# Concept Note

## Mainstreaming Coral Reef Resilience and Restoration as an Ecosystem-based Adaptation Strategy to Climate Change in the Caribbean Region (MaCREAS)

Belize, Dominican Republic, Jamaica, Saint Vincent and the Grenadines, Saint Lucia and Barbados | Caribbean Community Climate Change Centre (CCCCC)

1 December 2017

GREEN CLIMATE FUND

| | |
|---|---|
| Project/Programme Title: | **Mainstreaming Coral Reef Resilience and Restoration as an Ecosystem-based Adaptation Strategy to Climate Change in the Caribbean Region** (MaCREAS) |
| Country(ies): | Belize, Dominican Republic, Jamaica, Saint Vincent and the Grenadines, Saint Lucia and Barbados |
| National Designated Authority(ies) (NDA): | _____ |
| Executing Entities: | Caribbean Community Climate Change Centre in Partnership:<br><br>CLEAR Caribbean Ltd. - www.clearcaribbean.org (Executing Entity for Saint Lucia and St Vincent and the Grenadines)<br><br>Fragments of Hope - https://fragmentsofhopebelize.wordpress.com/ (Executing Entity for Belize)<br><br>University of the West Indies, Discovery Bay Campus - https://www.mona.uwi.edu/cms/dbml.htm (Executing Entity for Jamaica)<br><br>Punta Cana Ecological Foundation - https://www.puntacana.org/ (Executing Entity for Dominican Republic)<br><br>Coral Reef Restoration Alliance((Executing Entity for Barbados) |
| Accredited Entity(ies) (AE): | Caribbean Community Climate Change Centre (CCCCC) |
| Date of first submission/ version number: | *[YYYY-MM-DD] [V.0]* |
| Date of current submission/ version number | *[YYYY-MM-DD] [V.0]* |

| **A. Project / Programme Information (max. 1 page)** | | | |
|---|---|---|---|
| **A.1. Project or programme** | ☒ Project<br>☐ Programme | **A.2. Public or private sector** | ☒ Public sector<br>☐ Private sector |
| **A.3. Indicate the result areas for the project/programme** | Mitigation: Reduced emissions from:<br>☐ Energy access and power generation<br>☐ Low emission transport<br>☐ Buildings, cities and industries and appliances<br>☐ Forestry and land use<br>Adaptation: Increased resilience of:<br>☒ Most vulnerable people and communities<br>☒ Health and well-being, and food and water security<br>☐ Infrastructure and built environment<br>☒ Ecosystem and ecosystem services | | |
| **A.4. Estimated mitigation impact (tCO2eq over lifespan)** | | **A.5. Estimated adaptation impact (number of direct beneficiaries and % of population)** | 1,500,000 |
| **A.6. Indicative total project cost (GCF + co-finance)** | Amount: USD 11Mn | **A.7. Indicative GCF funding requested (max 10M)** | Amount: USD 10Mn |
| **A.8. Mark the type of financial instrument requested for the GCF funding** | ☒ Grant ☐ Loan ☒ Guarantee Other: specify | | |
| **A.9. Estimated duration of project/ programme:** | a) disbursement period:<br>b) repayment period, if applicable: **Appx USD 2.5Mn per annum** | **A.10. Estimated project/ Programme lifespan** | This refers to the total period over which the investment is effective.**4 years** |
| **A.11. Is funding from the Project Preparation Facility needed?** | Yes ☒ No ☐ | **A.12. Confirm overall ESS category is minimum to no risk[1]** | ☒ C or I-3 |
| **A.13. Provide rational for the ESS categorization (100 words)** | The coral restoration activities that form part of this initiative will take place in areas of ecological significance, including critical habitats and key biodiversity sites. These activities are of a rehabilitative nature and entirely beneficial to the environment. Their impact on the coral reefs will be wholly positive, intended to contribute to reversing the widespread cumulative deterioration that has occurred. This initiative proposes to make – through inter alia the active collaboration and participation of key stakeholder agencies and authorities- a contribution to address the problem of reef degradation in the region | | |
| **A.14. Has the CN been shared with the NDA?** | Yes ☐ No ☒ | **A.15. Confidentiality[2]** | ☐ Confidential<br>☒ Not confidential |
| **A.16. Project/Programme rationale, objectives and approach of** | MaCREAS will build on existing successes and progress being made in active reef restoration and scale them up in Barbados, Belize, Jamaica, Dominican Republic, St Vincent and the Grenadines, St Lucia. The overall objective of the programme is to | | |

[1] Refer to the SAP ESS Guidelines

[2] Concept notes (or sections of) not marked as confidential may be published in accordance with the Information Disclosure Policy (Decision B.12/35) and the Review of the Initial Proposal Approval Process (Decision B.17/18).

