Nature-based Solutions and Ecosystem-based Adaptation to Climate Change

Capacity Statement

The Problem

Climate Crisis

Climate change is the most urgent crisis facing humanity today. The past decade (2011-2020) was the warmest in recorded history, and under current climate policies, the world is heading toward a 2.7°C increase by 2100.[1] This would have catastrophic effects on people across the globe and the ecosystems we depend on.[2] The impacts of climate change are already visible. During the last two decades, climate change contributed to over 7,000 natural disasters, affecting four billion people at the cost of $3 trillion.[3] Simultaneously, climate change is causing gradual changes in environmental conditions with the potential to undermine decades of progress in reducing poverty around the world. Climate change disproportionately impacts the countries that have contributed least to its causes. And women and girls living in poor and vulnerable communities face disproportionate risks: 81% of people displaced by climate change are women.[4] Pervasive harmful social norms and institutional biases and discrimination continue to hold them back. Without greater action, climate change threatens to push 130 million people into poverty by 2030 and displace more than 216 million by 2050.[5]

The Intersection of Biodiversity & Ecosystem Loss and the Climate Crisis

Climate change cannot be properly addressed without understanding the critical role of ecosystems. Ecosystems are home to the wide variety of plant and animal species, water, air, and resources that sustain human life. Ecosystems provide services which are viewed as benefits people obtain through provisioning services such as food and water; regulating services such as flood and disease control; cultural services such as spiritual, recreational, and cultural benefits; and supporting services, such as nutrient cycling, pollination, and soil formation, which maintain the conditions for life on Earth[6]. Climate change is affecting provisioning, cultural and supporting services due to changes in temperature and rainfall. At the same time, climate change drives about 14% of biodiversity loss across ecosystems.[7] Over a million animal and plant species are currently at risk of extinction, the highest amount recorded in history.[8] Around 25% of global emissions come from the land sector, which includes tropical deforestation and land conversion to agriculture[9]. This not only reduces biodiversity but contributes to climate change. The changing climate also leads to loss in biodiversity and agricultural production due to habitat loss and floods and droughts that threaten agricultural yield. By 2050, estimates suggest that climate change will outpace land use change as the top driver of biodiversity loss.[10]

These threats to ecosystems that are home to diverse plants and animals, directly impact billions of people who work in resource-dependent livelihoods, including agriculture, pastoralism, fisheries, and forestry. Women, making up about 36.7% of all agricultural workers, face additional challenges, as they are less likely to have access to the education, resources and decision-making power to adapt their livelihood strategies that are dependent on these critical ecosystems.[11] Still billions of other people around the world are indirectly affected, as half of the world's GDP is dependent on nature.[12] Furthermore, the loss of critical ecosystems like mangroves and coral reefs and the biodiversity that the hold, reduces people's ability to protect themselves against extreme climate events such as floods, sea level rise, and cyclones.


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Historically, climate change and biodiversity loss have been treated as separate issues. But in 2021, the IPBES and IPCC released the first joint-report calling for a coordinated approach. UN Environment reports that investment in nature-based solutions must triple by 2030 and quadruple by 2050 to achieve global biodiversity, land degradation goals, and combat climate change.[13] If efforts to restore and protect land are not made and land use change and soil degradation continues at pace, it is estimated that nearly 70 gigatons more carbon would be emitted by 2050. This would represent approximately 17 per cent of current annual greenhouse gas emissions.[14]

The Importance of Nature-Based Solutions for Adaptation

Overview

Ecosystem stewardship is critical to combating climate change and involves using nature-based solutions, which the International Union for Conservation of Nature defines as "actions to protect, sustainably manage, and restore natural and modified ecosystems that address societal challenges effectively and adaptively, simultaneously benefiting people and nature."[15] Nature-based solutions play a powerful dual role in climate change mitigation and adaptation[1]. Restoring ecosystems would allow for critical ecosystems services to be restored. For example, the adoption of climate resilient agriculture techniques such as crop rotation and diversification help restore supporting services, such as healthy soils that can sequester carbon and retain water, and provisional services that leads to greater food production. Sustainably using ecosystems, such as forests, mangroves, and reefs, enables people to strengthen regulating services and adapt to climate change. For instance, forests help reduce the impacts of flooding while mangroves and reefs buffer the force and reduce the impacts of coastal storms.

