offer greater long-term resilience and co-benefits for ecosystems and communities. This widespread use of technocratic and structural responses, often favored for their visibility and more readily accessible financing, have significant drawbacks.

They can lead to maladaptation if they fail to account for local ecological dynamics, the socio-economic needs of communities, and long-term climate risks (OECD, 2024[8]). For example, poorly placed sea walls can worsen coastal erosion, transfer vulnerabilities to other areas, or damage surrounding ecosystems. Adaptation strategies may also include relocation solutions for both people and property. In France, such projects have been implemented in the French Antilles, for instance in Petit-Bourg, Guadeloupe. This initiative aimed to move residents from high-risk zones to newly built housing. However, despite a mixed governance model and mobilized funding, limited community buy-in and financial constraints weakened the initiative's success, highlighting the need for adequate ecological and social support in such projects (Tramis, Rey & Leone, 2022[9]).

Against this backdrop, attention turns to the essential role of marine biodiversity preservation in reducing the vulnerability of coastal communities to the impacts of climate change.

4. IPCC. (2019). *Special Report on the Ocean and Cryosphere in a Changing Climate.* Intergovernmental Panel on Climate Change.
5. United Nations. (n.d.). *Why women are essential to climate action. United Nations.*
6. Paris Agreement, 2015, adopted under the framework of COP21
7. Intergovernmental Panel on Climate Change (IPCC). (2022). *Oceans and coastal ecosystems and their services* (Chapter 3) & *Cross-Chapter Paper 2*. In Climate *Change 2022: Impacts, Adaptation and Vulnerability* (Contribution of Working Group II to the Sixth Assessment Report). Cambridge University Press.
8. OECD. (2024). *Infrastructure for a climate-resilient future.*
9. Tramis, M., Rey, T., & Leone, F. (2022). Managed retreat, a coastal risk adaptation strategy: Lessons learned from projects in the French West Indies. *Études caribéennes,* 53.

1. Sustainable adaptation: the potential of nature-based solutions

Rethinking biodiversity as a lever for adaptation

Biodiversity and climate are intimately linked: ecosystems play a fundamental role in regulating climate, absorbing carbon and protecting against natural disasters (UNEP, 2019[10]). Yet the climate crisis is accelerating the loss of biodiversity, disrupting ecological and ecosystem balances, and increasing the frequency of extreme weather events. Millions of people today depend on the benefits offered by coastal ecosystems such as mangroves, coral reefs and seagrass beds—ecosystems that are increasingly threatened by both human activities and natural pressures. These impacts directly endanger the livelihoods of local populations, particularly in tropical areas and small island states. In the face of these challenges, it is becoming increasingly urgent to develop integrated responses that protect both biodiversity and human populations. The Convention on Biological Diversity (CBD, 1992), which aims to preserve global biodiversity and guide international biodiversity policies, represents a major lever for action. By providing an international legal framework, the CBD encourages countries to adopt national strategies for the conservation and sustainable management of natural resources—through instruments such as the Kunming-Montreal Framework (CBD, 2023[11]), which sets a clear target of 30% of land and sea protected by 2030.

What are Nature-based Solutions and why do they work?

In the face of growing threats to coastlines worldwide, nature must be places at the center of adaptation and sustainable development strategies. Nature-based Solutions offer sustainable approaches to adaptation, generating both ecological and ecosystem co-benefits by addressing the effects of climate change, preserving biodiversity, and building community adaptative capacity.

These innovative approaches rely on natural processes and ecosystems to tackle major societal challenges such as climate change, food and water security, disaster risk reduction, and biodiversity loss. According to the International Union for Conservation of Nature (IUCN), Nature-based Solutions are defined as solutions to "address societal challenges through actions to protect, sustainably manage, and restore natural and modified ecosystems, benefiting people and nature at the same time" (IUCN, 2024[12]).

This concept was introduced at the 2009 United Nations Framework Convention on Climate Change (UNFCCC) Conference of the Parties (COP15), in response to the growing need for more sustainable and integrated solutions to environmental challenges. Nature-based Solutions are emerging as sustainable alternatives to "hard" infrastructures such as dykes or floodwalls. Unlike these conventional structures, which are often costly and harmful to ecosystems, Nature-based Solutions not only help mitigate the risks associated with extreme weather events, but also contribute to restoring biodiversity (IUCN, 2018 [13]).

10. United Nations Environment Programme (UNEP). (2019). *Why nature holds key to meeting climate goals.*
11. Convention on Biological Diversity. (2023). *Kunming-Montreal Global Biodiversity Framework*. CBD Secretariat.
12. Vidal, A., Martinez, G., Drion, B., Gladstone, J., Andrade, A., & Vasseur, L. (2024). *Nature-based solutions for corporate climate goals.* International Union for Conservation of Nature (IUCN).
13. IUCN French Committee. (2018). *Nature-based solutions to combat climate change and reduce natural hazards in France.* Paris: IUCN France.

Régis Leymarie, deputy delegate at the Conservatoire du Littoral[14], underscores the crucial role of these solutions. "Nature-based solutions are fundamental. The dike will protect but removes sand in the long term; on the contrary, groynes maintain the sand"[15]. Their aim is to achieve co-benefits for both local populations and biodiversity — contributing to carbon sequestration, preserving ecosystems, protecting against climatic hazards, and supporting local livelihoods. Based on an inclusive and participatory approach, they require the systematic involvement of local stakeholders, traditional knowledge, and scientific expertise. These solutions must be rooted in the local context and consistently consider geographical and socio-cultural specificities to ensure sustainable adaptation.

They are also a viable economic tool. By reducing the costs associated with natural disasters and reconstruction — while simultaneously protecting ecosystems—they help to avoid the expenses caused by maladaptation in coastal areas, aligning with a logic of long-term profitability.

For example, mangrove restoration — which reduces damage from flooding, coastal erosion, and cyclones — can prevent significant future costs (Barbier et al., 2011[16]). These solutions offer a sustainable return on investment by strengthening the resilience of coastal communities while preserving biodiversity (FFEM, 2019[17]).

Integrating Nature-based Solutions into infrastructure projects, for instance, costs on average less than half the price of hard adaptation measures, while generating 28% more added value (IISD, 2023[18]). In terms of coastal protection, natural ecosystems such as mangroves and salt marshes provide a far more cost-effective alternative — two to five times cheaper than artificial breakwaters for attenuating 50 cm waves and curbing coastal erosion (Narayan et al., 2016[19]; Dasgupta, 2021[20]).On a global scale, if Nature-based Solutions were implemented in just 11% of infrastructure projects deemed compatible, potential savings would amount to $248 billion annually, while generating nearly $489 billion in positive externalities (OECD, 2024[21]).When properly implemented, Nature-based Solutions can support sustainable and equitable adaptation. Notably, they help address the women and girls-differentiated impacts of climate change by promoting the inclusion of women in natural resource management, project development, and decision-making processes (IISD, 2024[22]).