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|---|---|
| **programme/project (max 100 words)** | strengthen the resilience of Caribbean coral reefs to ensure that their associated ecosystem services are sustained, augmented and strengthened to counter pending, progressive and potentially irreversible changes in the temperature, chemistry and storm intensity of the Caribbean Sea. MaCREAS will also increase the resilience of livelihoods in coastal communities by ensuring that both men and women benefit from more diverse, sustainable and climate-resilient livelihood options. |

## B. Project / Programme details (max. 3 pages)

### B.1. Context and Baseline (max. 1 page)

*Describe as relevant the climate vulnerabilities and impacts, GHG emissions profile, and mitigation and adaptation needs that the prospective intervention is envisaged to address.*

*Please indicate how the project fits in with the country's national priorities, action plans and programs and its full ownership of the concept.*

*Describe the main root causes and barriers (social, gender, fiscal, regulatory, technological, financial, ecological, institutional, etc.) that need to be addressed. Where relevant, please describe the key characteristics and dynamics of the sector or market.*

This initiative is consistent with host governments integrated efforts to simultaneously promote (i) increased livelihood resilience in coastal communities by ensuring that both men and women are able to benefit from more diverse, sustainable and climate resilient livelihood options in fisheries, tourism, aquaculture and artisan craft that are all dependent on coral ecosystems, and (ii) maintain and sustain the environmental, economic and social integrity of the coral reef eco-systems on which these livelihoods are based. Projected climate variability and change impacts suggest that the Caribbean's coral reefs are expected to come under dire threat due to advancing and potentially irreversible changes in the level, chemistry and temperature of the Caribbean Sea.

Numerous studies, including the IPCC's 5th Assessment Report [1], have indicated that the Caribbean is one of the world's most vulnerable regions to the projected impacts of climate change. Much of this vulnerability and risk is to coastal populations, built infrastructure along coasts, and to coastal and marine ecosystems that are exposed to a combination of intensifying and more frequent extreme weather events such as hurricanes, sea level rise, warming waters, coral bleaching, and ocean acidification.

Coral reefs are projected to be among the first ecosystem-wide casualties of climate change. In the Caribbean, which accounts for 10% of the world's coral reefs, the condition of reefs has steadily declined in the past few decades, with the most recent, comprehensive study documenting average live coral cover across the region at 16%, resulting from a broad range of local stressors such as coastal pollution, sedimentation and over-fishing of reef fish (particular key herbivores that help maintain reef health). The projected future impacts of climate change are expected to further accelerate the deterioration of Caribbean coral reefs, and exacerbate the effects of local stressors [3,4]. The mass coral bleaching events of 1998, 2005 and 2010 were unprecedented, triggering high coral mortality rates, often in excess of 25%, across the Caribbean [2].

The economic and social impacts of the rapid deterioration and eventual collapse of coral reefs would be enormous and catastrophic for the Caribbean region. It would profoundly impact already fragile economies dependent on the services that the reef ecosystems provide for fisheries, coastal protection, and especially for the tourism sector which is the dominant driver of economic activity in the region At a global scale, the World Bank has placed the magnitude of the economic losses at about US $8 to $11 billion per year by mid-century if 90% of the reefs disappear. A future without reefs in the Caribbean—which appears likely in the absence of forceful and urgent immediate action—is unimaginable. As one part of the response seeking to avert this impending ecosystem and economic collapse/disaster,the initiatives that form part of the MACREAS is proposed.

A growing body of evidence has demonstrated that the recovery of coral reef ecosystems can be greatly accelerated by actively restoring key coral species. Developed initially in the Indo-Pacific and Red Sea regions, coral restoration methods have been increasingly implemented in the Caribbean, where efforts have been concentrated almost exclusively on the branching corals Staghorn (*Acropora cervicornis*) and Elkhorn (*Acropora palmata*), that were once the dominant reef-building corals on the Caribbean's near-shore reefs. A virulent coral disease (White-Band Disease) decimated both Staghorn and Elkhorn populations in the 1980s and 1990s, with losses estimated at around 95%. The survivors from this epidemic are more resistant to diseases and warmer waters, and are very slowing recovering throughout the Caribbean. Their natural recovery is however greatly hampered by the fact that they are both rare and widely dispersed, which hinders successful sexual reproduction as their eggs and sperm seldom meet during the annual mass spawning events. Coral restoration can greatly accelerate the recovery process by propagating resilient genotypes in nurseries and then outplanting them in dense thickets where sexual reproduction becomes much more effective. Sexual reproduction of restored corals has been observed at many sites in the Caribbean.

The science of coral restoration/gardening is still in a nascent stage and many uncertainties remain, however a number of reviews and papers, including those by Rinkevich (2014), Bowden-Kirby & Carne (2013) and Young et al (2012), have shown that this method can help restore functional ecosystems under a variety of conditions. A study by Bowden-Kirby & Carne (2013) found that thermal tolerance was associated with the genotype of coral host and not only the genotype of the symbiotic zooxanthellea. This interesting finding suggests that selection and propagation of resilient coral genotypes could assist natural adapation of corals to higher temperatures. The review by Rinkevich (2014) found that "one of the most promising emerging approaches is the low-cost 'gardening concept', and that the gardening-toolbox could serve as a ubiquitous ecological engineering platform for restoration on a global scale. A number of unanticipated outcomes were the immediate establishment of coral infaunal biodiversity in nurseries, the development of nurseries into 'larval dispersion hubs' and the enhanced reproduction of transplanted coral colonies.
Rinkevich also suggests that coral restoration could be used for developing improved corals through epigenetics. Studies (e.g. Stern et al., 2012) have revealed that under a wide range of ecological insult scenarios, organisms modify levels of genome epigenetics that may coincide with increased tolerance to otherwise lethal conditions, further showing that these epigenetic changes may be stable across multiple generations. Therefore, genome-wide transcriptional plasticity may underlie whole organism adaptation to novel environmental insults, like those presented by global change (Cebrian et al., 2013) and can be used as an applied tool in coral nurseries.

