



ADAPTATION FUND

AFB/PPRC.23/28
18 September 2018

Adaptation Fund Board
Project and Programme Review Committee
Twenty-Third Meeting
Bonn, Germany, 9-10 October 2018

Agenda Item 7 b)

PROPOSAL FOR (MAURITIUS, SEYCHELLES)

Background

1. The strategic priorities, policies and guidelines of the Adaptation Fund (the Fund), as well as its operational policies and guidelines include provisions for funding projects and programmes at the regional, i.e. transnational level. However, the Fund has thus far not funded such projects and programmes.

2. The Adaptation Fund Board (the Board), as well as its Project and Programme Review Committee (PPRC) and Ethics and Finance Committee (EFC) considered issues related to regional projects and programmes on a number of occasions between the Board's fourteenth and twenty-first meetings but the Board did not make decisions for the purpose of inviting proposals for such projects. Indeed, in its fourteenth meeting, the Board decided to:

- (c) Request the secretariat to send a letter to any accredited regional implementing entities informing them that they could present a country project/programme but not a regional project/programme until a decision had been taken by the Board, and that they would be provided with further information pursuant to that decision*

(Decision B.14/25 (c))

3. At its eighth meeting in March 2012, the PPRC came up with recommendations on certain definitions related to regional projects and programmes. However, as the subsequent seventeenth Board meeting took a different strategic approach to the overall question of regional projects and programmes, these PPRC recommendations were not included in a Board decision.

4. At its twenty-fourth meeting, the Board heard a presentation from the coordinator of the working group set up by decision B.17/20 and tasked with following up on the issue of regional projects and programmes. She circulated a recommendation prepared by the working group, for the consideration by the Board, and the Board decided:

- (a) To initiate steps to launch a pilot programme on regional projects and programmes, not to exceed US\$ 30 million;*
- (b) That the pilot programme on regional projects and programmes will be outside of the consideration of the 50 per cent cap on multilateral implementing entities (MIEs) and the country cap;*
- (c) That regional implementing entities (RIEs) and MIEs that partner with national implementing entities (NIEs) or other national institutions would be eligible for this pilot programme, and*
- (d) To request the secretariat to prepare for the consideration of the Board, before the twenty-fifth meeting of the Board or intersessionally, under the guidance of the working group set up under decision B.17/20, a proposal for such a pilot programme*

based on consultations with contributors, MIEs, RIEs, the Adaptation Committee, the Climate Technology Centre and Network (CTCN), the Least Developed Countries Expert Group (LEG), and other relevant bodies, as appropriate, and in that proposal make a recommendation on possible options on approaches, procedures and priority areas for the implementation of the pilot programme.

(Decision B.24/30)

5. The proposal requested under (d) of the decision above was prepared by the secretariat and submitted to the Board in its twenty-fifth meeting, and the Board decided to:

- (a) Approve the pilot programme on regional projects and programmes, as contained in document AFB/B.25/6/Rev.2;*
- (b) Set a cap of US\$ 30 million for the programme;*
- (c) Request the secretariat to issue a call for regional project and programme proposals for consideration by the Board in its twenty-sixth meeting; and*
- (d) Request the secretariat to continue discussions with the Climate Technology Center and Network (CTCN) towards operationalizing, during the implementation of the pilot programme on regional projects and programmes, the Synergy Option 2 on knowledge management proposed by CTCN and included in Annex III of the document AFB/B.25/6/Rev.2.*

(Decision B.25/28)

6. Based on the Board Decision B.25/28, the first call for regional project and programme proposals was issued and an invitation letter to eligible Parties to submit project and programme proposals to the Fund was sent out on 5 May 2015.

7. At its twenty-sixth meeting the Board decided *to request the secretariat to inform the Multilateral Implementing Entities and Regional Implementing Entities that the call for proposals under the Pilot Programme for Regional Projects and Programmes is still open and to encourage them to submit proposals to the Board at its 27th meeting, bearing in mind the cap established by Decision B.25/26.*

(Decision B.26/3)

8. At its twenty-seventh meeting the Board decided to:

- (a) Continue consideration of regional project and programme proposals under the pilot programme, while reminding the implementing entities that the amount set aside for the pilot programme is US\$ 30 million;*

- (b) *Request the secretariat to prepare for consideration by the Project and Programme Review Committee at its nineteenth meeting, a proposal for prioritization among regional project/programme proposals, including for awarding project formulation grants, and for establishment of a pipeline; and*
- (c) *Consider the matter of the pilot programme for regional projects and programmes at its twenty-eighth meeting.*

(Decision B.27/5)

9. The proposal requested in (b) above was presented to the nineteenth meeting of the PPRC as document AFB/PPRC.19/5. The Board subsequently decided:

a) *With regard to the pilot programme approved by decision B.25/28:*

(i) *To prioritize the four projects and 10 project formulation grants as follows:*

1. *If the proposals recommended to be funded in a given meeting of the PPRC do not exceed the available slots under the pilot programme, all those proposals would be submitted to the Board for funding;*

2. *If the proposals recommended to be funded in a given meeting of the PPRC do exceed the available slots under the pilot programme, the proposals to be funded under the pilot programme would be prioritized so that the total number of projects and project formulation grants (PFGs) under the programme maximizes the total diversity of projects/PFGs. This would be done using a three-tier prioritization system: so that the proposals in relatively less funded sectors would be prioritized as the first level of prioritization. If there are more than one proposal in the same sector: the proposals in relatively less funded regions are prioritized as the second level of prioritization. If there are more than one proposal in the same region, the proposals submitted by relatively less represented implementing entity would be prioritized as the third level of prioritization;*

(ii) *To request the secretariat to report on the progress and experiences of the pilot programme to the PPRC at its twenty-third meeting; and*

b) *With regard to financing regional proposals beyond the pilot programme referred to above:*

(i) *To continue considering regional proposals for funding, within the two categories originally described in document AFB/B.25/6/Rev.2: ones requesting up to US\$ 14 million, and others requesting up to US\$ 5 million, subject to review of the regional programme;*

(ii) *To establish two pipelines for technically cleared regional proposals: one for proposals up to US\$ 14 million and the other for proposals up to US\$ 5 million, and place any technically cleared regional proposals, in those pipelines, in the order*

described in decision B.17/19 (their date of recommendation by the PPRC, their submission date, their lower “net” cost); and

(iii) To fund projects from the two pipelines, using funds available for the respective types of implementing entities, so that the maximum number of or maximum total funding for projects and project formulation grants to be approved each fiscal year will be outlined at the time of approving the annual work plan of the Board.

(Decision B.28/1)

10. At its thirty-first meeting, having considered the comments and recommendation of the Project and Programme Review Committee, the Adaptation Fund Board (the Board) decided:

(a) To merge the two pipelines for technically cleared regional proposals established in decision B.28/1(b)(ii), so that starting in fiscal year 2019 the provisional amount of funding for regional proposals would be allocated without distinction between the two categories originally described in document AFB/B.25/6/Rev.2, and that the funding of regional proposals would be established on a ‘first come, first served’ basis; and

(b) To include in its work programme for fiscal year 2019 provision of an amount of US\$ 60 million for the funding of regional project and programme proposals, as follows:

(i) Up to US\$ 59 million to be used for funding regional project and programme proposals in the two categories of regional projects and programmes: ones requesting up to US \$14 million, and others requesting up to US\$ 5 million; and

(ii) Up to US\$ 1 million for funding project formulation grant requests for preparing regional project and programme concepts or fully-developed project and programme documents.