Nature-based Solutions are increasingly favoured by local stakeholders in climate change adaptation strategies, particularly in coastal areas. For example, the mayor of Fermanville, Normandy, explains: "We already know what hasn't worked: artificialization, riprap, anything that's aggressive. When you want to protect yourself against the sea, you create a hard point, and the sea goes around and hits even harder, which reinforces erosion. We mustn't resist at all costs but favour soft solutions that work (they don't all work) and relocate when we must. Humans have always tried to protect themselves from the sea, with fortifications and so on. But some of our neighbours' dikes are in poor condition. There are no longer any funds to maintain them, and the organisations that looked after them have been disbanded. We can see that solutions based on nature are the ones that work"[23].

These sustainability and financing challenges are particularly critical in the Global South, where similar issues occur but with more severe budgetary constraints.

14. The Conservatoire du Littoral is a French public agency, created in 1975, dedicated to protecting coastal and lakeside areas. It manages about 15% of France's coastline with the goal of preserving one-third of the coast from development.
15. Interview with Régis Leymarie, Deputy Delegate at Conservatoire du Littoral, April 2025.
16. Barbier, E. B., et al. (2011). The value of estuarine and coastal ecosystem services. *Ecological Monographs*, 81(2), 169–193.
17. Fonds Français pour l'Environnement Mondial (FFEM). (2020). Nature-based solutions for climate change adaptation: Insights from the ONERC report.
18. International Institute for Sustainable Development. (2023). G*uiding principles for the preparation of financing strategies for climate change adaptation in developing countries*. IISD.
19. Narayan, S., Beck, M. W., Reguero, B. G., Losada, I. J., van Wesenbeeck, B., Pontee, N., Sanchirico, J. N., Ingram, J. C., Lange, G. M., & Burks-Copes, K. A. (2016). The effectiveness, costs and coastal protection benefits of natural and nature-based defences. PLOS ONE, 11(5)
20. Dasgupta, P. (2021). *The economics of biodiversity: The Dasgupta review*. HM Treasury.
21. OECD. (2024). *Infrastructure for a climate-resilient future*. OECD Publishing.
22. International Institute for Sustainable Development (IISD). (2024). *Mainstreaming gender equality and social inclusion in nature-based solutions for climate change adaptation*. IISD.
23. Interview with the Mayor of Fermanville, Normandy, April 2025.

Nature-based Solutions

"Actions to protect, sustainably manage and restore natural or modified ecosystems to respond effectively to societal challenges, while simultaneously providing benefits for biodiversity and human well-being." (IUCN, 2016).

Nature-based Solutions are broken down into three types of action:
- Restore degraded ecosystems.
- Preserve ecosystems.
- Improve ecosystem management.

The IUCN, the main body framing and regulating the use of Nature-based Solutions defines them based on eight criteria:
- Respond to a clear societal challenge (such as climate change, food security, erosion, disaster risk reduction, etc.).
- Adapt to the local ecological, socio-economic, and cultural context, applying solutions at the landscape scale while considering its unique characteristics. This includes designing with scale in mind, recognizing that scale encompasses not only biophysical and geographic factors but also economic systems, policy frameworks, and cultural perspectives.
- Provide net benefits to biodiversity and ecosystem integrity alongside addressing societal challenges. Nature-based Solutions reinforce biodiversity conservation strategies at national and sub-national levels.
- Be economically viable, bringing economic benefits to local populations, thereby ensuring the project sustainability.
- Be subject to equitable, inclusive, transparent, and empowering governance.
- Be capable of providing complementary services, not only for the community or communities directly benefiting from the projects, but for to society as a whole (e.g. carbon sequestration).
- Be adaptively managed to ensure sustainability and resilience, effectively addressing long-term adaptation needs. As such, they are subject to rigorous monitoring and evaluation.
- Be integrated into public policies and scaled up beyond individual projects.

The five most implemented Nature-based Solutions to combat the effects of climate change, protect biodiversity, and support communities are:

1. Restoration and protection of mangroves
Functions: Serve as natural barrier against erosion and storms, act as carbon sink, and provide critical habitat for biodiversity.
Contexts: Primarily applied in tropical coastal zones such as West Africa, Southeast Asia, and Latin America.

2. Reforestation and agroforestry
Functions: Carbon sequestration, water cycle regulation, soil improvement, diversification of farm income.
Contexts: Deforested rural areas and degraded farmland.

3. Rehabilitation of coral reefs and seagrass beds
Functions: Coastal erosion protection, fish nursery habitats, and blue carbon sequestration.
Contexts: Tropical marine and island areas.

4. Wetland restoration
Functions: Flood mitigation, water purification, and support for aquatic biodiversity.
Contexts: Deltas, marshes, and flood plains.

5. Sustainable management of agricultural and pastoral ecosystems
Functions: Drought resilience, maintenance of soil fertility, and landscape preservation.
Contexts: Sahelian zones, steppes, and savannahs.

Source: https://portals.iucn.org/library/sites/library/files/documents/2020-020-En.pdf

a. Meaningfully involve communities in local governance

To address these various *existential* threats, our findings highlight illustrate the importance of adopting a locally grounded governance approach, one that actively involves local communities in decision-making as well as in the design and implementation of coastal adaptation projects. The participation of local actors, especially those traditionally marginalized—such as women, artisanal fishers, youth, and Indigenous peoples—is essential to ensure equitable and sustainable ecosystem management.

In Toubacouta, located in Senegal's Sine Saloum delta—which spans 55,643 hectares of mangrove forest—local authorities emphasize the importance of involving communities in local governance and project management. **As a representative of the Local Advisory Committee for Climate Change** explains "community involvement is crucial. When they are engaged from the project design stage, trained in planting techniques, and feel ownership of the initiatives, the chances of success are much higher. [...]. Local communities must also be involved in developing and implementing adaptation plans"[24]. This approach is supported by many international bodies, which emphasize the need to improve local communities' access to information, scientific data, and expertise, enabling their full participation in coastal planning processes (FAO, 2021[25] ; UNEP, 2020[26]). As the IUCN states, "governance has proven to be a key determinant of management effectiveness in achieving nature conservation and other social objectives"[27].