Acroporids are well suited for active restoration as they have high growth rates relative to other corals, and are critically important for Caribbean fisheries, tourism and coastal protection. The branching structure of Acroporids makes them particularly effective at dissipating wave energy and reducing coastal erosion. The loss of Acroporids across the Caribbean has decreased both the height and roughness of reef crests, which dissipate over 85% of wave energy. Recent research by coral geneticists has also found that thermal tolerance (bleaching resistance) is associated with the genotype of the coral host rather than the symbiotic microalgae, suggesting that restoration projects that select and propagate resilient coral genotypes could help Caribbean corals adapt to climate change. Advances in coral genetics will enable more effective mapping and tracking of genotypes that display greater tolerance to warmer conditions and greater resistance to diseases and other stressors. The aim of MACREAS will be to create genetically diverse restored sites, which incorporate resilient genotypes that can reproduce sexually and thus replenish surrounding areas. By strategically placing these restoration sites at locations where currents disperse their fertile eggs to suitable reef areas, coral restoration will have the potential to significantly contribute to the natural recruitment of resilient corals regionally. Natural spawning of restored corals has been observed already in several locations in the Caribbean.

Many of the current coral restoration projects in the selected countries are establishing genetically diverse nurseries and selecting the most resilient genotypes for restoration.They have successfully propagated and out-planted several hundreds of thousands of corals, with high survival (>90%) and rapid growth (>20cm per year).*2 The MaCREAS programme will use the lessons learnt from these and other restoration projects to significantly scale-up these activities.

These projects are also developing operational and financial models that allow local communities to be trained and employed in reef restoration activities with resources provided by the tourism sector. There is growing support and interest from the scientific community, policy-makers, and tourism and fisheries sectors for a major scaling-up of these coral restoration partnerships in order to help provide alternative livelihoods to vulnerable communities while also restoring fringing coral reefs with resilient and diverse genotypes. *1.

**B.2. Project / Programme description (max. 1 page)**

*Describe the expected set of components and activities to address the above barriers identified that will lead to the expected outcomes.*

*Please explain why this project or programme is ready for scaling up and having the potential for transformation. Has it been piloted in the country or region? Are the proposed interventions well documented for their costs and benefits?*

Describe in what way the Accredited Entity(ies) is well placed to undertake the planned activities and what will be the implementation arrangements with the executing entity(ies) and implementing partners.

*Please provide a brief overview of the key financial and operational risks and any mitigation measures identified at this stage.*

The "proof of concept" for coral restoration has been amply demonstrated by projects in many Caribbean countries including Barbados, Belize, Jamaica, Dominican Republic, St Vincent and the Grenadines and St Lucia. There is now an urgent need to scale up these reef restoration efforts before it is too late. A key objective of the MaCREAS programme will also be to establish sustainable-financing mechanisms to provide sustainable and climate-resilient livelihoods for both men and women in coral restoration. The program will comprise four main components:

**1) Coral Restoration and Reef Resilience**

This component will include the deployment, at scale, of a repopulation programme for robust, resilient coral genotypes at strategically located sites throughout the insular Caribbean and Mesoamerican barrier reef. Outplanting sites will be concentrated in Marine Protected Areas (MPAs) in the six target countries, where fish biomass is generally higher and reef ecosystems more biodiverse and resilient. These activities will be coordinated by partners as shown in Appendix 1

The specific activities involved in Component 1 will be:

- Enlarge coral nurseries in the 6 target countries. A minimum of 100,000 corals will be grown in these nurseries using either tree or table systems depending on the location.
- The conduct of Surveys to identify and categorise existing wild populations of Acroporids
- Collection of source material, propagation in nurseries, monitoring andf maintenance of nurseries
- Outplanting of second generation corals at strategically selected sites (minimum of 100,000 corals outplanted) within the the time period

**2) Financing and Public-Private Partnerships**

An essential component of MaCREAS will be to explore opportunities to create, strengthen, expand and replicate Public-Private Partnerships (PPPs) that support reef restoration and livelihood diversification in local communities. This component will build on existing models of PPPs, such as those brokered by the Punta Cana Foundation in the DR, or CLEAR Caribbean Ltd. with Sandals Resorts International in St Lucia and Petit Saint Vincent Resort in SVG. The private sector companies in these PPPs provide sustainable financing mechanisms based on contributions provided by their customers (tourists, scuba divers) who visit the coral nurseries or “adopt a coral”. These contributions allow local communities, in particular fisherfolk, to be employed in reef restoration activities and hence diversify their livelihoods and reduce fishing effort on already over-fished reefs. As part of this programme component the creation of mechanisms whereby an increased number of private sector entities, clients and stakeholders can make voluntary contributions towards the maintenance and regeneration of the resource will be explored including the creation of partnerships and mechanisms for sustainable financing.
A local coordinating agency is essential (NGO or CBO) to oversea the operational, technical and financial aspects of these PPPs and to ensure ongoing communication with, and support from, national governments, the scientific community and other key stakeholders.

The Sandals Foundation currently funds a coral restoration project in St Lucia with a grant of US$47,000, and in SVG, the Philip Stephensoon Foundation also provides a grant of US$80,000 towards coral restoration and livelihood diversification in the southern Grenadines. Sandals is developing a mechanism to get contributions from their customers who do a “coral restoration speciality dive”.

Component 2 is essential to establish effective and sustainable financing mechanisms, so that coral restoration and the livelihoods in coral gardening are supported beyond the life of the project. “Adopt a coral” programs, that exist in the Seychelles and Maldives, need to be adapted and scaled up for the Caribbean.
The mechanism needs to be coordinated by an impartial and preferably “not-for-profit” entity that understands all the partners, and has no historical conflict with any of them.