1 Often NbS and ecosystem-based adaptation (EbA) are used interchangeably but EbA is a type of NbS or a sub-set of NbS that focuses on adaptation. NbS is an "umbrella" term that could refer to both adaptation and mitigation (Seddon et al. 2020). Since our work covers both adaptation and mitigation, we use NbS in this capacity statement.

Nature-based solutions are increasingly recognized as effective and cost-efficient strategies for climate change adaptation and mitigation. Implementing NbS on a large scale could not only save money and other resources in comparison to engineered solutions, but also reduce loss and damage costs associated with environmental degradation and climate change.[16] To scale NbS, however, integrated approaches that link policy, financial instruments and technical advances will be required in addition to building a common understanding of the nature and value of NbS for scaling up[17]. Robust safeguards, standards, and guidance for NbS also need to be further developed, refined, and applied to ensure that NbS are implemented in ways that are effective, gender-responsive, transparent, and consensual.

Although restoring, protecting, and sustainably using NbS can provide many benefits through ecosystem services, is not a panacea nor a one size fits all solution. A range of factors need to be considered before implementing NbS. From a social perspective, implementing NbS can lead to dispossession where land and other natural resources are appropriated by powerful groups at the expense of vulnerable social groups. NbS, if not implemented in partnership with these groups, may reproduce existing power imbalances and obscure vulnerable social groups' interests and relationships with nature. [18]. This can happen when vulnerable social groups are unable to participate in decision making over how NbS should be implemented due to unequal societal power structures. Therefore, from a governance perspective, whether local communities have access to ecosystems and governance rights over them needs to be assessed. Community stewardship is critical since most ecosystems encompass significant amounts of public or common lands or waters. From an ecological perspective, natural sciences need to be applied to assess whether suitable ecological conditions exist to implement NbS. A reef, for example, needs to be healthy enough to offer coastal protection and the water temperatures suitable enough for reefs to be viable.[19]. For mangroves, this may mean assessing whether suitable levels of salinity and coastline exist to accommodate retreat. From an economic perspective, NbS should provide equitable and sustainable financial benefits to support people's livelihoods since many people depend on them for food and income[20]. If governance structures do not allow people to financially benefit from NbS, incentives to protect them could be diminished. Considering these factors when designing and implementing NbS has the potential to lead to climate and social justice.


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Governing Nature-Based Solutions

Gender Based Violence

In many cases, women have been underrepresented in environment-related decision-making across levels and sectors even though they play a significant role in protecting, managing, and using ecosystems for their livelihoods. For example, in forest ecosystems, women are traditionally responsible for gathering forest products, such as plants, medicinal herbs, and mushrooms, which allow women to hold much of the traditional and ecological knowledge for forest management and conservation. When it comes to managing water resources, women and girls are traditionally tasked with collecting and managing water in their household. They are responsible for planning how much water is needed for household and agricultural purposes, how to clean and store the water, negotiating access to water with their neighbors, and evaluating which water source to go to. However, despite their unique roles and knowledge managing forests and water, many women rarely hold leadership positions in formal management structures and are not often included in decision-making processes. Many social, cultural, legal, economic, and institutional frameworks around environmental activism reinforce gender inequalities and prohibit women from being able to defend, protect, conserve, and benefit from the environment.

In addition to the lack of formal decision-making power, women also face gender-based violence (GBV) in relation to access to and control of natural resources[21], environmental pressure and threats, and environmental action to defend and conserve ecosystems and resources. Gender inequalities and norms that differentiate between men and women's roles and responsibilities are present in the ways that land and resources related to ecosystems are accessed and controlled. Evidence and experience show that GBV is often used to maintain these power structures, as men seek to maintain economic dependencies, and women's traditional roles of fetching firewood and water put them at higher risk of sexual harassment or violence during the collection journey.[22] As resources become scarcer because of environmental degradation and climate change, and result in food insecurity, poverty, and displacement, household and community-level tensions are heightened, putting women are at greater risk of experiencing GBV. This could lead to increased instances of child marriage; exploitation of women to work in illegal logging, mining, and fishing operations; and increased rates of intimate partner violence (IPV) as men use violence to establish control over scarce natural resources.[23] At times, GBV has been used to forcibly discourage or prevent women from taking actionable steps to assert their rights.[24]

Evidence shows that taking gender differences into account, including experience and knowledge of ecosystems, increases effectiveness and sustainability of the ecosystem.