When properly managed, co-management mechanisms for natural resources can reconcile ecological preservation, economic development, and social justice— particularly by recognizing and empowering traditional knowledge of environmental management (Loch & Riechers, 2021[28]).

Acknowledging the diversity and agency of local stakeholders is a key lever for developing effective responses to coastal erosion and sea-level rise. Ecosystem preservation, climate resilience, and social equity can be reconciled by strengthening co-management frameworks, promoting and empowering local knowledge, and ensuring equitable access to resources and expertise.

b. Sharing capacity is necessary: the importance of community access to technical expertise and of incorporating traditional knowledge and local expertise

Integrating local knowledge and expertise into decision-making processes and research projects on coastal adaptation is essential—particularly for the management and protection of marine ecosystems. It enhances scientific responses with empirical data while strengthening the social legitimacy and acceptance of the measures taken. This approach supports the co-construction of context-specific solutions, increases community resilience, and promotes sustainable local ownership of conservation initiatives. Neglecting such knowledge means overlooking a vital component of local socio-ecological dynamics, often in favour of top-down approaches that may be poorly adapted to on-the-ground realities. As the municipal secretary of the Mbollo commune notes "we know where it grows and where it dies.

24. Interview with the representative of the Local Advisory Committee on Climate Change (COMLECC), Toubacouta, April 2025.
25. FAO. (2021). *Building resilience to climate change through community-based coastal and fisheries management*. Food and Agriculture Organization of the United Nations.
26. United Nations Environment Programme (UNEP). (2020). *Enhancing climate resilience in coastal communities: A guide for policy-makers and practitioners.* United Nations Environment Programme.
27. International Union for Conservation of Nature (IUCN). (2022). *State of West African marine protected areas 2022*. IUCN.
28. Loch, A., & Riechers, M. (2021). Integrating indigenous and local knowledge in management and research on coastal ecosystems in the Global South: A literature review. *Ocean & Coastal Management.*

The experts must listen. Communities are involved in replanting projects, but not much in strategic planning. There's a lack of post-project maintenance"[29].

Emphasizing the importance of involving those who live in mangrove areas in project management, Mr. **Alassane CISSE, deputy mayor of Diossong, Senegal**, explains: "As part of projects financed by NGOs, we have planted new mangrove trees in certain degraded areas., mainly using mangrove seedlings. Sometimes this worked well, especially when the area was well chosen and protected. But in other places, the seedlings didn't survive because of pollution or strong currents. You really have to prepare the ground properly and involve the local people. Community involvement is essential. When you're engaged from the outset, understand the importance of restoration and are trained in the techniques, you're more motivated to take care of it and protect the young plants"[30].

The IUCN (2024) policy brief on sea-level rise highlights the lack of awareness and preparedness among coastal communities in the face of these challenges[31]. **Rafael Almar, an oceanographer and physicist specializing in coastal issues in the IRD[32]'s Global South**, confirmed this concern: "Working on risk awareness and making information accessible is fundamental. It's like living next to a volcano without knowing it's dangerous. It's hard to reach every community, but that's the most important thing"[33]. Local actors share this view. The municipality of Mbollo in Senegal emphasized: "One of the priorities is training in sustainable management and environmental education in schools"[34].

Additionally, the dissemination of information and access to expertise remains a challenge when selecting strategies to adapt to and combat coastal erosion. According to researcher Clara Therville, a sustainability geographer at the IRD, coastal populations, when consulted, tend to prefer mainly hard solutions, such as large-scale dyke-building projects which they are more familiar with[35]. This preference stems from high-visibility projects implemented in some beneficiary towns, rather than from a full understanding of the benefits of relocation and Nature-based Solutions, which are often more sustainable. This highlights a clear gap in information.

While differentiated and context-specific responses to coastal erosion are necessary, it is essential to systematically include all stakeholders, particularly local communities. "Dykes may be interesting for big cities, but you can't put dykes everywhere, not even in sparsely urbanized areas", notes Rafal Almar[36] : "The solutions lie in managing the problem at the right scale, from A to Z with the various stakeholders".

Local ownership of the issues, access to information, and the active inclusion and meaningful participation of communities are essential to the success of adaptation strategies. Awareness-raising, training and co-construction are the pillars of an effective and sustainable response. Nature-based Solutions, often better suited to local contexts and more resilient over time, can only be fully deployed if local capacities are supported. This also requires a collective shift in thinking: moving away from the assumption that climate adaptation must rely solely on heavy, engineered infrastructure, and embracing more integrated, context-specific approaches.

29. Interview with Mamodou Ba, Municipal Secretary of Mbollo, Senegal, April 2025.
30. Interview with Alassane Cissé, Deputy Mayor of Dissong, Senegal, April 2025.
31. International Union for Conservation of Nature (IUCN). (2024). *Policy brief on sea level rise.*
32. French National Research Institute for Sustainable Development.
33. Interview with Rafael Almar, Senegal, April 2025.
34. Interview with Mamodou Ba, Municipal Secretary of Mbollo, Senegal, April 2025.
35. Interview with Clara Therville, Senegal, February 2025.
36. Interview with Rafael Almar, Senegal, April 2025.

2. Case-study: mangroves, a sustainable ecosystem management as an adaptation strategy

a. Mangrove forests: natural allies to reduce the vulnerability of coastal populations

As natural barriers between land and sea, mangroves play a crucial role in combating the various effects of climate change and meet the needs of many coastal communities.

Moreover, mangroves are not only vital ecosystems for climate adaptation, but also pillars of the economic, social, and nutritional life of local populations: "Mangroves are at the heart of our lives here. They provide wood for building and for smoking fish, although this practice is increasingly regulated. They are home to crabs, oysters, clams, and other resources that the women harvest for food and sale. The degradation of mangroves means fewer of these products, less income for families, and increased food insecurity. Fishing, a major economic activity, is directly linked to the health of the mangroves"[37].

These ecosystems play a key role in mitigation, as they are particularly efficient carbon sinks. Mangroves capture and store large amounts of carbon in their roots and in soil, helping to reduce greenhouse gas (GHG) emissions. They can sequester up to 100 times more GHGs than conventional forests, making mangroves a vital asset for effective and sustainable climate change mitigation.

Mangroves as a source of local income: A source of biodiversity and a sustainable means of adapting to climate change

Mangroves account for less than 1% of the world's tropical forests (FAO, 2020[38]), with 75% located on tropical and subtropical coasts. Despite their small footprint, mangroves are crucial to climate change adaptation strategies. Their ability to protect coastlines from erosion, flooding, and storms, significantly reducing the vulnerability of coastal communities to extreme climatic events such as cyclones and storm surges (FAO, 2020). Mangroves serve as natural bulwarks for inhabited coastal areas, preventing $65 billion in property damage and reducing the risk of flooding for 15 million people every year (Global Mangrove Alliance, 2021[39]). Their roots trap sediment, shielding shorelines from wave action and retreating coastlines, thereby protecting coastal areas from flooding.