The specific activities tio be undertaken as part of Component 2 will include:

- Inviting more private sector entities to join these PPP arrangements and scale up sustainable financing mechanisms
- Exploring potential linkages with regional programmes (Caribbean Biodiversity Fund, Blue Solutions and impact investments in MPAs; Crowd-funding)
- Using social media and ITCs to engage visitors, hotels, resorts, dive shops and yacht charter companies

**3) Knowledge Management**

The MACREAS programme will develop and implement an effective communication strategy to ensure that information is disseminated to all relevant stakeholders, such as policy-makers and the fisheries and tourism sectors.

The specific activities involved in Component 3 will be:
Communications: These will be coordinated across the 6 target countries using social media and traditional media channels, such as radio, TV and press as well as face-to-face interactions with stakeholders including farmers, fishers, community actors, etc

- Technical support will be provided by scientific experts, including the recently established regional Coral Restoration Consortium (CRC), that is coordinated by NOAA and The Nature Conservancy (TNC). This consortium of coral restoration scientists and practitioners has created internet platforms and working groups to help disseminate best practices and establish rigorous standards for all aspects of coral restoration. All the main partners of the MACREAS programme are members of the CRC.

- Scientific standards and recognised training programmes in coral restoration will be established, building on the current project by the Caribbean Development Bank and coordinated by CLEAR to establish the first National Vocational Qualification in Coral Restoration.

**4) Monitoring and Evaluation**

A monitoring and evaluation programme will be developed and implemented to collect baseline data and then track the ecological, socio-economic and policy indicators that will reflect the success of the programme. The following is a list of proposed indicators for the M&E component:

Ecological indicators

- Number of corals propagated and out-planted/ Percent coral coverage at out-planting sites/ Survival and growth
- Sexual reproduction at the out-planting sites with appropriate host genetic diversity
- Biomass of fish and key species inside MPAs and at out-planting sites

Socio-economic indicators

- Number of fisherfolk and others whose livelihoods( whether wholly or in part) are dependent on the state of health of the reef eco-system derived increasedeconomic benefits from reef restoration
- Numbers of divers certified with specialist coral restoration course (PADI)
- Tourism visitor and diver numbers to nursery/out-planting sites
- Contributions from and numbers of private sector partners
- How nominal and/or real incomes have changed/improved

Policy Mainstreaming indicators

- Incorporation of coral restoration in MPA management plans and fisheries policy

The funds to be provided for this initiative will be managed in accordance with the terms and conditions of the Accreditation Agreement between the Caribbean Community Climate Change Centre (CCCCC), and the Green Climate Fund(GCF). The CCCCC will be responsible for all fiduciary (banking, procurement and hiring an independent auditor at the end of the project to audit the project). The CCCCC will overseas the procurement of all services for the project using international best practice and the appropriate procurement method.
The CCCCC will also be responsible for reporting on the progress of the implementation of all envisaged activities. Funds received according to an agreed disbursement schedule will be placed in a separate designated account established exclusively for the purpose of implementation of this PPF. The CCCCC will follow internationally acceptable financial standards in the management of all funds received under the PPF.

The major project risks envisaged included:

**Financial Risks**

**(i).** Unavailability of finance in a timely mannner
Mitigation:a large segment of funds for the ongoing maintenance is expected to come from tourim interest and clients

**Operational Risks**

**(I).** Climatic Risk arising from an extreme weather event that can reverse/destroy work that has been undertaken
Mitigation: to some extent this is /can be mitigated by having several sites dispersed throughout the region
(il). Political risk stemming from a lack of support for the initiative
Mitiagtion: all of the Governments have expressed support for the initiative
(iii) Conflict with local stakeholders
Mitiagtion: Local stakeholders will continue to be engaged, and incentivized to encourage the continued positive pro-active involvement in the development and implementation of the project that has been witnessed thus far.

## B.3. Expected project results aligned with the GCF investment criteria (max. 1 page)

*Please describe and provide an estimate of the expected impacts aligned with the GCF investment criteria: paradigm shift, sustainable development, needs of recipients, country ownership, and efficiency and effectiveness.*

**PARADIGM SHIFT POTENTIAL**

MaCREAS will provide the means and structure to support these enabling environments and to ensure that local actors are provided with adequate resources and political support to replicate and scale up these models of success. The resulting economic, social and environmental benefits that will be generated will provide significant incentives for local partners to sustain reef restoration activities and established governance systems. The programme presents a win-win-win scenario, with substantial ecological, social and economic benefits, with no risk of losses or mal-adaptation.

MaCREAS will contribute significantly to sustaining the ecosystem services of Caribbean reefs and ensuring that they are strengthened and restored. The value of the ecosystems services provided by coral reefs to the Caribbean has been estimated to be around US$2.7 billion for tourism, $400 million for fisheries and between US$1 billion to US$2.8 billion for shoreline protection - as assessed in their current, degraded state.*3 This does not include many other ecological, cultural and spiritual values that are of great importance to people and the planet.The project will create direct and indirect benefits, including tangible economic benefits and new livelihood opportunties to coastal communities in five countries, both males and females, young and old alike.

MaCREAS will contribute to food security by ensuring that the productivity and health of coral reefs are sustained to support coastal fisheries.

**SUSTAINABLE DEVELOPMENT POTENTIAL**

The investment proposed under the MaCREAS is expected to yield significant positive socio-economic and sustainable development benefits by contributing to reducing coastal erosion and the hazard mitigation associated with storms surges and sea level rise (SLR). The proposed programme will also deliver substantial benefits by contributing the conservation and restoration of the Caribbean's unique marine biodiversity – one of the acknowledged biodiversity hotspots of the world (IUCN, UNEP)- and one of the principal reasons for the high levels of tourist visitations.