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For example, it has been shown that conservation and management outcomes improve when women participate in natural resource management groups..[25] According to the IPCC special report on Climate Change and Land, land management and adaptation strategies would be bolstered by recognizing gender differences and enabling women to realize their land rights and apply their knowledge in decision-making.[26] Therefore, further to a rights-based imperative, including women in decision making on nature-based solution is critical in addressing climate change, tackling biodiversity loss.

Nature-Based Solutions & Ecosystem Services

CARE collaborates with local communities and cross-sector partners in designing projects on nature-based solutions, with a focus on protecting, restoring, and managing natural resources and biodiversity within the context of climate change. Many CARE projects integrate multiple elements of nature-based solutions, including gender-equitable governance, as highlighted by some programmatic examples in Annex 1. Examples in Annex 1 focus on the various NbS practices that have been implemented and how they have especially targeted provisioning, regulating, and supporting services. Below are ecosystems in which CARE works that address climate change adaptation.

Forests

Forests are among the most biodiverse ecosystems and play a significant role in mediating the effects of climate change. In both rural and urban settings, forests protect communities from climate hazards, including flooding, wildfires, storms, and extreme heat.[27] By buffering and absorbing floodwaters and contributing to groundwater intrusion, forests can slow the pace of water flow leading to floods. Vegetation also helps to stabilize soil through root systems, and trees can intercept soil, snow, or rocks moving down steep slopes, helping to prevent landslides after intense rainfall. Forests near coastlines, such as mangrove forests, can help reduce the impact of stormwater intrusion during storms; and well-managed forests inland are better able to withstand wildfires.[28] In addition to protecting inland and coastal communities from the natural disasters increasing in frequency and intensity due to climate change, forests help to sequester carbon contributing climate change mitigation. CARE has collaborated with partners to implement programs promoting forest restoration, biodiversity conservation, sustainable landscape management, and climate change adaptation in Madagascar, Malawi, and Laos PDR (see Annex I).

Mountains

Mountains are essential ecosystems for the world's freshwater supply, providing over half of humanity with freshwater. All of Earth's major rivers begin in mountains, and this is where freshwater is collected, channeled, and stored on every continent. This water cycle is essential to regulating the global climate. People living in mountain communities also rely on the ecosystem for biodiverse crops, including tea and coffee, medicine, and building materials.[29] Mountains are also subject to various natural hazards, including flooding, rockfalls, avalanches, and landslides. At their bases, mountain communities must be aware of water quality and runoff from agricultural areas on mountain faces. NbS to maintain mountain ecosystems include planting trees in buffer zones to protect riverbanks, restoring traditional water management systems, and conserving mountain wetlands to revitalize native grasslands.[30] CARE launched its Glaciares+ project alongside partners to use community-based adaptation strategies to equip people to adapt to and mitigate the effects of climate change in new lakes created by glacial retreat in Peru (see Annex I).

Wetlands

Wetlands are a powerful ecosystem to both protect against climate hazards and provide resources to nearby communities. They protect against flooding and erosion, providing critical defenses in the face of climate change and absorb carbon dioxide from the atmosphere. The nutrients in wetlands provide food for small fish and organisms which are critical for supporting biodiversity and the food web that supports larger, commercially caught fish. In Uganda, CARE launched the Women's Empowerment in Natural Resource Management Project to lead wetland management efforts (see Annex I).

Drylands

Drylands, which cover over almost half of the world's terrestrial surface (mostly in Northern and Southern Africa, the Middle East, and Australia), are comprised of barren land, grassland, forests, and croplands. They are extremely rich in biodiversity, hosting rare species that are not found in other ecosystems. Drylands, however, are also one of the most vulnerable ecosystems to land degradation and surface warming caused by climate change. Nature-based solutions such as afforestation, agroforestry, and wetland/rangeland (grassland) restoration are strategies to combat these negative impacts of climate change on dryland ecosystems.[31] In partnership with the World Agroforestry Center, CARE launched the Drylands Development Program in Niger, which took a gender-focused approach to help women transition from subsistence agriculture to sustainable rural development in the context of climate change (see Annex I).