Furthermore, mangroves are rich reservoirs of biodiversity, supporting a wide variety of animal and plant species. They serve as nurseries for many fish and crustaceans that later migrate to the oceans as adults, sustaining local fisheries that are vital to the economies of many coastal communities (IUCN-PACO, 2021[40]). Preserving mangroves therefore plays an essential role in combating the depletion of ocean life, which has significant economic consequences for men, women, and young people alike.

37. Interview with Mariama Thiare, President of the Groupement d'Intérêt Economique (GIE) of Bambounga El Hadji, Senegal, April 2025.
38. Food and Agriculture Organization of the United Nations (FAO). (2020). *The relevance of mangrove forests to African fisheries, wildlife and biodiversity*. FAO.
39. Global Mangrove Alliance (2021). The State of the World's Mangroves 2021.
40. IUCN-PACO. (2021). *Semi-annual narrative report – PAPBio C1-Mangroves – June 2021 to December 2021*. International Union for Conservation of Nature – Central and West Africa Programme.

"Mangroves are vital for us. They filter the water, which is where many fish and shellfish grow before going to sea, they protect the coast against erosion and waves, and they store carbon. (...) Since mangroves are the mainstay of fishing activities—generally artisanal and sustainable—for over 4.1 million fishermen worldwide **(Global Mangrove Alliance, 2021[41]),** fishermen are really on the frontline, because the decline in fish populations directly affects their income. Women who depend on fish processing to feed their families are particularly vulnerable when the resource becomes scarce. Young people, meanwhile, see their future in fishing slipping away, and often have to migrate to towns to find work. It's a loss of know-how and culture for our community"[42]. Mangroves are also used for shellfish farming, providing a naturally protected, nutrient-rich habitat. This activity can be part of the solution to the depletion of deep-sea fish stocks, caused by overfishing and the impacts of climate change. It plays a vital role in alleviating food insecurity in many regions (FAO, 2020[43]). Moreover, it is primarily women and girls who tend to this type of cultivation, making it a significant lever for their economic empowerment. Shellfish farming in mangrove areas contributes to local resilience by preserving traditional practices and strengthening household food security. However, this activity depends on healthy mangrove ecosystems.

In short, preserving and sustainably managing these ecosystems means investing in the resilience of coastal communities.

b. Women are central actors in mangrove and coastal resource management

Women in coastal mangroves areas play a central role in the daily management of natural resources essential for household subsistence. With limited access to financial resources and technical training, they are often the first to rely directly on mangrove ecosystems. **El Hadji, president of the *"Groupement d'Intérêt Économique de Bambounga (GIE)"***[44] affirms that "as a women's economic interest group, mangroves are a source of food, wood for smoking fish, and natural medicines. Degradation is reducing access to these resources, affecting crafts and food security"[45]. Women are primarily responsible for harvesting resources from mangroves, including collecting wood—an essential fuel for coharvesting resources many rural households (Global Mangrove Alliance, 2021[46]) —as well as shellfish gathering, artisanal fishing, and small-scale farming. These activities are critical for household survival, serving both as subsistence and income-generating endevors. In contexts where achieving financial independence is particularly challenging, these resources become a vital lever for women's autonomy. This is particularly true in Toubacouta, at the heart of Senegal's Sine Saloum delta: "In the past, the mangrove was a vital source of income for women in Toubacouta. Today, with climate change and the scarcity of species, their income has dropped significantly, sometimes leaving them without any resources for days"[47]. Women face unequal access to resources and decision-making in ecosystem management, despite their dependence on these ecosystems (IUCN-PACO, 2021[48]). Studies conducted as part of various projects have shown that although women make up a significant portion of the workforce in artisanal fishing and mangrove management, their contributions often remain invisible in local policies and conservation initiatives (IUCN-PACO, 2021). The lack of official recognition, combined with limited access to funding and technical training, hinders their ability to diversify income sources and improve their living conditions.In Bambounga, El Hadji highlights this imbalance: «Women are part of the local management committees and are occasionally consulted, but women and youth have very little decision-making power, even though they should be much more involved in management.» Furthermore, their reliance on informal practices makes them especially vulnerable to environmental changes that directly impact mangrove ecosystems, such as coastal erosion, marine biodiversity loss, and extreme climate events.

According to Djilor Diallo: *"Our community's involvement in environmental and climate decision-making is still limited. We're sometimes consulted during meetings, but our views are not always taken into account. Women and youth have even fewer opportunities to participate in important decisions about our environment. This is partly due to a lack of information and inclusive participation mechanisms."*

CARE project "Women & Mangroves" Madagascar (2007)

CARE has implemented projects that combined mangrove reforestation with women's empowerment. These initiatives underscore the vital role mangrove ecosystems play in the lives of women—providing water and wood for domestic use, and supporting income-generating activities such as harvesting shrimp or mussels, collecting propagules, and gathering wild plants

Impact assessments highlight the value of involving women in suchprojects, showing significant benefits for both environmental protection and climate change mitigation, as well as enhancing women's quality of life:

- 80 hectares of mangroves reforested;
- After five years, communities living near restored areas began benefiting from the ecosystem services provided by the mangroves;
- $1,600 per year per woman generated through the sale of mangrove-based products.

41. Global Mangrove Alliance (2021). The State of the World's Mangroves 2021.
42. Interview with M. Alassane CISSE, Deputy Mayor of Diossong, April 2025.
43. Food and Agriculture Organization of the United Nations (FAO). (2020). *The relevance of mangrove forests to African fisheries, wildlife and biodiversity.* FAO.
44. A Groupement d'Intérêt Économique (GIE) in West Africa is a legal form of cooperation between several individuals or legal entities (often small entrepreneurs, artisans, farmers, fishers, traders, etc.) who wish to pool certain activities or resources while maintaining their legal and financial autonomy.
45. Interview with Mariama Thiare, President of the Groupement d'Intérêt Economique (GIE) of Bambounga El Hadji, Senegal, April 2025.
46. Global Mangrove Alliance (2021). The State of the World's Mangroves 2021.
47. Interview with Sergeant-Chef Mbaye, Forestry and Water Officer in Toubacouta, Senegal, April 2025.
48. IUCN-PACO. (2021). *Semi-annual narrative report – PAPBio C1-Mangroves – June 2021 to December 2021*. International Union for Conservation of Nature – Central and West Africa Programme.
49. Vidal, A., Martinez, G., Drion, B., Gladstone, J., Andrade, A., & Vasseur, L. (2024). *Nature-based solutions for corporate climate goals*. International Union for Conservation of Nature (IUCN).
50. FFEM & Océanopolis. (2021). *Marine ecosystems – Mangroves, coastal anchors.* Fonds Français pour l'Environnement Mondial (FFEM) and Océanopolis.
51. Food and Agriculture Organization of the United Nations (FAO). (2022). *The world's mangroves 2000–2020.*