(Decision B.31/3)

11. According to the Board Decision B.12/10, a project or programme proposal needs to be received by the secretariat no less than nine weeks before a Board meeting, in order to be considered by the Board in that meeting.

12. The following project concept document titled “Restoring marine ecosystem services by rehabilitating coral reefs to meet a changing climate future” was submitted by the United Nations Development Programme (UNDP), which is a Multilateral Implementing Entity of the Adaptation Fund.

13. This is the fourth submission of the proposal. It was first submitted as a pre-concept in the twenty-sixth Board meeting, using the three-step approval process established for regional projects, and was endorsed. It was then submitted as a concept in the twenty-eighth meeting and the Board decided to:

- a) *Endorse the project concept, as supplemented by the clarification response provided by the United Nations Development Programme (UNDP) to the request made by the technical review;*
- b) *Request the secretariat to transmit to UNDP the observations in the review sheet annexed to the notification of the Board's decision, as well as the following issue:*
- (i) *The fully-developed project document should further expand on how the approach taken in Mauritius will be done in synergy with other conservation measures, such as the establishment of Marine Protected Areas, which are said to have more potential for contributing to natural reef recovery, provided that some active reef restoration is undertaken at the same time;*
- (ii) *The fully-developed project document should include a better description of the business oriented approach proposed in the two countries, and particularly in Seychelles;*
- (iii) *The fully-developed project document should ensure that, although rated as low, the risks identified during UNDP's Social and Environmental Safeguard Policy screening and requiring further assessment and management are reflected in the table and other sections provided in the Adaptation Fund proposal template;*
- c) *Approve the Project Formulation Grant of US\$ 80,000; and*
- d) *Encourage the Governments of Mauritius and Seychelles to submit through UNDP a fully-developed project document that would also address the observations under item (b) above.*

(Decision B.28/25)

14. It was then then submitted to the secretariat for consideration at its thirtieth meeting and was withdrawn following the initial review by the secretariat. The present fully-developed project document was received by the secretariat in time to be considered in the thirty-second Board meeting. The secretariat carried out a technical review of the project proposal, assigned it the diary number AFR/MIE/Food/2015/1, and completed a review sheet.

15. In accordance with a request to the secretariat made by the Board in its 10th meeting, the secretariat shared this review sheet with UNDP, and offered it the opportunity of providing responses before the review sheet was sent to the PPRC.

16. The secretariat is submitting to the PPRC the summary and, pursuant to decision B.17/15, the final technical review of the project, both prepared by the secretariat, along with the final submission of the proposal in the following section. In accordance with decision B.25.15, the proposal is submitted with changes between the initial submission and the revised version highlighted.

Project Summary

Mauritius, Seychelles – Restoring marine ecosystem services by rehabilitating coral reefs to meet a changing climate future

Implementing Entity: *UNDP*

Project/Programme Execution Cost: USD 867,787

Total Project/Programme Cost: USD 9,132,420

Implementing Fee: USD 867,580

Financing Requested: USD 10,000,000

Project Background and Context:

Coral reefs provide a wealth of ecosystem services (food, recreational use, biodiversity benefits, and regulating services such as coastal protection) that are vital to the local economies and food security of human populations living on vulnerable Small Island Developing States (SIDS). Reef-related fisheries provide the primary protein source and livelihoods for many island communities. Fisheries is also a key sector in the economies of both Seychelles and Mauritius. Healthy reefs also serve as natural coastal breakwaters, shielding coastlines, coastal populations, properties and infrastructure against storms, flooding and erosion. Coral bleaching caused by warmer than normal seawater temperatures has emerged as one of the major threats to coral reefs and their associated communities. A single event in 1997-1998 resulted in the highest seawater temperature anomalies recorded in 50 years and a world-wide mass coral bleaching event. The reefs in the western Indian Ocean (WIO) region were the most severely impacted: coral mortality was 30% at the regional level ranging from 10% in Mauritius to 80-95% on the most heavily impacted reefs in the Seychelles.

The objective of the proposed project is to upscale and mainstream the rehabilitation of coral reefs degraded by coral bleaching in order to restore essential ecosystem services in the face of climate change threats and to generate knowledge about the most effective solutions for dissemination to SIDS and countries within the wider region.

Component 1: Enhancement of food security and reduction of risks from natural disasters through the restoration of degraded reefs in Mauritius (USD 2,500,000)

Component 2: Enhancement of food security and reduction of risks from natural disasters through the restoration of degraded reefs in Seychelles (USD 2,500,000)

The three project components will run in parallel and are closely interlinked. Components 1 and 2 address Mauritius and Seychelles respectively and concern the establishment of new, or expansion of existing, coral farming facilities and nurseries, and the restoration of selected degraded reefs. This measure (restoration of degraded coral reefs with thermal tolerant species), if successfully implemented, will ultimately lead to both an increase in food security and in disaster risk reduction. The project has therefore been designed with a coral reef restoration component for each country. The activities will be broadly similar in each country but adapted to the different national environmental and socio-economic characteristics, and to the previous experiences in coral reef restoration and development of adaptation measures of each country.

The project will start with a full stakeholder analysis in each country and the drawing up of agreements with the organisations and communities that are to be involved in coral restoration.

In Mauritius and Rodrigues, the approach will be to work with small coastal communities and local NGOs, with the involvement of tourism enterprises (hotels, dive centres, boat operators etc) where appropriate. The technical work will be led by MOI and AFRC (MOEMRFSOI), with the support of the University of Mauritius (UoM). The community/NGO aspect of the work will be managed through a UNDP-SGP call for proposals, with the selection of organizations and communities to take part based on a careful assessment. There are also a number of NGOs with relevant experience including Reef Conservation, the Mauritius Marine Conservation Society (MMCS), Eco-Mode, Eco-Sud and, on Rodrigues, possibly TerMer Rodriguez and the Shoals Rodrigues Association.

In Seychelles, there are few local coastal communities and the focus will be on NGOs, SNPA and the tourism industry. Nature Seychelles will have a lead role in implementation of project activities, but other NGOs, such as the Marine Conservation Society Seychelles and the Green Island Foundation, will also be involved, according to their interest, capacity and skills. Consideration will be given to involving the University of Seychelles, notably the Blue Economy Research Institute (BERI) which was established in 2015 to provide the knowledge and technical input for the development of the Seychelles Blue Economy. The National Institute of Science, Technology and Innovation (NISTI) might also play a role by contributing to the innovative approaches that will be needed to develop coral restoration as a sustainable enterprise.

In each country, participants will be trained in handling corals and in maintenance and monitoring at the nurseries and transplanted sites. Scoping studies and technical assessments will be undertaken to identify nursery and restoration sites, species for propagation and appropriate approaches and methodologies. An important component of the project is construction of coral nurseries in each country where the colonies will be farmed. A land-based coral nursery is envisaged for Mauritius, building on previous experience at MOI. A large ocean-based coral nursery has been proposed for the Seychelles, possibly based at the existing facility at Cousin Island managed by Nature Seychelles.