Coasts

Nature-based solutions on coastlines can effectively reduce flooding and erosion through various methods. For example, restoring mangroves, salt marshes, and seagrass can help stabilize shorelines with root systems and reduce the force of waves that lead to flooding and erosion in their dense vegetation. Mangroves, themselves, are some of the most effective carbon sinks in the natural world, trapping more than four times the amount of carbon dioxide as terrestrial forests.[32] Sandy beaches and dunes help protect the coastline from strong winds, waves, and tides, while coral reefs work within the water to reduce wave velocity, all reducing the possibility of coastal erosion. [33] Restoring coastal wetlands can be two to five times cheaper than constructing submerged breakwaters to attenuate waves climbing up to half a meter. In addition to addressing flooding and erosion on the coasts, these NbS can help generate income for local communities by creating opportunities for fisheries and tourism [34]

Under the Coral Reef Resilience Initiative (CRRI), CARE led the *Gender Transformative Approaches for Advancing Gender Equality in Coral Reef Socio-Ecological Systems Good Practice and Technical Brief* and *Policy Brief* explaining and advocating for the need to promote gender transformative practices in communities that depend on coral reefs. CARE has launched two programs that use nature-based solutions to address coastal erosion and flooding. In Vietnam, CARE supported local partners to implement an integrated, community-based approach to mangrove management, disaster risk reduction, and climate change adaptation. In Mozambique, CARE and WWF implemented *Primeiras e Segundas*, which established natural resource management of fisheries, formed community-led mangrove committees, and provided resilient agriculture education. Read more in Annex I.

CARE's Value Add

Through its programming, CARE implements and advocates for NbS that amplify its existing work in climate resilience, gender empowerment, livelihoods, and humanitarian action.

CARE's value add on NbS includes:

- When planning with communities on what NbS adaptation options to implement, CARE uses the **Climate Vulnerable and Capacity Analysis** (CVCA) tool to identify climate vulnerability, use of natural resources differentiated by gender, and capacities of communities to effectively manage their ecosystems. Results of the CVCA help build community level adaptation plans that incorporate NbS and influence relevant policies.
- CARE uses its **Gender Equality Framework** to identify ways to achieve gender equality and women's voice through transformative change when designing NbS projects. The aim of CARE's work is to build agency for people of all genders and life stages, improve relations between them, and transform structures.
- CARE applies an **Integrated Risk Management** (IRM) framework that combines disaster risk reduction, climate change adaptation, and nature-based solutions to develop systematic and comprehensive responses to increased climate risks and vulnerabilities. Using a landscape approach, which layers geo-ecological processes, social rules, stakeholder actions, and economic activities, CARE identifies an addresses driver of risk, communities' capacities and assets, and the enabling environment to increase community resilience[35].
- **The Farmer Field and Business School (FFBS)** is a participatory learning and action curriculum that aims to equip farmers with agricultural production techniques, nutrition, marketing, climate resilience and gender equality training to strengthen food and nutrition security. This includes building capacities on sustainable and climate resilient production which increases agro-biodiversity and protects ecosystems so that they can increase food, water security, and support nutritious diets.

- **Village Savings and Loan Associations** (VSLA) are a core component of CARE's efforts to fight poverty through improving financial savings, spurring investments in business development, and increasing women's decision-making in households. In Northern Ghana, CARE is piloting adding a conservation element to the VSLAs to help women save to benefit from NbS through land restoration practices.
- The **Community Score Card** (CSC) is a participatory tool for assessment, planning, monitoring, and evaluation of services. It helps to analyze issues underlying service delivery problems and find a common and shared way of addressing those issues. The main goal of CSC is to positively influence the quality, efficiency and accountability with which services are provided at various levels. This has been applied to assess forest ecosystem service delivery.