c. Mangroves in peril: pressures, pollution, and the urgent need for protection

More than half of the world's mangrove ecosystems are currently at risk of collapse by 2050 if current trends persist (IUCN, 2024[49]). Since the 1980s, an estimated 3.7 million hectares of mangroves have been lost, due to a combination of deforestation, urban expansion, pollution, and climate change (FFEM & Océanopolis, 2021[50]). Mangrove deforestation is occurring at a rate of three to five times faster than in other forested areas globally. This deforestation is often driven by wood harvesting (for construction and charcoal), salt production, and the development of tourism or port infrastructure, as seen in several French overseas territories. By 2100, without effective intervention, mangroves in these regions could see a 13% reduction in surface area, largely due to ongoing urban expansion. Between 2000 and 2020, 27% of global mangrove loss was attributed to aquaculture and 17% to agriculture—particularly rice cultivation and palm oil production (FAO, 2022[51]). Mangroves are also severely impacted by watershed pollution, including wastewater discharge, oil spills, agricultural pesticides, heavy metals and plastic pollution (FFEM & Océanopolis, 2021). These forms of pollution weaken the ecosystems' ability to function and contribute to the accelerating loss of biodiversity. Multiple pressures are undermining the resilience of mangroves and hastening their degradation. For instance, as sea levels rise, mangroves attempt to migrate inland, but coastal development and shoreline hardening[52] often obstruct this natural retreat, putting their survival further at risk (Global Mangrove Alliance, 2021). Plastic pollution is an increasingly serious threat to mangrove ecosystems, with implications for biodiversity, human health, and local economies (Indian Ocean Commission, 2023[53]). Mangroves naturally trap plastic debris, leading to an accumulation that disrupts essential ecological functions. As plastic waste breaks down, it generates microplastics that infiltrate sediments and are ingested by marine life, disrupting food chains and posing health risks to humans (Garces-Ordonez et al., 2019[54]). In Senegal, for instance, plastic pollution is a major concern in efforts to preserve shrinking mangrove areas. **As one local testimony** explains: "The state of the mangroves is alarming. We see entire zones deteriorating, with dead or diseased trees. The total surface area appears to be shrinking. Multiple factors are at play—pollution, especially plastic waste, is a growing problem. There's also pressure from urbanization, and sometimes illegal logging for charcoal or construction. Poorly managed aquaculture can also destroy mangrove areas"[55] .

Indeed, the economic cost of marine plastic pollution is significant, estimated at over $2 billion in losses per year (Indian Ocean Commission, 2023), affecting tourism, fisheries, health outcomes, and climate adaptation.

52. Construction of engineered structures, such as seawalls and revetments, along coastlines to prevent erosion and protect property from flooding (National Oceanic and Atmospheric Administration, 2024).
53. Indian Ocean Commission. (2023). *Regional and national action plan for the prevention, reduction and control of marine plastic pollution* (Policy Brief No. 2).
54. Garces-Ordonez, O., Castillo-Olaya, V. A., Granados-Briceno, A. F., Blandon Garcia, L. M., & Espinosa Diaz, L. F. (2019). *Marine litter and microplastic pollution on mangrove soils of the Cienaga Grande de Santa Marta, Colombian Caribbean* (Study No. 108). Environmental Law Alliance Worldwide (ELAW).
55. Interview with Djibril Diamé, Head of the Environment Commission, Municipality of Toubacouta, Senegal, April 2025.
56. Biodiversité Outre-mer. (n.d.). *Conservation of overseas mangroves.*
57. Payri, C.-E., Cabioch, G., Andréfouët, S., & Vilayleck, M. (2008). *Coral reef ecosystem biodiversity: Report from the forum held in Nouméa, New Caledonia, 30 October – 4 November 2006.* Natures Sciences Sociétés, 16(2).
58. Conservatoire du littoral. (2009). *Mangroves in French overseas territories: Ecosystems associated with coral reefs.*

Mangroves in France and Senegal: Contrasting Challenges, Shared Vulnerabilities

In France, 98% of mangroves are in overseas territories, covering a total area of 87,754 hectares[56] —primarily in French Guiana and New Caledonia (Andréfouët et al., 2008[57]). These two regions alone account for 92.7% of France's mangrove areas, each with their distinct ecological dynamics. Despite existing legislative frameworks and designated protected areas, these mangroves face various stressors, including industrial pollution (from mining, agriculture, and gold panning), urban development, and coastal infrastructure. In Saint-Barthélemy, in the Caribbean, mangrove cover decreased by 65% between 1954 and 2020, while in nearby island of Saint-Martin, it declined from approximately 40 hectares to just 24.2 hectares over a span of 70 years (Conservatoire du littoral & IFRECOR, 2016[58]).

In Senegal, mangroves cover approximately 185,000 hectares, primarily in the Casamance region and the Sine-Saloum Delta. Since the 1970s, between 25% and 40% of these mangrove forests have disappeared. This decline is attributed to several factors, including the droughts of the 1970s, deforestation for firewood, and the construction of infrastructure such as roads and dikes, which disrupt water flow. Since then, numerous projects have sought to replant and sustainably manage mangrove forests. However, reforestation remains a critical challenge.

According to the **municipal secretary of Mbollo:**
«The main manifestations of climate change here in Mbollo are coastal erosion, soil salinization, and the gradual disappearance of mangroves. These phenomena have worsened over the past ten years. Rising sea levels and deforestation for firewood have made mangroves less resilient, increasing our vulnerability to storms»[59].

Degraded Ecosystems, Forced Departures: Mangrove Loss as a Driver of Migration

In a context of dwindling resources, particularly food, and the loss of income-generating activities, living conditions can become extremely difficult, prompting people to leave these remote and underserved areas in search of better food and water security, and better economic opportunities.

In an interview, the Forestry and Water officer of Toubacouta, Senegal, highlighted the growing scale of this issue: «For young people, this situation is driving migration to major urban centers like Dakar, and even attempts to cross to Europe, in hopes of a better life»[60] .