**NEEDS OF RECEIPIENT**

The Caribbean is one of the most vulnerable regions in the world to the impacts of climate change with the majority of development and residents in these countries located in coastal communities and low-lying areas, being particularly exposed to the combined threats of sea level rise (SLR) and extreme weather events as evinced recently by Hurriances Irma and Maria[1]. Furthermore the Coral reefs are among the most fragile eco-systems existing in the Caribbean region. The dramatic decline of Caribbean coral reefs in the past four decades is a major threat to the territories of the region. The decline in live coral cover (50% reduction since the 1970s) is not only accelerating coastal erosion, with 80% of beaches currently eroded, but is also having profound impacts on the region's tourism and fisheries sectors, and potentially undermining the economic sustainability and food security of many small islands. If left unchecked, the rate of decline of Caribbean coral reefs is expected to increase in the coming decades due to among other things climate change, the combined effects of mass coral bleaching and ocean acidification [18,19,20,21,22] as well as terrestrial side stressors. The World Bank has placed the magnitude of the economic losses at about 8 to 11 billion dollars per year by mid-century if 90% of the reefs disappear. This intervention is intended to make a partial and significant contribution to National and regional institutions across the Caribbean (e.g CARICOM, CCCCC, UWI) increasingly recognize interventions that slow down or reverse the loss of coral reefs as priorities for adaptation to climate change. Given their current economic circumstances the region does not have the resources to implement the requisite investments and initiatives complemented by the required regional frameworks, platforms and capacity to safeguard the territories and residents from a potential economic catastrophe.

**COUNTRY OWNERSHIP**

Wide ranging, country, Community and stakeholder ownership is critical to the success of the proposed undertaking, hence the modality of conceptualization and implementation employed thus far involves working with national governments, regional and national institutions, NGOs, and local communities to ensure local ownership and engagement. The MaCREAS programme is aligned with national climate change strategies and priorities in all the target countries. At the political level, the programme will build on recent commitments made by the governments of eight Caribbean countries at the Caribbean Challenge Initiative Summit. The Leaders Declaration stated that *each participating country and territory would effectively conserve and manage at least 20% of the marine and coastal environment by 2020*. To help achieve this goal, governments agreed to have in place, by 2020, fully functioning sustainable finance mechanisms. In addition, a set of seven specific actions were agreed, covering a broad scope of issues related to the marine environment (e.g. marine protected areas, fisheries, tourism, climate change adaptation, and marine pollution). https://www.cbd.int/cooperation/cci/doc/leaders-declaration-en.pdf

The engagement of local communities has been central to the design of the programme and as a means to obtain buy-in for future implementation. This will be achieved by using participatory governance approaches and targeted public education. Buy-in will also be ensured by providing tangible short-term incentives to local stakeholders, as well as long-term socio-economic benefits and risk reduction. Poverty in coastal communities is often the main challenge to effective community engagement in positive environmental management practices. To counter this, MaCREAS will provide practical assistance aimed at enhancing local livelihoods including provision of equipment, training and access to markets for fishers.

CCCCC will work with a variety of collaborating agencies and partners that are established in the target countries. This shall include the following organisations who will function as National Coordinating Partners:

- CLEAR Caribbean Ltd www.clearcaribbean.org (Barbados, Saint Lucia and St Vincent and the Grenadines)
- Fragments of Hope - https://fragmentsofhopebelize.wordpress.com/ (Belize)
- University of the West Indies, Discovery Bay Campus - https://www.mona.uwi.edu/cms/dbml.htm (Jamaica)
- Punta Cana Ecological Foundation - https://www.puntacana.org/ (Dominican Republic)
- Seascape Caribbean - http://www.seascapecarib.com/; (Jamaica)
  Coral Restoration Foundation - http://www.coralrestoration.org/ (USA)
- Corals for Conservation - http://coralsforconservation.org/; (Fiji)

**EFFECTIVENESS & EFFICIENCY**

The economic and financial effectiveness of the programme will be a central focus of this initiative. While the precise value of the social, economic and environmental benefits generated by this programme are difficult to quantify at this stage, they are expected to greatly exceed the cost of the investment required.

The monetary value of the ecosystem services provided by coral reefs was examined in a paper by de Groot et al. (2012) that reviewed 94 peer-reviewed studies. The authors found that the average value of the goods and services provided by coral reefs to fisheries, tourism and coastal protection was US$ 353,000 per hectare per year. (The median value was US$198,000 per hectare per year; the minimum value was US$ 37,000 per hectare per year; the maximum was US$ 2,129,000 per hectare per year). These values do not include other cultural and ecological values associated with reefs, including the fact that coral reefs are the most biodiverse habitat on earth (based on numbers of phyla).

The MACREAS project will propagate and outplant a minimum of 100,000 corals in five target countries, allowing the restoration of at least 100,000$m^2$ of reef. These reefs will be selected to have greater than average economic value (US$353,000 per hectare per year). A rough estimate would suggest that the project will generate a minimum of US$3.5 million in good and services per year. This estimate does not include the value of the reproductive output of the restored reefs, which will help restore a far greater area from the dispersal of fertile coral eggs after spawning events.