Component 3: Knowledge management and sharing, training and sensitization to build regional capacity for sustainable reef restoration (USD 3,264,633)

This component focuses around the need to ensure that experiences built up through Components 1 (Mauritius) and 2 (Seychelles) contribute to the development of a solid base of knowledge on best practices in the use of coral restoration as an adaptation measure at both international and regional levels, with particular emphasis on the SIDS. A review of coral restoration initiatives in the region and globally to identify factors determining success, constraints and obstacles, lessons learned, and cost/benefits of different approaches will be undertaken at the start of the project, with the emphasis on assessing applicable methods and experiences in scaling up successful approaches as adaptation measures.



ADAPTATION FUND

ADAPTATION FUND BOARD SECRETARIAT TECHNICAL REVIEW OF PROJECT/PROGRAMME PROPOSAL

PROJECT/PROGRAMME CATEGORY: Regional Project

Countries/Region: **Mauritius, Seychelles**

Project Title: **Restoring marine ecosystem services by rehabilitating coral reefs to meet a changing climate future**

Thematic focal area: **Food security, DRR**

Implementing Entity: **UNDP**

Executing Entities: **Seychelles: Ministry of Environment, Energy, and Climate Change; Mauritius: Ministry of Ocean Economy, Marine Resources, Fisheries, and Shipping**

AF Project ID: **AFR/MIE/Food/2015/1**

IE Project ID:

Reviewer and contact person: **Daouda Ndiaye**

IE Contact Person(s): **Dr Akiko Yamamoto**

Requested Financing from Adaptation Fund (US Dollars): **10,000,000**

Co-reviewer(s): **Dirk Lamberts**

Review Criteria	Questions	Comments on 20 August 2018	Comments on 17 September 2018
Country Eligibility	1. Are all of the participating countries party to the Kyoto Protocol?	Yes.	
	2. Are all of the participating countries developing countries particularly vulnerable to the adverse effects of climate change?	Yes. The people and economies of Mauritius and Seychelles are facing climate-induced threats such as coral bleaching, due to rising seawater temperatures, as well as sea level rise, and ocean acidification, which have negative effects on their food security and disaster risk reduction capacities.	
Project Eligibility	1. Has the designated government authority for the Adaptation Fund endorsed the project/programme?	Yes. Letter of endorsement of the Government of Mauritius signed on 9 January 2018. Letter of endorsement of the Government of Seychelles signed on 12 January 2018.	

	<p>2. Does the regional project / programme support concrete adaptation actions to assist the participating countries in addressing the adverse effects of climate change and build in climate resilience, and do so providing added value through the regional approach, compared to implementing similar activities in each country individually?</p>	<p>Yes. Coral reefs are known to play a double role of protection of coastlines and coastal communities against climate-induced sea-level rise, flooding and coastal erosion, while ensuring food security through reef associated fishes. At the same time as reefs are protecting against these climate threats, other phenomenon resulting from climate change, i.e. rise of sea temperature, is mainly responsible for extensive coral reef bleaching in the area of the project and other areas of the world.</p> <p>The project seeks to address this issue in Mauritius and Seychelles through a regional approach combining similar but country-specific solutions with a comprehensive learning and knowledge management component that will allow for sharing lessons and replication in the wider West Indian Ocean and beyond.</p> <p>The proposed activities under this project in Mauritius, will be at pilot scale and will be upscaled in the medium term owing to, the Mauritian government initiative to promote a business approach through small and medium enterprises (SMEs), and ultimately, in the long run, will impact 150 km of the coast in Mauritius and 90 Km in Rodrigues. During this project, in Mauritius, an estimated reef extent to be restored (3.2 Ha) will potentially protect some 1 km of coast line. In Seychelles, at least 2.5 Ha of the coral reef will be restored at 4 different sites, namely Cousin Island, Curieuse Island, Ste Anne Island and Ans Forbans.</p> <p>CR1: Please clarify if the length of areas to be restored will be the results of both passive and active restoration activities.</p> <p>CR2: Please elaborate on how institutional capacities will be built under outcome 3.3 including the scope and target beneficiaries of the training activities. Please clarify if and which government institutions will be involved.</p>	<p>CR1: Addressed. The length of areas to be restored indicated in the proposal refers to the estimated areas directly influenced by active coral restoration efforts supported by the project.</p> <p>CR2: Addressed.</p>
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	<p>3. Does the project / programme provide economic, social and environmental benefits, particularly to vulnerable communities, including gender considerations, while avoiding or mitigating negative impacts, in compliance with the Environmental and Social Policy of the Fund?</p>	<p>Yes. However, CR3: From a DRR perspective, please provide information on the level of socio-economic significance and vulnerability of the targeted coastline to be protected. Please confirm it includes the following: “Mahébourg region – located next to Blue Bay Marine Park which was earmarked as a rehabilitation site - has been designated as a vulnerable coast, with 1442 persons likely to be affected by coastal inundation by 2065... In Seychelles, small businesses (+/-200 businesses total) especially tourism enterprises which tend to be near the beach/waterfront investment will be at risk from flooding resulting from sea level rise and increased storm surges and will similarly benefit, as will urban dwellers (+/- 40,000 people in the Seychelles) that are at risk of losses of life and property from increased flooding.”</p>	<p>CR3: Addressed.</p>
	<p>4. Is the project / programme cost-effective and does the regional approach support cost-effectiveness?</p>	<p>Yes. Please provide an estimate of the cost of a hard infrastructure to protect 1 km of coastal line in Mauritius and 1.5km of coastal line in Seychelles. CR4</p>	<p>CR4: Addressed. It is estimated that the cost of rehabilitating 1km of coastal line in Mauritius using hard structures (rock revetment, parapet walls, etc) will be approximately USD 2 million. In Seychelles the cost for rehabilitating 1.5 km of coast using hard structure will range from USD 2.5 million to USD 5.7 million.</p>

	<p>5. Is the project / programme consistent with national or sub-national sustainable development strategies, national or sub-national development plans, poverty reduction strategies, national communications and adaptation programs of action and other relevant instruments? If applicable, it is also possible to refer to regional plans and strategies where they exist.</p>	<p>Yes.</p>	
	<p>6. Does the project / programme meet the relevant national technical standards, where applicable, in compliance with the Environmental and Social Policy of the Fund?</p>	<p>Unclear. For neither country there is a clear list of relevant national technical standards. Compliance with listed legislation is stated as an intention. The relevance to the project is not explained, nor is the process of complying. CR 1: Please clarify for each country which the national technical standards are that are in place and that are relevant to the project and its activities. Please clarify for each standard what the implications/requirements are for the project and how these standards will be met.</p>	<p>CR: Addressed.</p>
	<p>7. Is there duplication of project / programme with other funding sources?</p>	<p>No. A list of initiatives and projects implemented in the two countries is provided, highlighting the potential synergies to be sought out during the project implementation.</p>	

	8. Does the project / programme have a learning and knowledge management component to capture and feedback lessons?	Yes. An entire component (3) is dedicated to knowledge management and learning.	
	9. Has a consultative process taken place, and has it involved all key stakeholders, and vulnerable groups, including gender considerations?	A 'full stakeholder analysis' is said to have been completed but the findings are not presented in the proposal, and are said to require updating under output 1.1.1 (p. 76). There is no reference to an annex that would contain that information. Same for a 'full gender analysis', which is also lacking. CAR: please provide the missing information – stakeholder analysis and gender analysis, and clarify how all the key stakeholders were consulted	CAR: Addressed.
	10. Is the requested financing justified on the basis of full cost of adaptation reasoning?	Although the project scope will not allow for the protection of the entire coastline of Mauritius and Seychelles, it will cover the full cost of adaptation in terms of regional planning, as it will enable the review of the legislative and institutional framework of both countries to develop a regional coral reef restoration plan. It will also help improving knowledge and sharing lessons on coral reefs restoration in the region and enhancing adaptive capacity of select beneficiaries.	
	11. Is the project / program aligned with AF's results framework?	Yes.	
	12. Has the sustainability of the project/programme outcomes been taken into account when designing the project?	Yes.	
	13. Does the project / programme provide an	Yes, an overview of the environmental and social risks that have been identified is presented on p. 84.	