Partnerships

CARE works alongside a range of partners to develop programming, conduct research and learning, and support policy advocacy from the local to international level. CARE has been part of the CARE-WWF Alliance since 2008. The Alliance brings together WWF's conservation and restoration expertise; CARE's gender equality, nutrition, and livelihood development expertise; both organizations' combined expertise in climate change adaptation; and their joint presence in more than forty countries. CARE is part of the Coral Reef Rescue Initiative, an international partnership between seven countries and eight global and national organizations in coral reef conservation and science, ecosystem management, sustainable livelihoods, and gender equality. CARE is also working with the International Union for the Conservation of Nature (IUCN), International Institute for Sustainable Development IISD), the Food, Agriculture and Natural Resources Policy Analysis Network (FANRPAN) and multiple government and national partners on a community-based adaptation scaling program in Southern Africa which has various nature-based solutions. CARE is also part of the Global Evergreening Alliance, a collaborative platform to support and facilitate massive-scale land restoration projects. CARE is actively seeking investments to further scale its work with strategic partners and accelerate gender transformative nature-based solutions that deliver multiple benefits.

Going Forward

CARE will continue to mainstream NbS into its adaptation and livelihoods related programming and interventions, and advocate for NbS to be integrated into relevant policies and frameworks around adaptation at the community, country, and global levels. CARE will seek opportunities to prioritize gender-equitable management of natural resources and continue to address GBV in its programming by raising awareness and capacities of CARE staff and local partners, integrating action on GBV across program cycles, and considering intersectional vulnerabilities faced by groups based on their identities. The connection between GBV and NbS will also be part of CARE's learning agenda alongside the connection between NbS and intersectionality. CARE will also seek opportunities to integrate NbS as a protective measure in humanitarian programming to prevent or mitigate the incidence and severity of hazards and reduce people's exposure and vulnerability to hazards.

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ANNEX I.

Examples of CARE's Programming in Nature-Based Solutions

Forests

CARE Madagascar is part of a consortium of international institutions led by KEW Gardens, which is collaborating to develop a sustainable community landscape management model for community led forest conservation, carbon storage and livelihoods enhancement across Madagascar's protected area network through the **Sustainable Management for Future Generations Project in Madagascar**. One of the key aims is for local stakeholders to develop an inclusive, consensual vision for sustainable management of natural resources in their landscape. Alongside this, they will work to improve food security, financial independence, and reproductive health because of increased access to sustainable livelihood opportunities and community health services. A key component of this project is to reduce greenhouse gas emissions through protection of forests. CARE Madagascar is playing a critical role in this, building the capacity of the conservation organizations managing the protected areas in inclusive and participatory community-based approaches which ensure a women and girls have a voice and a role in decisions related to natural resource management.

Netherlands is implementing the **Restore Africa Project in Malawi** to restore land and livelihoods of 305,000 small-scale farming households, covering an area of approximately 275,000 hectares in Malawi. This will help improve livelihoods, food security and resilience to climate change through restoring ecosystem services and improved management of agricultural, pastoral and forest areas contributing to emissions reductions. It focuses on strengthening social, institutional, and economic infrastructure. The program will develop equitable agroforestry value chains and ecosystem-based businesses, including engagement with carbon markets, to ensure the sustainability of positive impacts achieved through Evergreening practices. Strategic communications will be employed for widespread scaling, and the program will contribute to national, continental, and global climate change and sustainable development goals. It also aims to create national movements for sustained adoption beyond the program's duration, utilizing a comprehensive approach that recognizes the interconnectedness of trees, forests, watersheds, markets, livelihoods, and community ownership. This project will scale to Tanzania and Ethiopia in 2024.

Starting in August 2024, CARE International will support planting of more than five million trees over five years while farmers adopt evergreening practices through the **Restore Asia Project in Laos**. This includes increasing the adoption of sustainable agroforestry practices among smallholder farmers and empowering women in the region to increase their participation in decision-making processes related to agriculture, land management, and community development. This project will also generate carbon credits through agroforestry and land restoration practices, contributing to climate mitigation efforts. It will increase the income of participating farmers through diversified income sources, including fruit orchards and shade tree integration. The project will enhance local biodiversity by planting and maintaining a diverse range of fruit trees and other plant species while strengthening the capacity of local government agencies, including the Ministry of Agriculture and Forestry and the Ministry of Natural Resources and Environment, to support sustainable land management and carbon credit initiatives.