The cost-effectiveness of reef restoration as an adaptation strategy is receiving the attention of the re-insurance industry across eight Caribbean nations [26] as part of a risk assessment study. The study examined the costs and benefits of some 20 different approaches for coastal risk reduction and adaptation, from reef restoration to new building codes, and found that reef restoration was always substantially more cost effective than breakwaters across all eight nations considering only coastal defense benefits. As living structures, reefs also have the potential for self-repair and thus lower maintenance costs as compared with artificial structures. Even though reef restoration is still a comparatively new field, the addition/consideration of ecosystem benefits and maintenance costs in a full benefit cost analysis would likely add to the relative cost effectiveness of reefs as coastal defence.

The tourism sector has signalled its intention to provide sustainable financing for MPAs and coral restoration through obligatory user-fees and voluntary contributions from tourists and scuba divers (e.g. Adopt a Coral Programmes http://www.coralrestoration.org/adopt-a-coral/ and http://kihavah-maldives.anantara.com/Coral-Adoption/). There are currently several private sector partnerships for coral restoration in several countries, and these will be scaled-up and replicated. Examples of these include:

- In the Dominican Republic, the PUNTACANA Resort and Club together with the PUNTACANA Ecological Foundation and the local community have established several coral nurseries and successful out-planting programme.
- In Jamaica, coral nurseries has been established as a partnership between Royal Caribbean Cruises, Sandals Resorts International, CARIBSAVE, Coral Restoration Foundation International, and the Bluefield's Bay Fishermen Friendly Society. Tourists and visitors will pay a fee to contribute to the operational costs of the coral restoration programme.
- In St Lucia, Sandals Resorts International, Sandals Foundation, CLEAR Caribbean Ltd and the Department of Fisheries have established coral nurseries and trained local fishers in coral restoration. A sustainable financing

mechanism is being developed with divers from Sandals. The Caribbean Development Bank has joined this PPP and is now funding a National Vocational Qualification in coral restoration coordiunated by CLEAR.

- The Petit Saint Vincent Resort in St Vincent and the Grenadines has partnered with CLEAR Caribbean Ltd to establish a coral restoration programme. Local stakeholders and the resort staff have been trained and their work is supported by the donations from the private sector and the Philip Stephenson Foundation.

In Mustique (St Vincent and the Grenadines) a coral nursery has been established as a partnership between the Mustique Company, the Coral Restoration Foundation. T Mustique Dive shop is now providing day-to-day management of the coral restoration programme.

## C. Indicative financing / Cost information (max. 2 pages)

### C.1. Financing by components (max ½ page)

*Please provide an estimate of the total cost per component and disaggregate by source of financing.*

| Component | Indicative cost (USD) | GCF financing | | Co-financing | | |
|---|---|---|---|---|---|---|
| | | Amount (USD) | Financial Instrument | Amount (USD) | Financial Instrument | Name of Institutions |
| Component 1 | 8,000,000 | 8,000,000 | Grant | 1,000,000 | Donations | See notes below |
| Component 2 | 500,000 | 500,000 | Grant | | | |
| Component 3 | 750,000 | 750,000 | Grant | | | |
| Component 4 | 750,000 | 750,000 | Grant | | | |
| **Indicative total cost (USD)** | 10,000,000 | 10,000,000 | Grant | 1,000,000 | Donations | See notes below |

*Co-financing from the private sector will include contributions from existing partners involved in coral restoration projects (e.g. Sandals Resorts International, Petit St Vincent resort, Mustique Island Company) as well as as new private sector entities that have expressed an interest in supporting reef restoration efforts. These contributions wil amount to an estimated US$1 million over the 4 year project. These contributions are made by tourtists and visitors to the coral nurseries, who are invited to make small donations to “adopt a coral” or do a “coral restoration speciality dive” where part of the fee is used to provide sustainable fiunance to the coral restoration programme (see Appendix 2)

*For private sector proposal, provide an overview (diagram) of the proposed financing structure.*

### C.2. Justification of GCF involvement (max 1/2 page)

**Climate Change Imperative and Adaptation Priority for the Caribbean Region : Without GCF’s support the full** economic, social, environmental and other prospective benefits of this potentially transformative investment will not be realized.The proposed intervention is universally recognised and accepted as a highly ranked adaptation priority for the region as it seeks to address a fundamental and growing vulnerability of the Caribbean region that will affect the vast majority of people of the region if not dealt with urgently. The region does not have the resources to implement the programme at the scale that is required at this time. GCF imprimatur in the form of initial financing is an indispensable first step in assisting the Caribbean region to (i) make further progress in advancing its climate change adaptation objectives, and (ii) in this particular case to be able to mobilize local, regional and global wide support in pursuit of eco-system solutions to a problem that can undermine the very foundation of the regional economy. A host of public and private sector entities, NGOs, international sector interest agencies, philanthropic organizations, CBO including Sandals Foundation, University of South Florida, Puntacana Ecological Foundation, World Wildlife Fund (WWF), CCCCC, The Nature Conservancy (TNC) and others have aligned themselves with this initiative and are intent on contributing through various modes of assistance.

**Regional Capacity Building**: The investment sought will provide much needed resources to build the regional capacity that is required to scale-up and replicate existing successful models of reef restoration and resilience. Additionally, MACREAS with the participation and imprimatur of the GCF will serve as a platform to raise awareness about the feasibility of reversing coral reef degradation, that in turn will contribute to enhancing resource mobilization efforts geared towards ongoing restoration and re-building efforts, that are imperative for the reef systems survival and sustainability.

GCF funding at this stage is necessary/vital to:

**Assure technically and financially sound future investments** by ensuring that the implementation of all subsequent interventions will take place in a technically/scientifically and financially sound and integrated manner, and will be properly informed of viable and sustainable scalability and replicability options.