	<p>overview of environmental and social impacts / risks identified?</p>	<p>Principle on compliance with the law. The proposal states that “The regulatory framework provides for the control of the coral nurseries in both countries.” CR5: please clarify what this framework entails as far as it is relevant for project activities, and what restrictions are in place regarding the ownership or trade in coral in both countries. Please clarify how the risk for illegal/uncontrolled traffic of corals will be managed by the project, both for those in nurseries and those transferred to the wild. Please clarify also how the project will safeguard itself and the AF against possible accusations in this context.</p> <p>Principle on Access & Equity. The proposal states that there is a risk that access to fishing grounds or unimpeded passage for vessels may be affected by the installation of the nurseries and the location of the restoration sites. Based on the description of the project activities (e.g. Fig 10, p. 35) it appears that these sites’ locations have been firmly selected. CR6: Please clarify the risk finding.</p> <p>Principle on Marginalized and vulnerable groups. The risks findings are not substantiated, it is unclear to what extent these groups have been identified. CR7: Please clarify the marginalized and vulnerable groups findings with details on the nature of their marginalization or vulnerability, and how they may or may not be at risk.</p> <p>The risk/impact that is identified under this principle (p. 85) that “<i>some of the marginalized and vulnerable groups will be unable to carry out their normal economic activities due to the coral reef restoration activities</i>” is also an impact of involuntary resettlement</p>	<p>CR5: Addressed.</p> <p>CR6: Addressed.</p> <p>CR 7: Addressed.</p>
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		<p>and needs to be addressed under that principle.</p> <p>CAR1: Please include this finding on the risk of involuntary resettlement under that principle.</p> <p>CR8: Please clarify if an initial gender assessment was carried out and substantiate the risks findings accordingly.</p> <p>Principle on Protection of Natural Habitats: CR9: Please clarify the risk to the habitats that may be affected by the installation of the nurseries and the restoration sites.</p> <p>Principle on Biodiversity Conservation: CR10: Please quantify the area of donor coral that will be affected to populate the nurseries.</p> <p>Principle on Climate change: the ESP relates to impacts by the project on the environment rather than the risk to the project by climate change impact. No risks seem to be present. CR11: Please clarify the risk finding and the overview table accordingly.</p>	<p>CAR1: Addressed.</p> <p>CR8, CR9, CR10, CR11: Addressed.</p>
	<p>14. Does the project promote new and innovative solutions to climate change adaptation, such as new approaches, technologies and mechanisms?</p>	<p>Yes. Although coral reef restoration technologies have largely been developed, the methodologies for undertaking those on a larger scale, are yet to be tested. Lessons from this project will also be disseminated in other countries in the WIO region facing similar climate change related issues.</p>	
<p>Resource Availability</p>	<p>1. Is the requested project / programme funding within the funding windows of the pilot programme for regional</p>	<p>Yes. The requested funding is US\$ 10,000,000 and two Project Formulation Grants (PFG) for a total of US\$ 100,000 were submitted.</p>	

	projects/programmes?		
	2. Are the administrative costs (Implementing Entity Management Fee and Project/ Programme Execution Costs) at or below 20 per cent of the total project/programme budget?	Yes.	
Eligibility of IE	3. Is the project/programme submitted through an eligible Multilateral or Regional Implementing Entity that has been accredited by the Board?	Yes. UNDP is an accredited Multilateral Implementing Entity of the Adaptation Fund.	
Implementation Arrangements	1. Is there adequate arrangement for project / programme management at the regional and national level, including coordination arrangements within countries and among them? Has the potential to partner with national institutions, and when possible, national implementing entities (NIEs), been considered, and included in the management arrangements?	Yes.	
	2. Are there measures for financial and project/programme risk management?	Yes.	

	<p>3. Are there measures in place for the management of for environmental and social risks, in line with the Environmental and Social Policy of the Fund? Proponents are encouraged to refer to the Guidance document for Implementing Entities on compliance with the Adaptation Fund Environmental and Social Policy, for details.</p>	<p>To some extent. The mitigation and management measures that are presented in Table 12 need to be updated or clarified in accordance to the requests presented under points 6, 9 and 13 of the Project Eligibility section.</p> <p>Some of the proposed measures need further substantiation, e.g. for the principle of compliance with the law: <i>“The relevant authorities would implement enhanced enforcement measures [...]”</i></p> <p>CR12: Please clarify the agreements that have been concluded for the implementation of these measures.</p> <p>P. 102: <i>“The evaluation of results of environmental and social mitigation will be carried out by the PMT comparing baseline data collected in the planning phases”</i></p> <p>CR13: Please include this baseline information in an annex to the proposal as appropriate.</p> <p>The ESMP is lacking. The institutional arrangements (p. 102) are limited to oversight and monitoring, rather than the implementation of the ESMP.</p> <p>CR14: Please clarify the implementation arrangements for the ESMP of the project.</p> <p>CAR2: Please include an ESMP compliant with the ESP of the AF.</p> <p>The grievance mechanism described on p. 102-103 should not require access to the IE website to download forms and instructions.</p> <p>CAR3: Please amend the grievance mechanism to improve its accessibility, in line with the ESP. Please add and publicize that grievances may also be addressed directly to the AFB Secretariat at the address mentioned in the ESP (para 34).</p>	<p>CR12: Addressed.</p> <p>CR13: Addressed.</p> <p>CR14: Addressed.</p> <p>CAR2: Addressed.</p> <p>CAR3: Addressed.</p>
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	4. Is a budget on the Implementing Entity Management Fee use included?	No.	
	5. Is an explanation and a breakdown of the execution costs included?	Yes.	
	6. Is a detailed budget including budget notes included?	Yes.	
	7. Are arrangements for monitoring and evaluation clearly defined, including budgeted M&E plans and sex-disaggregated data, targets and indicators?	Yes. However, please see CR2 and update the results framework accordingly. CR15 CR16: Please consider adding project objective indicators to the results framework.	CR15: Addressed. CR16: Addressed.
	8. Does the M&E Framework include a break-down of how implementing entity IE fees will be utilized in the supervision of the M&E function?	Yes.	
	9. Does the project/programme's results framework align with the AF's results framework? Does it include at least one core outcome indicator from the Fund's results framework?	Yes.	