Mountains

Peru is home to 71% of the world's tropical glaciers, but the area covered by glaciers has been reduced by over 40% in the last four decades. Glacial retreat increases the risk of flooding and reduces water quality in rivers and streams. It also presents opportunities, such as increased water supply and labor demand for employment in natural resource management of newly created lakes. To address these challenges and opportunities, CARE launched the **Glaciares+ Project in Peru** alongside Swiss and Peruvian partners that included the University of Zurich, Meteodat, Research Center for the Alpine Environment (CREALP), the Unidad de Glaciología y Recursos Hídricos, and the Instituto Nacional de Investigación en Glaciares y Ecosistemas de Montaña (INAIGEM). Glaciares+ used community-based adaptation strategies from 2011-2019 to equip people with the tools, knowledge, and institutions to both adapt to and mitigate the effects of climate change in the Peruvian river basins of Santa River in Ancash, the Vilcanota-Urubamba River in Cusco, and the Cañete River in Lima. This includes investing in natural resource management projects for new lakes created by glacial retreat, as well as creating reservoirs in upper basins of Cañete y Vilcanota-Urubamba to manage water supply.

Wetlands

The **Nabapallab project in Bangladesh** led by CARE Bangladesh in 2023 with a consortium of partners, aims to address current and future impacts of climate change in the Sundarbans and Hakaluki Haor eco-regions in an effective and community led approach using nature-based solutions. The project approach comprises six interlinked pillars: climate and weather information services, climate resilient WASH services, climate resilient infrastructure and know how, renewable energy solutions, climate resilient and nature positive livelihood practices, and locally led approaches for nature-based solutions. These pillars will be delivered in a participatory, community centered and inclusive ecosystem-based approach to provide maximum impact to the communities, especially women and children and other marginalized groups in these eco-regions.

Drylands

In 2014, in partnership with the World Agroforestry Center (ICRAF), CARE launched the **Drylands Development Program (DryDev) in Niger** with the aim of helping households to transition from subsistence agriculture and emergency assistance to sustainable rural development that would result in a sustained improvement in food and water security, livelihoods, and resilience. DryDev is explicitly gender-focused: the program puts women's Village Savings and Loan Associations (VSLAs) at the center of planning activities and mobilizing community support. The VSLAs work with watershed committees, local governments, community groups, and local farmers to organize trainings, change behavior, and regenerate community natural resources through creating and supporting 33 watershed maintenance plans. These community platforms also provided interest-free loans to eight hundred extremely vulnerable farmers so they could purchase the inputs they needed to adopt new climate-friendly farming techniques, such as rainfall harvesting and conservation agriculture techniques, and improve their production. As a result of DryDev, more than 12,000 community volunteers were engaged to regenerate land, plant trees, and put community land under sustainable natural resource management practices. Communities report that the water levels in local wells have risen dramatically, and getting water is easier than before the program. Farmers are also reporting higher crop yields, sometimes three times more than what they were producing before the program started.

Coastal and marine

Improving Community Climate Resilience in Nissan project in the Autonomous Region of Bougainville, Papua New Guinea improved awareness and understanding of the importance of marine and coastal environments, including mangroves among communities and District Government. Building awareness of the value of NbS was based on a fisheries survey and a marine ecosystems rapid assessment. This led to the development of 16 community-based marine resource management plans covering coastal and lagoon areas adjacent to all 21 villages between 2015-2017. The plans, endorsed by local government, established Locally-managed Marine Areas, with regulations enforced through village by-laws. This led to mangrove restoration and banning of ring barking of mangrove trees. Youth groups who received training on protecting mangroves, helped lead restoration activities.

Ocean temperature is rising, causing widespread bleaching and loss of corals. Millions of people depend on reefs for their livelihoods and food and nutrition security. CARE is engaged with multiple partners in the Coral Reef Rescue Initiative, which aims to turning these ecosystems into seed banks for the oceans of tomorrow. This partnership of conservation and development experts, governments, and communities, working to safeguard globally significant coral reefs for the benefit of people and nature is focusing on reefs in seven locations worldwide that are less exposed to climate change. Connected by ocean currents, these sites can help breathe life into other reefs. These 'regeneration reefs' have been scientifically selected to ensure maximum positive impact and the best chance of success. The scope of our initiative is bigger and broader than anything tried before. Combining global effort with local impact, we are working to deliver inclusive, equitable and sustainable nature-based solutions to the coral reef crisis and in doing so, we contribute to the achievement of several SDGs.


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