Women and girls, many of whom already face precarious living conditions and depend heavily on mangrove resources, are particularly impacted by the effects of climate change and overexploitation of these ecosystems.

60. Interview with Mamodou Ba, Municipal Secretary of Mbollo, Senegal, April 2025.
61. Interview with Sergeant-Chef Mbaye, Forestry and Water Officer in Toubacouta, Senegal, April 2025.

The president of the Bambounga GIE El Hadji decries the conditions that push women to leave: “Women whose income depends on harvesting shellfish in the mangroves are seeing fewer and fewer. With no opportunities, young people migrate to Dakar or risk the dangerous ocean crossing by canoe to Europe”[61].

The precarity of coastal communities is worsening, with youth and women being the most affected. As mangrove degradation threatens local livelihoods, it becomes a direct driver of displacement. Protecting these ecosystems is not only an environmental imperative, but also key to strengthening social stability and offering sustainable alternatives to migration.

Mangroves as a Sustainable Solution for Adaptation and Coastal Erosion Control

Protecting mangroves is one of the key solutions to be scaled up in the fight against climate change, both in terms of adaptation and mitigation. As powerful carbon sinks, preserving and restoring them represents a high-impact mitigation strategy. Conversely, their destruction releases large quantities of greenhouse gases (GHGs), accounting for up to 10% of global emissions from deforestation (Mangrove Alliance, 2021). Their protection and restoration are therefore strongly recommended by organizations such as the IUCN and FAO. From an adaptation perspective, mangroves reduce wave energy, stabilize soils, prevent coastal erosion, and help limit marine submersion. In doing so, they significantly enhance the resilience of coastal communities. International institutions recognize mangroves as “natural infrastructure” in the fight against the impacts of climate change. Viewing mangrove restoration as a Nature-based Solution allows communities to continue benefiting from the ecosystem services they provide, while also using them as an effective tool to address the consequences of climate change.

However, it is essential that these initiatives be properly regulated, funded, monitored, and, above all, co-designed with the populations who are directly involved in and dependent on these ecosystems. Women and girls, who play a key role in natural resource management and are among the first affected by climate change, must be actively and meaningfully engaged with in the design and implementation of Nature-based Solution projects.

Nature-based Solutions must not be reduced to simple labels serving economic or financial agendas. They must form part of a genuinely transformative and inclusive approach—one that serves both ecosystems and the communities who rely on them.

61. Interview with Mariama Thiare, President of the Groupement d’Intérêt Economique (GIE) of Bambounga El Hadji, Senegal, April 2025.

Financing Nature-based Solutions

Nature-based Solutions (NbS) remain significantly underfunded, despite their immense potential to enhance community resilience to climate change impacts, while also contributing to ecosystem preservation and social justice. NbS also offer a strategic opportunity to address the interconnected goals of climate resilience, biodiversity conservation, and sustainable development.

CARE France calls for increased support for NbS through financing mechanisms aligned with the Paris Agreement and the Sustainable Development Goals (SDGs), particularly in countries most vulnerable to climate impacts.

CARE France supports the following priorities :

- Promote NbS that offer proven co-benefits for climate, ecosystems, and communities—such as mangrove restoration, community-led reforestation, sustainable wetland management, coral reef protection, and agroecology—ensuring these are backed by strong transparency and accountability mechanisms;

  Channel funding toward high-impact social projects, particularly those led by local organizations—including women’s rights and women-led organizations (WROs and WLOs), and Indigenous People— in line with the principles of subsidiarity and inclusive participation.

- Integrate NbS into national climate and biodiversity strategies, and support countries in developing enabling frameworks that facilitate the recognition and financing of these solutions.

3. Conclusion

The harmful and destructive impacts of climate change on coastal zones and coastal communities are escalating. Nature-based Solutions offer a sustainable, equitable, and economically viable approach. They present a significant opportunity to enhance the resilience of coastal communities, safeguard marine biodiversity, and mitigate economic losses resulting from ecosystem degradation.

This study’s deep-dive into mangroves illustrates how an ecosystem-based approach, developed in close collaboration with local communities, can not only strengthen territorial adaptation but also to foster sustainable livelihoods. It highlights the imperative of positioning women—who often serve as principal stewards of natural resources in coastal areas, —at the heart of these strategies. Women must be recognized not merely as beneficiaries, but as key agents in decision-making processes, to ensure equitable and effective outcomes. Despite their potential, these solutions remain underfunded, poorly integrated in public policies and adaptation policies, and largely unknown beyond expert circles.

To maximize their impact, Nature-based Solutions must be grounded in equitable governance frameworks, supported by robust monitoring and evaluation mechanisms, and built on genuine recognition of the diversity of local knowledge systems. Collective engagement, transparency, inclusion, and context-specific implementation are essential to their success. It is time to make Nature-based Solutions a central pillar of coastal climate adaptation strategies.

4. Key recommendations

1. Protect and Restore Marine Ecosystems to Strengthen Resilience

- Prioritize the protection and restoration of critical coastal ecosystems such as mangroves.
  How? By financing community-led reforestation, supporting sustainable income-generating activities, and promoting the regeneration of ecosystem services.

- Elevate Nature-based Solutions as essential tools for climate adaptation
  How? By explicitly integrating them into Nationally Determined Contributions (NDCs), National Adaptation Plans (NAPs), and biodiversity strategies, with clear targets and implementation plans.

2. Ensure Social Inclusion and women and girls equality in Ocean Governance

- Place local communities at the center of adaptation policies.
  How? By integrating co-management mechanisms, establishing local committees, and ensuring participatory consultation processes from the earliest stages of project design.

- Strengthen women's leadership in ecosystem governance.
  How? By supporting women's rights and women-led organizations (WROs and WLOs) and ensuring direct access to funding, technical training, and decision-making bodies.

- Systematically integrate social, environmental, and women and girls dimensions into NbS projects.
  How? By requiring participatory and intersectional assessments from the ex-ante evaluation phase, in line with IUCN criteria.

3. Mobilize Climate Finance and Ensure Its Integrity

- Promote the allocation of climate finance to projects with strong social and community impact
  How? By prioritizing funding for initiatives led by local civil society organizations, WRO/WLOs, and Indigenous Peoples, and by establishing accountability mechanisms.

4. Strengthen the Scientific Base and Local Capacities

- Invest in robust scientific monitoring frameworks accessible to local stakeholders.
  How? By supporting local data generation, engaging researchers and citizens, and financing community-based monitoring systems.

- Encourage knowledge exchange between communities, scientists, and decision-makers.
  How? By creating platforms for dialogue, valuing traditional knowledge, and training local actors in scientific tools and data use.