	10. Is a disbursement schedule with time-bound milestones included?	Yes.	
Technical Summary	<p>The proposal seeks to upscale and mainstream the rehabilitation of degraded coral reefs in Mauritius and Seychelles in order to restore essential ecosystem services in the face of climate change threats and to compile and disseminate lessons learnt. The project will capitalise upon the knowledge gained from successful previous initiatives in both countries.</p> <p>The initial technical review found that the approach between the two target countries was no longer as differentiated as it was presented in the concept, with similar activities scheduled to be implemented in both countries. Also, the cost effectiveness of some activities as well as the approach of disaster risk reduction needed to be better justified. A few other observations were also made, mainly related to compliance with the Environmental and Social Policy of the Fund.</p> <p>A number of clarification requests (CRs) et corrective action requests (CARs) were made.</p> <p>The final technical review finds that the revised fully-developed project document has adequately addressed the requests made by the secretariat.</p>		
Date:	17 September 2018.		



ADAPTATION FUND

PART I: PROJECT/PROGRAMME INFORMATION

Title of Project/Programme:	Restoring marine ecosystem services by restoring coral reefs to meet a changing climate future
Countries:	Republic of Mauritius, Republic of Seychelles
Thematic Focal Area ¹ :	Food Security and Disaster Risk Reduction.
Type of Implementing Entity:	MIE
Implementing Entity:	UNDP
Executing Entities:	Mauritius: Ministry of Ocean Economy, Marine Resources, Fisheries, and Shipping Seychelles: Ministry of Environment, Energy, and Climate Change
Amount of Financing Requested:	10,000,000 (in U.S Dollars Equivalent)

Project Overview

Climate change has intensified coral bleaching events and mortality in Mauritius and Seychelles over recent decades. Climate change projections predict that global coral bleaching events will increase in frequency and intensity. Therefore, to reduce the adverse impact of climate change on local communities and coral reef-dependent economic sectors in Mauritius and Seychelles, the proposed project will increase climate resilience at both regional and local levels by implementing coral reef restoration with thermal tolerant corals as adaptation to climate change. The proposed project objective will be achieved through the following outcomes: in Mauritius i) development of a sustainable partnership and community based approach to reef restoration, ii) establishment of coral farming and nursery facilities, iii) active restoration of degraded reefs; in Seychelles, iv) development of a sustainable partnership and business approach to reef restoration, v) establishment of coral farming and nursery facilities, vi) active restoration of degraded reefs; in both countries vii) improved understanding and knowledge management of using coral reef restoration as an adaptation to climate change viii) sharing regionally and globally the experienced learned in sustainable coral reef restoration, and ix) training to build capacity for long-term sustainable coral reef restoration. As such coral reef projection

¹ Thematic areas are: Food security; Disaster risk reduction and early warning systems; Transboundary water management; Innovation in adaptation finance.

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List of Abbreviations

AF	Adaptation Fund	GLISPA	Global Island Partnership
AFCCP	Anse Forbans Community Conservation Programme	HDI	Human Development Index
AFRC	Albion Fisheries Research Centre	HRBA	Human Rights Based Approach
AHC	Association des Hôtels de Charme	IAS	Invasive Alien Species
AHRIM	Association des Hôteliers et Restaurateurs de l'Île Maurice	ICRS	International Coral Reef Symposium
BBMP	Blue Bay Marine Park	ICT	Information and Communication Technology
BERI	Blue Economy Research Institute	ICZM	Integrated Coastal Zone Management
CFPF	Catch per fisherman day	INDC	Intended Nationally Determined Contribution
CITES	Convention on International Trade in Endangered Species	IPCC	Intergovernmental Panel on Climate Change
CLCS	Commission on the Limit of the continental shelf	ITCZ	Inter Tropical Convergence Zone
COI	Commission de l'Océan Indien	IW	Inception Workshop
CORDIO	Coastal Oceans Research and Development in Indian Ocean	JICA	Japan International Cooperation Agency
CRIS	Coral Reef Information System	LPAC	Local Project Appraisal Committee
CSR	Corporate Social Responsibility	MCSS	Marine Conservation Society Seychelles
CTA	Chief Technical Advisor	MDG	Millennium Development Goal
FDI	Foreign Direct Investment	M&E	Monitoring and Evaluation
EbA	Ecosystem based Approach	MEECC	Ministry of Environment, Energy and Climate Change
EEZ	Exclusive Economic Zone	MDR	Ministry of Defence and Rodrigues
EIA	Environmental Impact Assessment	MIE	Multilateral Implementing Entity
EMPS	Environment Management Plan of Seychelles	MMCS	Mauritius Marine Conservation Society
ENSO	El Nino-Southern Oscillation	MOEMRFS	Ministry of Ocean Economy, Marine Resources, Fisheries and Shipping
EPA	Environment Protection Act	MOI	Mauritius Oceanography Institute
ESA	Environmentally Sensitive Areas	MoSSNSESD	Ministry of Social Security, National Solidarity, and Environment and Sustainable Development (Environment and
EU	European Union		
FSP	Full Size Project		
GCCA	Global Climate Change Alliance		
GDP	Gross Domestic Product		
GEF	Global Environment Facility		

	Sustainable Development Division)		Protected Area
MPA	Marine Protected Area	SeyCCAT	Sey Debt-for Adaptation Swop funding mechanism
MUR	Mauritian Rupees	SFA	Seychelles Fisheries Authority
MTE	Mid Term Evaluation	SGP	Small Grant Programme
NBSAP	National Biodiversity Strategy and Action Plan	SIDS	Small Island Developing State
NDA	National Designated Authority	SME	Small and Medium Enterprise
NEP	National Environmental Policy	SNPA	Seychelles National Parks Authority
NGO	Non-governmental Organization	SSDS	Seychelles Sustainable Development Strategy
NIE	National Implementing Entity	SST	Sea Surface Temperature
NISTI	National Institute of Science, Technology and Innovation	SWIO	South Western Indian Ocean
NPD	National Project Director	TNA	Technical Need Assessment
NPT	National Project Team	UNCSD	United Nations Commission on Sustainable Development
Nsey	Nature Seychelles	UNEP	United Nations Environment Program
POPP	Programme and Operational Policies and Procedures of UNDP	UNDP	United National Development Programme
PM	Project Manager	UNFCCC	United Nations Framework Convention on Climate Change
PMT	Project Management Team	UoM	University of Mauritius
PNCC	Project National Coordinating Committee	USAID	United States Agency for International Development
PPR	Project Progress Report	USD	United States Dollar
PSC	Project Steering Committee	WIO	Western Indian Ocean
RCP	Representative Concentration Pathway	WIOCC	Western Indian Ocean Coastal Challenge
RCU	Regional Coordinating Unit	WIOMSA	Western Indian Ocean Marine Science Association
R&D	Research and Development	WIOSAP	UNEP-GEF project titled as "Implementation of the Strategic Action Programme for the protection of the Western Indian Ocean from land-based sources and activities"
RoM	Republic of Mauritius		
RoS	Republic of Seychelles		
RRA	Rodrigues Regional Assembly		
SAPPHIRE (or WIO LME SAPPHIRE)	UNDP-GEF project, titled "Western Indian Ocean Large Marine Ecosystems Strategic Action Programme Policy Harmonization and Institutional Reform"		
SCP	Sustainable Consumption and Production		
SDG	Sustainable Development Goal		
SEMPA	South East Marine		

A. Project / Programme Background and Context:

1. Geographic context

Both the Republic of Mauritius (RoM) and the Republic of Seychelles (RoS) are Small Island Developing States (SIDS) in the Western Indian Ocean, located off the eastern coast of Africa.