**Contribute to the implementation of a major/priority climate adaptation initiative that can have a profound effect on the pursuit of the sustainable development goals of the region:** GCF support will contribute in a direct and material manner to addressing a problem(s) that can be potentially catastrophic for the region ecologically and economically, that

if not addressed immediately will be inimical to the future development prospects of the Caribbean region and its ability to make any headway in attaining the sustainable development goals.

**Contribute to the implementation of a pioneering/flagship PPP project that is seeking to respond to Climate change variability and impact in the Caribbean in a proactive manner:** The regional travel and leisure private sector have already signalled their intention to contribute to and be part of any system/arrangement that is aimed at addressing any further deterioration of this vital resource and lifeblood of regional economies. The motivation for their involvement goes well beyond a preoccupation with the commercial bottom-line but has a lot to do with preserving the defining ecological characteristics for which the region is renown. Without GCF involvement this vital transformative project may not see the light of day

**C.3. Sustainability and replicability of the project (exit strategy) (max. 1/2 page)**

*Please explain how the project/programme sustainability will be ensured in the long run and how this will be monitored, after the project/programme is implemented with support from the GCF and other sources.*

*CompoinFor non-grant instruments, explain how the capital invested will be repaid and over what duration of time.*

The financial viability of the initiative beyond GCF's intervention, the financial and economic rate of return, estimates of the investment costs, estimates of other key efficiency and effectiveness indicators, etc, are among the key considerations to be examined as part of precursor prefeasibility study exercises to be undertaken

One of the principal means by which the programme's activities will be sustained after the GCF intervention is with the use of financing mechanisms developed with and based on private sector partnership. These include obligatory user-fees as well as voluntary contributions from tourists visiting MPAs and reef restoration sites. Willingness to pay studies indicate that these fees will not detract/discourage tourists, but rather produce the opposite effect, as a growing number of visitors are willing to contribute generously to support successful conservation projects that benefit local communities and biodiversity.

Property owners and resort developers are also increasingly interested in supporting reef restoration activities once they are aware of successful demonstrations and of the added-value that these can provide to their coastal assets. Other financing mechanisms such as crowd-sourcing and impact-investments will be examined during the course of the programme. The programme will also collaborate with existing regional funds such as the Caribbean Biodiversity Fund (established by The Nature Conservancy) that was established specifically to provide sustainable financing to Caribbean MPAs.

The impact of the programme will also be sustained and expanded through natural reproduction of restored corals and the dispersal of their eggs in ocean currents. The main aim of the coral restoration component is the creation of sexually active thickets of corals that have higher thermal tolerance and greater resilience to stressors associated with climate change.

The investment sought will provide much needed resources to build the regional capacity that is required to scale-up and replicate existing successful models of reef restoration and resilience. It will serve as a platform to raise awareness of the feasibility of reversing the current trend of coral reef degradation while simultaneously creating new opportunities for livelihoods diversification based on partnerships and financing mechanisms for ecosystem services

*For non-grant instruments, explain how the capital invested will be repaid and over what duration of time.*

The initial Capital funding for the initiative is proposed to be sourced from Grant and private sector sources. Financing for future capitalization and maintenance overtime is proposed to come from various cost recovery measures e.g. User Fees, Firm undertakings and financialcommitment from the tourism sector interest who are direct and indirect beneficiaries of this initiative e.g. Sandals Resorts and other tourism interests

**C.4 Stakeholders engagement in the project or programme (max ½ page)**

*Please describe how engagement among the NDA, AE, EE and/or other relevant stakeholders in the country has taken place so far and what further engagement will be undertaken as the concept is developed into a funding proposal.*

The proposed programme builds on a number of coral restoration and MPA projects where the engagement and support of multiple stakeholders from civil society and government are of critical importance. MaCREAS will scale-up and replicate these activities, and strengthen the engagement of local stakeholders by providing greater resources for training, equipment and implementation. The PPP financial mechanisms that are already established, will be expanded to include more private sector partners and to provide sustainable livelihoods for local stakeholders in vulnerable fishing communities.

The MaCREAS proposal was developed in close consultation with many national and regional organizations involved in coral restoration and MPAs. These partners have extensive experience of the process of engaging local communities and governments, and brokering partnerships with key private sector agencies. Several workshops, meetings and site

visits were arranged during the initial development of this proposal, so as to ensure that the engagement and buy-in of local communities was central to the design of the MaCREAS programme. Buy-in will be achieved by using participatory governance approaches and targeted public education, and further will be ensured by providing tangible short-term economic incentives to local stakeholders, as well as long-term socio-economic benefits and risk reduction.

Poverty in coastal communities is often the principal challenge to effective community engagement in environmental management programmes. MaCREAS will address this by providing practical assistance for local livelihoods including equipment, training and access to markets for fishers to allow livelihood diversification into coral restoration as well as community tourism and offshore fishing.

**C.5 Monitoring and Evaluation and reporting plans (max ¼ page)**

*Please explain how the M&E will be conducted as part of the project or programme (routine and concurrent monitoring, interim and final evaluations, and annual reports)*

M&E will be coordinated on a regional level by the University of the West Indies to ensure consistency in the collection of data from a wide range of indicators. These indicators will include key metrics for measuring outcomes and impacts on the targeted countries, with specific methodologies for ecosystem, socio-economic and policy indicators.

Monitoring of these indicators will be performed on an annual basis by the National Coordinating Partners (NCP) in collaboration with specialists from the University of the West Indies. The data will be collated and analysed by staff at UWI and CCCCCC and then dissseminated to the project partners.