5. Adapt Public Policies to Nature-Based Adaptation Challenges

- Revise national legal frameworks to support NbS.
  How? By simplifying procedures, aligning land tenure, climate, and biodiversity regulations, and enhancing long-term public incentives.

6. Accelerate Awareness, Education, and Information Access for Coastal Communities

- Enhance environmental education from an early age in coastal areas.
  How? By integrating sustainable ecosystem management and climate risk topics into school curricula and extracurricular programmes, as recommended by municipalities in Senegal.

- Develop awareness campaigns on the benefits of Nature-based Solutions.
  How? By translating scientific data into accessible, localized messages co-created with community media, schools, and rural radio stations.

- Train local decision-makers and community organizations in nature-based adaptation.
  How? By supporting multidisciplinary training workshops in local languages and disseminating practical planning and implementation tools.

- Increase access to data on coastal risks and ecosystems.
  How? By funding open, participatory mapping platforms, involving communities in data collection (citizen science), and ensuring feedback to users.

7. Ensure Inclusive, Equitable, and Multi-Stakeholder Governance of Coastal Ecosystems

- Systematically include local actors—particularly women, youth, and Indigenous Peoples—in all phases of adaptation projects.
  How? By establishing representation quotas in management committees, adapting consultation formats and schedules, and supporting the training of community spokespersons.

- Recognize local knowledge as a legitimate source of expertise in coastal governance.
  How? By creating dialogue spaces between scientists and communities, and funding participatory, transdisciplinary research that incorporates traditional practices.

8. Establish a Rigorous and Participatory Monitoring and Evaluation Framework for Nature-Based Solutions

- Develop common indicators to assess the social, economic, and environmental co-benefits of NbS.
  How? By using IUCN criteria, integrating women and girlsand social justice metrics, and regularly publishing locally disaggregated results.

- Engage communities in project evaluation from the design phase.
  How? By forming local monitoring committees with dedicated resources and valuing qualitative feedback from end-users in impact reports.

Examples of CARE International's programs showcasing the role of biodiversity in adaptation and the importance of local community inclusion in project management

CARE Bangladesh's project « Nature Based Adaptation towards Prosperous and Adept Lives & Livelihoods in Bangladesh (NABAPALLAB) » - October 2023 to September 2028

CARE Bangladesh is leading a consortium of partners -CNRS, Cordaid, C3ER-BRAC University, DSK, Friendship, Humanity & Inclusion, iDE, and Practical Action- responsible for implementing the project.

Bangladesh is one of the most climate-vulnerable countries in the world, facing increasing threats from sea level rise, cyclones, salinity intrusion, and coastal erosion. The Sundarbans, the largest contiguous mangrove forest globally and a designated Ecologically Critical Area (ECA), play a crucial role as a natural buffer against these hazards. However, the mangroves are under growing pressure from both human activities and climate change. In recent years, biodiversity has been declining, with shrinking habitats for key species like the Bengal tiger, and degraded nursery grounds for fish and crustaceans.

- To address these challenges, CARE Bangladesh is leading the « Nature-Based Adaptation towards Prosperous and Adept Lives & Livelihoods in Bangladesh (NABAPALLAB) » project under the « Adaptation in Ecologically Critical Areas in Bangladesh (AECAB) » initiative :

Implemented in five climate-vulnerable districts -Khulna, Bagerhat, Satkhira, Sylhet, and Moulvibazar- the project focuses on empowering natural resource-dependent communities to enhance their climate resilience, protect biodiversity, and diversify livelihoods through nature-based solutions (NbS) and locally led adaptation (LLA) approaches.

Key program areas include mangrove restoration in the Sundarbans, sustainable water and sanitation, climate-resilient homes and agriculture, renewable energy, weather information services, and the active participation of women and girls.

- **Expected outcomes :** NABAPALLAB aims to improve the resilience of over 210,000 vulnerable households and support the ecosystem-based protection and restoration of 5,000 km².

Source : CARE Bangladesh, YouTube, 2024 https://www.youtube.com/watch?v=g_Ujc0yFyMw

CARE places particular emphasis on biodiversity and is part of the Coral Reef Rescue Initiative —an international partnership involving seven countries and eight global and national organizations dedicated to coral reef conservation and research, ecosystem management, sustainable livelihoods, and women and girls equality.

Within this framework, CARE has led the development of reference documents on transformative women and girls approaches in socio-ecological systems of coral reefs. These documents explain and advocate for the necessity of promoting transformative women and girls' practices within communities dependent on coral reefs.

CARE France will continue to integrate Nature-Based Solutions into its adaptation and livelihood programs, while advocating for their inclusion in policy frameworks at community, national, and international levels. The organization gives priority to equitable and women and girls-sensitive natural resources management and remains committed to preventing and responding to women and girls-based violence (GBV), notably through awareness-raising, capacity building, and incorporating this dimension into climate adaptation program cycles.

CARE – WWF Project in Mozambique, 2008 Primeiras e Segundas Archipelago

The Primeiras e Segundas (P&S) archipelago in northern Mozambique is home to rich biodiversity that is increasingly threatened by climate change and human pressures. The CARE-WWF Alliance implemented a project aimed at promoting community-based natural resource management—focusing on mangrove forests and other marine ecosystems—with a particular emphasis on the inclusion of women and girls.

Key results: healthy ecosystems, healthy livelihoods

- Community committees supported 65 communities across two provinces in adopting sustainable natural resource and fisheries management practices, improving the livelihoods of over 215,000 people.
- Mangrove coverage increased between 2002 and 2014, partly due to community-led efforts such as selective logging and replanting. Mangroves serve as nurseries for fish and crabs, provide protection against cyclones, and are a renewable source of building materials.
- Farmers involved in the project were twice as likely to overcome food crises, demonstrating the effectiveness of sustainable approaches in building resilience.
- Women were 7.5 times more likely to report access to credit.
- In 2012, after years of advocacy by the CARE-WWF Alliance, the Mozambican government declared P&S a protected area—the largest coastal marine reserve in Africa at that time.
  The Alliance contributed key components of the management plan.