MAURITIUS²

The Republic of Mauritius (RoM) has an area of 2,040 km², comprising the mainland Mauritius (located 800 km east of Madagascar), Rodrigues Island, Agalega Islands, Tromelin Island, Cargados Carajos Shoals and the Chagos Archipelago. Its Exclusive Economic Zone (EEZ) is nearly 2.3 million km² as well as an Extended Continental Shelf of 396 000 km² managed jointly by RoM and RoS, outside the border of their respective EEZ (Fig. 1).

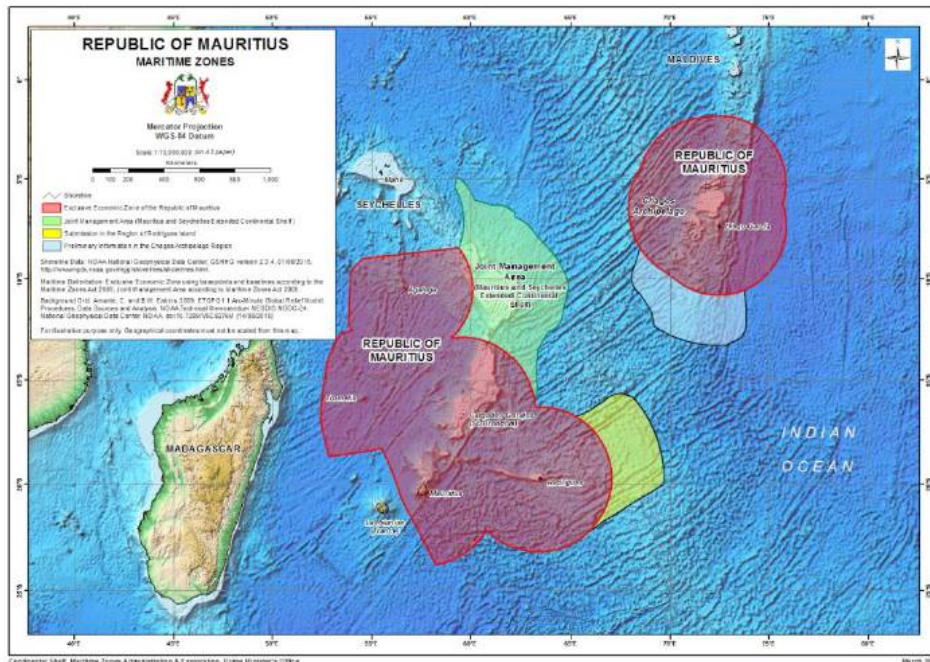


Figure 1 Geographical location of Mauritius and Outer Islands with the EEZ (light red), Joint Management Area - Mauritius and Seychelles Extended Continental Shelf (light green), Extended Continental Shelf Submission to the UN Commission on the Limit of the continental shelf (CLCS) in the region of Rodrigues (yellow) and Preliminary Information in the Chagos Archipelago Region (light blue)

The island of Mauritius is volcanic in origin and is almost entirely surrounded by coral reefs. Situated 619 km to the east of Madagascar, Rodrigues Island is hilly with a central spine culminating in its highest point, Mont Limon (393 m). Rodrigues is the only Mascarene Island with extensive limestone deposits and caves. Rodrigues is characterised by a drier climate than Mauritius and frequently faces droughts, which affect agricultural production.

² Republic of Mauritius (2016). Third National Communication: Report to the United Nations Framework Convention on Climate Change. Republic of Mauritius, Port Louis. 210 pp.

The Republic of Mauritius is also situated in the tropical cyclone belt of the South Western Indian Ocean (SWIO) where rapid formations of high intensity tropical cyclones and super cyclones have been observed. The annual losses from cyclones and associated wind, flood and storm surge hazards are estimated to be USD 91 million, representing 8% of all natural hazards assessed for Mauritius³. It is therefore highly exposed to such extreme climatic phenomenon with serious risks to life and development progress including basic amenities and properties.

SEYCHELLES⁴

The Republic of Seychelles is an island archipelago located between latitudes 4° and 11° S and longitudes 46° and 57° E, about 1,600 km east of Kenya. It has a total landmass of 455 km², and an Exclusive Economic Zone (EEZ) covering 1.374 million km². The archipelago consists of 115 islands, of which 42 are granitic and the rest are of coralline origin. The main granitic islands, also known as the inner islands, are in descending order of size Mahé, Praslin, Silhouette and La Digue. The granitic islands are within a 56-km radius of the main island of Mahe. These islands are rocky, and most have a narrow coastal strip and a central range of hills up to 914 m high. Mahe is the largest island with 157 km² and is the site of Victoria, the capital. The coralline islands, rising only a few feet above sea level, are flat with elevated coral reefs at different stages of formation. These islands are largely waterless, and very few have a resident

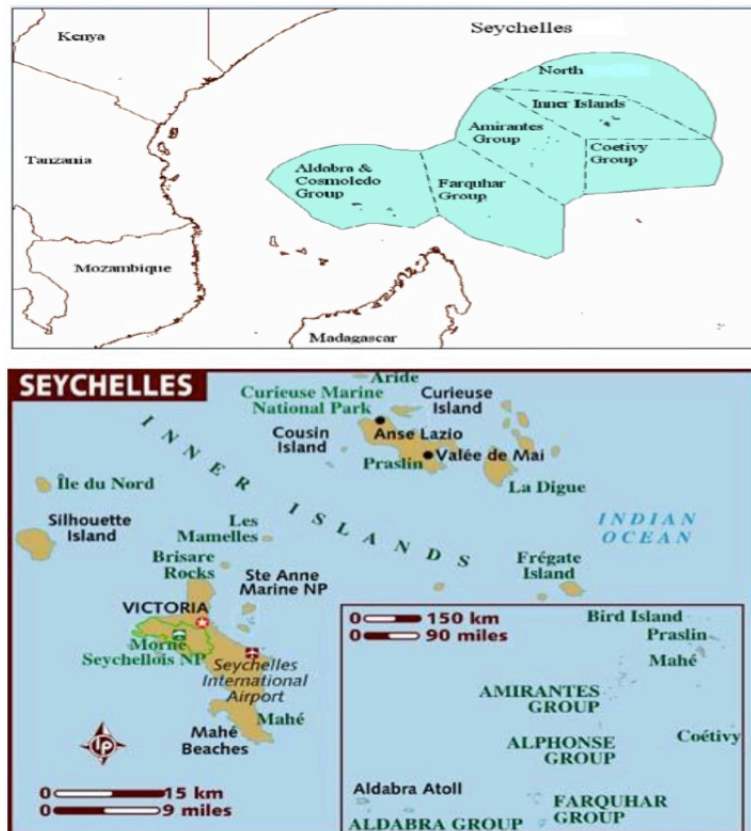


Figure 2 Geographical location of Seychelles. Top: Seychelles Archipelago. Bottom: Inner and Outer Islands.