A final evaluation will be conducted by independent consultants who will review the reports, data and methodologies, and visit all the sites in order to verify the outputs, outcomes and impacts of the 4-yeat project.

## D. Annexes

☒ ESS screening check list (Annex 1)

☒ Map indicating the location of the project/programme (as applicable)

☐ Evaluation Report of previous project (as applicable)

## Annex 1: Environmental and Social Screening Checklist

### Part A: Risk Factors

The questions describe the "risk factors" of activities that would require additional assessments and information. Any "Yes" response to the questions will render the proposal not eligible for the Simplified Approval Process Pilot Scheme. Proposals with any of the risk factors may be considered under the regular project approvals process instead.

| Exclusion criteria | YES | NO |
|---|---|---|
| Will the activities involve associated facilities and require further due diligence of such associated facilities? | ☐ | ☒ |
| Will the activities involve trans-boundary impacts including those that would require further due diligence and notification to downstream riparian states? | ☐ | ☒ |
| Will the activities adversely affect working conditions and health and safety of workers or potentially employ vulnerable categories of workers including women, child labour? | ☐ | ☒ |
| Will the activities potentially generate hazardous waste and pollutants including pesticides and contaminate lands that would require further studies on management, minimization and control and compliance to the country and applicable international environmental quality standards? | ☐ | ☒ |
| Will the activities involve the construction, maintenance, and rehabilitation of critical infrastructure (like dams, water impoundments, coastal and river bank infrastructure) that would require further technical assessment and safety studies? | ☐ | ☒ |
| Will the proposed activities potentially involve resettlement and dispossession, land acquisition, and economic displacement of persons and communities? | ☐ | ☒ |
| Will the activities be located in protected areas and areas of ecological significance including critical habitats, key biodiversity areas and internationally recognized conservation sites? | ☒ | ☐ |
| Will the activities affect indigenous peoples that would require further due diligence, free, prior and informed consent (FPIC) and documentation of development plans? | ☐ | ☒ |
| Will the activities be located in areas that are considered to have archaeological (prehistoric), paleontological, historical, cultural, artistic, and religious values or contains features considered as critical cultural heritage? | ☐ | ☒ |

### Part B: Specific environmental and social risks and impacts

| Assessment and Management of Environmental and Social Risks and Impacts | YES | NO | TBD |
|---|---|---|---|
| Has the AE provided the E&S risk category of the project in the concept note? | ☒ | ☐ | ☐ |
| Has the AE provided the rationale for the categorization of the project in the relevant sections of the concept note or funding proposal? | ☒ | ☐ | ☐ |
| Is there any additional requirement required by the country? | ☐ | ☒ | ☐ |
| Are the identification of risks and impacts based on recent or up-to-date information? | ☒ | ☐ | ☐ |
| **Labour and Working Conditions** | **YES** | **NO** | **TBD** |
| Will the proposed activities expected to have impacts on the working conditions, particularly the terms of employment, worker's organization, non-discrimination, equal opportunity, child labour, and forced labour of direct, contracted and third-party workers? | ☐ | ☒ | ☐ |

| | | | |
|---|---|---|---|
| Will the proposed activities pose occupational health and safety risks to workers including supply chain workers? | ☐ | ☒ | ☐ |
| **Resource Efficiency and Pollution Prevention** | **YES** | **NO** | **TBD** |
| Will the activities expected to generate (1) emissions to air; (2) discharges to water; (3) activity-related greenhouse gas (GHG) emission; and (5) waste? | ☐ | ☒ | ☐ |
| Will the activities expected to utilize natural resources including water and energy? | ☒ | ☐ | ☐ |
| Will there be a need to develop detailed measures to reduce pollution and promote sustainable use of resources? | ☐ | ☒ | ☐ |
| **Community Health, Safety, and Security** | **YES** | **NO** | **TBD** |
| Will the activities potentially generate risks and impacts to the health and safety of the affected communities? | ☐ | ☒ | ☐ |
| Will there a need for an emergency preparedness and response plan that also outlines how the affected communities will be assisted in times of emergency? | ☐ | ☒ | ☐ |
| Will there be risks posed by the security arrangements and potential conflicts at the project site to the workers and affected community? | ☐ | ☒ | ☐ |
| **Land Acquisition and Involuntary Resettlement** | **YES** | **NO** | **TBD** |
| Will the activities likely involve voluntary transactions under willing buyer-willing-seller conditions and has these been properly communicated and consulted? | ☐ | ☒ | ☐ |
| **Biodiversity Conservation and Sustainable Management of Living Natural Resources** | **YES** | **NO** | **TBD** |
| Will the activities likely introduce invasive alien species of flora and fauna affecting the biodiversity of the area? | ☐ | ☒ | ☐ |
| Will the activities have potential impacts on or dependent on ecosystem services including production of living natural resources? | ☐ | ☒ | ☐ |
| **Indigenous Peoples** | **YES** | **NO** | **TBD** |
| Will the activities likely to have indirect impacts on indigenous peoples? | ☐ | ☒ | ☐ |
| Will continuing stakeholder engagement process and grievance redress mechanism be integrated into the management / implementation plans? | ☒ | ☐ | ☐ |
| **Cultural Heritage** | **YES** | **NO** | **TBD** |
| Will the activity allow continuous access to the cultural heritage sites and properties? | ☒ | ☐ | ☐ |
| Will there be a need to prepare a procedure in case of discovery of cultural heritage assets? | ☐ | ☒ | ☐ |

**Sign-off:** *Specify the name of the person responsible for the environmental and social screening and any other approvals as may be required in the accredited entity's own management system.*