Source: Initial Results from a decade of CARE – WWF Alliance Work in Mozambique

CARE Project in Vietnam, 2006–2014 – A Community-Based Approach to Mangrove Management, Disaster Risk Reduction, and Climate Change Adaptation

Between 2006 and 2014, CARE Vietnam implemented an integrated project in Thanh Hoa province, combining:

- Community-based mangrove management: Establishment of Mangrove Management Committees (MMCs) composed of elected local community representatives responsible for planning, planting, and maintaining mangroves.
- Disaster risk reduction (DRR): Training village facilitators to conduct vulnerability assessments and develop disaster preparedness plans in coordination with local authorities.
- Resilient livelihoods: Promotion of sustainable agricultural practices such as the use of biofertilizers, alongside income diversification activities like beekeeping and sustainable fishing

Key results:

- Over 300 hectares of mangroves were planted, bringing the total area to 500 hectares in Da Loc commune. The planted mangroves showed a survival rate between 70 and 90%, reflecting the success of community planting techniques.
- The involvement of local labor and experts helped reduce costs, improve project effectiveness, and strengthen community commitment to mangrove protection. Local leaders and residents are now confident that the forests are no longer at risk of overexploitation or illegal activities in the near future.
- Training sessions increased participants' understanding of mangrove management and women and girlsissues, with a remarkable 89% female participation.
- Significant increases in shellfish yields (multiplied by 5 to 10) and improved household incomes thanks to sustainable practices.

Source: A Community-Based Approach to Mangrove Management, Disaster Risk Reduction, and Climate Change Adaptation. Experience from CARE-Vietnam in Thanh Hoa, 2006–2014.

Bibliography

ActionAid, CARE, Germanwatch & WWF. (2012). *Into unknown territory: The limits to adaptation and reality of loss and damage from climate impacts.*

Convention on Biological Diversity – Ramsar Convention. (2010). *Blue Carbon: The Role of Coastal and Marine Ecosystems in Climate Change Mitigation.*

Conservatoire du Littoral. (2009). *The mangroves of French overseas territories: Ecosystems associated with coral reefs.*

Dasgupta, P. (2021). *The Economics of Biodiversity: The Dasgupta Review.* HM Treasury.

FAO. (2022). *The world's mangroves 2000–2020.*

FFEM. (2019). *Mangrove Initiative: Factsheet 6 – Mangrove restoration: Capitalisation and valorisation of best practices.*

FFEM & Océanopolis. (2021). *Marine ecosystems – Mangroves, coastal anchors.* French Facility for Global Environment (FFEM) and Océanopolis.

Gemenne, F., & Rankovic, A. (2019). *Atlas of the Anthropocene.* Presses de Sciences Po.

Global Environment Facility (GEF). (2021). *Enhancing Blue Carbon for Climate Mitigation and Adaptation: A Global Synthesis Report.* GEF.

Global Mangrove Alliance. (2021). *The state of the world's mangrove forests: Executive summary.*

Global Mangrove Alliance. (2023). *GMA Policy Brief V6: Legal and policy frameworks that enable mangrove conservation, restoration and sustainable use, in support of global goals for climate, biodiversity and sustainable development.*

Global Mangrove Alliance. (2024). *Global Mangrove Watch: Integrating mangrove ecosystems into National Biodiversity Strategies and Action Plans (NBSAPs).*

Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES). (2018). *The IPBES regional assessment report on biodiversity and ecosystem services for Africa.*

IPCC. (2022). *Climate Change 2022: Impacts, Adaptation and Vulnerability – Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press.

International Institute for Sustainable Development (IISD). (2023). *Guiding Principles for the Preparation of Financing Strategies for Climate Change Adaptation in Developing Countries.*

International Institute for Sustainable Development (IISD). (2024). *Mainstreaming Gender Equality and Social Inclusion in Nature-Based Solutions for Climate Change Adaptation.*
International Union for Conservation of Nature French Committee. (2018). *Nature-based solutions to combat climate change and reduce natural hazards in France.* Paris: IUCN France.

International Union for Conservation of Nature (IUCN). (2019). *Legal guide – French Guiana.* Wetlands Tropical Areas Network.

La Gazette des Communes. (2024). *Does ecofeminism have a place in local authorities?*

Malandrino, A., & Centeno, I. (2021). *The offer of climate change adaptation solutions (SAFN) – Emerging economic sectors: Final report.* French Office for Biodiversity (OFB).

Ministère de la Transition écologique. (2018). *French ecosystem and ecosystem services assessment: French marine and coastal environments.*

Office français de la biodiversité (OFB). (2021). *Adaptation to climate change: Nature provides the solutions – Life ARTISAN Project.*

Organisation for Economic Co-operation and Development (OECD). (2024). *Infrastructure for a climate-resilient future.* OECD Publishing.

The Nature Conservancy (TNC). (2020). *Nature-based Solutions for Coastal Resilience: A Global Review.* The Nature Conservancy.

Tramis, M., Rey, T., & Leone, F. (2022). *Relocation as an adaptation strategy to coastal risks: Lessons learned from projects in the French Antilles.* Études caribéennes, (53).
United Nations Development Programme (UNDP). (2022). *Building Resilience in Coastal Communities: Integrating Ecosystem-based Adaptation in National Climate Policies.* UNDP.

United Nations Environment Programme (UNEP) & FAO. (2020). *United Nations Decade on Ecosystem Restoration (2021–2030): Scaling up restoration of degraded and destroyed ecosystems globally.*

World Bank. (2023). *Restoring Coastal Ecosystems for Climate Resilience and Sustainable Development.* World Bank Group.

Why did CARE France choose to use the term Nature-Based Solutions?

The distinction between Nature-Based Solutions (NbS) and Ecosystem-Based Adaptation (EbA) is the subject of ongoing political and scientific debate, particularly in climate and biodiversity arenas such as the UNFCCC and the Convention on Biological Diversity.

The IPCC uses both terms, but with different meanings and nuances.

Ecosystem-Based Adaptation (EbA) focuses on using ecosystems to support climate change adaptation. In contrast, Nature-Based Solutions (NbS) refer to broader actions that use nature to address multiple challenges—including climate change, biodiversity loss, and development issues.

As an NGO committed to climate justice for the most vulnerable populations, CARE France chooses to use the term NbS because it is more visible, mobilizing, and compatible with an integrated, rights-based approach centered on climate justice and co-benefits for communities.

However, we also recognize the relevance of the term EbA in many contexts, particularly due to its clearer and more legally grounded definition in international law.

For more information on the conceptual differences between these two terms, please refer to the table below:

Term	General Definition	Main Objective	Origin/Institution
Ecosystem-Based Adaptation (EbA)	The use of biodiversity and ecosystem services to help people adapt to the adverse effects of climate change	Adaptation	UNFCCC
Nature-Based Solutions (NbS)	Actions to protect, sustainably manage, and restore natural or modified ecosystems to address societal challenges while benefiting biodiversity and climate	Multifunctional (climate, biodiversity, health, etc.)	IUCN, later adopted by the EU, and by climate and biodiversity COPs


care