³ Southwest Indian Ocean Risk Assessment and Financing Initiative “Disaster Risk Profile Mauritius” 2016

⁴ Republic of Seychelles (2011) Second National Communication Under the United Nations Framework Convention on Climate Change. Ministry of Home Affairs, Environment, Transport and Energy Government of Seychelles, Victoria. 378 pp.

population. The main outer islands are, from north to south, Bird, Denis, the Amirantes group, Alphonse, Coetivy, and the Aldabra, Cosmoledo and Farquhar groups (Fig. 2).

Seychelles' vibrant but tranquil island society has lush tropical vegetation, beautiful beaches, and a wide variety of marine life; almost 50% of land area has been set aside as natural reserves. The climate is tropical oceanic, with little temperature variation during the year. Daily temperatures rise to the low 30° C in the afternoon and fall to the low 20° C at night. Precipitation levels vary greatly from island to island; on Mahé, annual precipitation ranges from 2,300 mm at sea level to 3,560 mm on the mountain slopes. Humidity is persistently high but is ameliorated somewhat in locations windward of the prevailing southeast trade winds. Seychelles is located within the equatorial region, and while the islands are extremely rarely directly impacted by tropical cyclones, they are indirectly affected by them via the intensification of the intertropical convergence zone and spinal rain bands associated with storms passing south. This leads to impacts through intense rains and swells and storm surges⁵.

2. Socio-economic context

2.1. Mauritius

Mauritius has a population of 1.26 million, of which around 97% live on the main island and the rest on Rodrigues⁶. Population density on Mauritius island is high (641 people per km²), and even higher when tourist arrivals are included: the country had over a million visitors in 2014. Rodrigues has a much lower density of 399 people/km², although this is still high in global terms. Cumulative economic growth over recent decades has meant that Mauritius has moved from classification as a Low Income to an Upper Middle-Income country with a 2016 Per Capita GDP of USD 9,627⁷; it is aiming to achieve High-Income status by 2020. The Mauritian economy has diversified since the mid-1990s, when the sugar and textile sectors were dominant and, although both these sectors are still important, the offshore financial sector, a rapidly growing information, communication and technology (ICT) industry and the expanding ports sector are now key to the national economy. Sustained growth of the economy has been possible due to several factors such as political stability; stable institutions; an outward market-driven strategy; prudent fiscal, exchange rate, trade, investment and monetary policies; and the careful overall planning, and policy choices.

Despite these successes, several important challenges remain. Mauritius has been facing increasing inequality levels in recent years, with the Gini coefficient rising from 0.388 in 2007 to 0.44 in 2015, indicating that prosperity is not equally shared in Mauritius and those at the bottom 4 percent of the population have seen their expenditures decrease and their living standard deteriorate over time⁸. Moreover, unemployment rate has stagnated at around 8 per cent over the past five years with an increasing proportion unemployed among the skilled youth.

Fisheries Sector in Mauritius.

Mauritius has an Exclusive Economic Zone of 2.3 million km² (including approx. 400,000 km² Extended Continental Shelf (ECS) jointly managed with Seychelles) supporting ocean-related economic activities including coastal tourism, marine leisure, seaport-related activities and

⁵ UNDP, 2008, "Disaster Risk Profile of the Seychelles"

⁶ Mauritius in Figures 2015. Statistics Mauritius

⁷ <http://data.worldbank.org/country/mauritius>

⁸ World Bank Group. *Mauritius: Systematic Country Diagnostic*. (2015).

seafood activities which contribute to 10.8 percent of GDP (2012)⁹. The total economic value of coastal resources is estimated around USD 330 million¹⁰. Direct fisheries contribution is estimated at 1 to 2 percent, however the entire fisheries value chain brings the contribution of this sector to 4 percent of GDP with exports estimated at USD 460 million in 2013 and equivalent to 20 percent of all annual exports¹¹. Artisanal fisheries remain an important coastal economic activity and are part and parcel of the social and cultural fabric of coastal communities with around 3,200 fishers registered in the Republic of Mauritius, out of which 44% are in Rodrigues. Although measures such as bad weather allowances and a Fishermen Welfare Fund have been put in place to improve the conditions of artisanal fishermen, their socioeconomic conditions remain precarious¹². Mean monthly earnings are estimated at MUR 9,801¹³ corresponding to the average income of households living in relative poverty in Mauritius in 2012¹⁴. Domestic fish production is estimated at 9,000 tons per year, insufficient to meet the local consumption rates of 30,000 tons per year or its export-processing industry of 169,000 tons¹⁵.

Coastal area and tourism in Mauritius

Mauritius has 322 km of coastline and 243 km² of lagoon area enclosed by 150 km of fringing reef that surrounds part of the island. About 20% of the population resides in coastal areas. The total economic value of the coastal resources has been estimated to be about USD 330 M¹⁶. The revenue generated directly from activities in the coastal zone was equivalent to 36% of GDP in 2011 – out of which 99% was represented by tourism. This sector is considered to be a highly climate-sensitive economic sector¹⁷.

The coastal areas of Mauritius are under constant threat. Increasing beach erosion has shrunk the width of the beaches around certain coastal areas by up to 20m over the last few decades. Assuming a constant rate of beach erosion, it was estimated that the cumulative 50-year value of beach tourism (USD 45.5 billion, assuming no increase in tourist numbers from 2010, to be conservative) would have a revenue loss per year ranging from USD 2 million in 2011 to USD 100 million/year in 2060 (in 2010 terms)¹⁸.

⁹ World Bank Group. *Mauritius: Systematic Country Diagnostic. Systematic Country Diagnostic*, World Bank, Washington, DC. © World Bank. <https://openknowledge.worldbank.org/handle/10986/23110> License: CC BY 3.0 IGO

¹⁰ Ministry of Environment, Sustainable Development and Disaster and Beach Management “Third National Communication – United Nations Framework Convention on Climate Change”, October 2016

¹¹ World Bank Group. *Mauritius: Systematic Country Diagnostic*. (2015).

¹² Truth and Justice Commission “Volume 1: Report of the Truth and Justice Commission”, 2010, 255-260

¹³ Indian Ocean Commission Smart Fish Programme “Value Chain Analysis of the Artisanal Fisheries Sector in Mauritius”, 2012.

¹⁴ Republic of Mauritius Ministry of Finance and Economic Development, Statistics Mauritius “Poverty Analysis”, 2012

¹⁵ World Bank Group. *Mauritius: Systematic Country Diagnostic*. (2015)

¹⁶ ICZM Framework, 2010, Mauritius

¹⁷ Ministry of Environment and Sustainable Development, 2012. *Mainstreaming Climate Change Adaptation in the Development Process in the Tourism Sector of the Republic of Mauritius in the context of the Africa Adaptation Programme (AAP)*, Port Louis: Government of Mauritius.

¹⁸ GoM, 2012. *National Climate Change Adaptation Framework*, Port Louis: Government of Mauritius

2.2. Seychelles

The Seychelles has a population of just over 94,677 people (49.5 % male, 50.4 % female; 12 % total are migrant workers)¹⁹. Most people live on the narrow coastal plains of the three granitic islands of Mahé (79% of the population), Praslin (9% of the population) and La Digue (4% of the population), where economic activities are also concentrated. Seychelles has a high Human Development Index (HDI) value of 0.836 (the highest in Africa) and a 2016 Per Capita GDP of USD 15,072²⁰; it ranks high on human development indicators such as life expectancy, primary school enrolment (100%), and adult literacy rate (over 90%). Absolute poverty is very low, with only 0.25% of the population living on USD 1.25 or less a day (2007 statistics), but inequality is significant (Gini coefficient of 0.47 in 2012). Once a largely agricultural economy (cinnamon and coconut), the Seychelles is now a dual economy, heavily dependent on tourism and fishing which are the main production sectors and, like Mauritius, it has a growing offshore financial sector.

Despite the positive development, Seychelles continues to face a number of challenges. Since the beginning of the 1990s, Official Development Assistance flows have fallen by over 90%. This situation and the increased need to borrow from commercial institutions, has led to a slowdown of the economy. Above all, the country suffers from insufficient economic diversifications and vulnerability to external shocks, including climate change.

Fisheries in Seychelles

Seychelles has a very large EEZ, which extends over almost 1.4 million km². The fisheries sector was and continues to be critically important for assuring food security and for generating local employment. Fish catches are valued at around 35 million USD per year, representing less than 10% of the GDP, but it provides an important 26% of foreign exchange earnings²¹. It generates around 6,000 jobs, amounting to about 17% of total formal employment. Although this sector is dominated by high-seas and export-oriented tuna fishing, the artisanal fisheries which are largely reef-based, are also vital for the local generation of income and employment, and for the local availability of protein.

In 2011, Seychelles was the 3rd largest consumer of fish per capita (59.3 kg) in the world, and the percentage of fish as a contribution to animal protein is 47.6%. A significant proportion of this is sourced from reef and coral associated areas (2011).²² The submarine banks of the Seychelles, particularly the Mahé plateau where some 100 species of demersal fish are commonly caught, form the basis of the artisanal fishery providing vital food security, employment and high value trade commodities. Also important are the reef-based sea cucumber, lobster and octopus fisheries. Artisanal fishery catches peaked in 1991 and have declined steadily since, providing a very strong indication that the demersal stocks have been heavily overfished²³. In this context, the Government of Seychelles embarked in 2013 in the development of the second phase mariculture master plan to diversity the economies of fishing communities and improve the resilience of their livelihoods in the face of climate change.

¹⁹ Seychelles in Figures 2015. National Bureau of Statistics.

²⁰ <http://data.worldbank.org/country/seychelles>

²¹ Republic of Seychelles, Country Strategy Paper 2016-2020.

²² <http://www.globefish.org/total-fish-c> onsumption-per-capita-kg-and-fish-contribution-to-total-proteins-percent.html

²³ GoS (2014). Seychelles Biodiversity Strategy and Action Plan 2015-2020.

Coastal area and tourism in Seychelles

Tourism has followed a similar pattern in both countries. The Seychelles tourism industry expanded greatly after the opening of the airport in 1971. In 2016, tourism in Seychelles stood at 303,177²⁴ visitors a year, contributing 46.1% of the country's GDP, providing 56.4% of national employment and generating 33.2% (USD 382.5 million) of the country's foreign exchange earnings. In both countries, the contribution of tourism to the national economy is even greater than these figures indicate if one takes into account the economic multiplier effect created by the industry and the value added in other sectors.

Coral reefs are well developed around the main groups of granitic islands located on the Mahé plateau, as well as around the satellite coral islands, with a total cover of 1,700 km². 65% of tourists choose to visit Seychelles for the predominantly pristine nature of their coastal resources and the natural beauty in general. The effects of climate change on tourism in small islands are expected to be largely negative, especially on the health of the coral reef systems and the islands' fisheries and conservation of biodiversity. Increased coral mortality would also accelerate coastal erosion, as demonstrated by the effects of coral mortality over the past decade in the Seychelles²⁵.

3. Environmental context

Mauritius and Seychelles lie within the Indian Ocean centre of diversity for corals. The most recent analysis²⁶, incorporating earlier studies²⁷, indicates that the reefs of the two countries fall into three ecoregions on account of their different coral faunas: the Mascarene Islands, the northern Seychelles (predominantly the granitic islands surrounded by nearshore fringing reefs) and the southern Seychelles (predominantly the outer islands, which are largely atolls). The northern Seychelles and the Mascarenes have a slightly lower diversity than the southern Seychelles, but nevertheless, have over 350 species (Fig. 3). Further work is required to fully

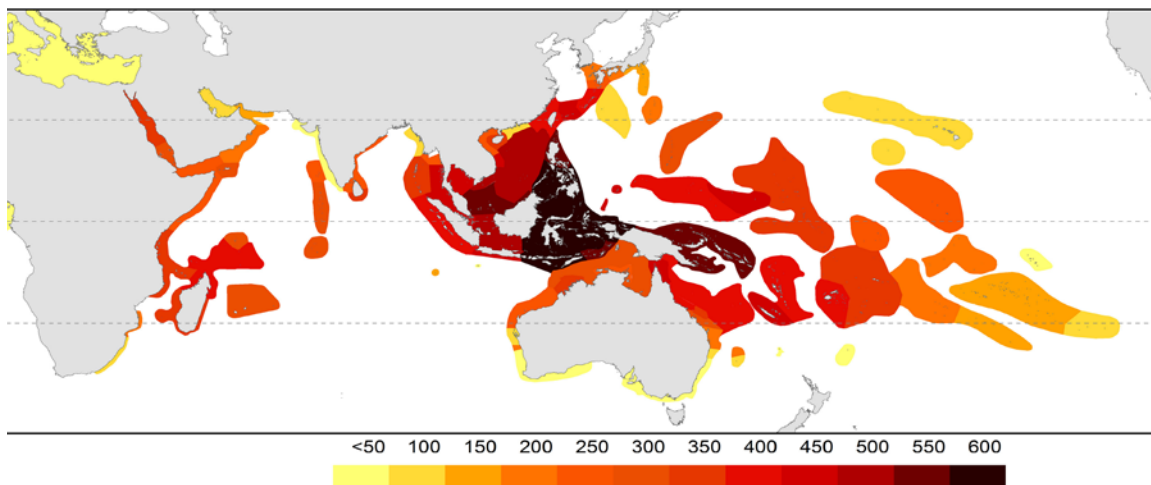


Figure 3 Global diversity indicated by all records of occurrences. Colours indicate number of coral species found in each area (see bar below map)⁸

²⁴ National Bureau of Statistics, Seychelles. Visitor arrival data 2000 to 2017

²⁵ Seychelles National Climate Change Strategy

²⁶ JVeron, M Stafford-Smith, Lyndon DeVantier and Turak, E. 2015. Over view of distribution patterns of zooxanthellae Scleractinia *Frontiers in Marine Science* 1(81).

²⁷ Obura D (2012) The Diversity and Biogeography of Western Indian Ocean Reef-Building Corals. *PLoS ONE* 7(9): e45013. doi: 10.1371/journal.pone.0045013

understand the coral diversity and taxonomy of these countries.

Reef building corals are made of millions of tiny animal polyps living in symbiosis with microscopic algae. The algae (zooxanthellae) live inside the gut of the animal polyp. During daylight hours, zooxanthellae produce sugars through photosynthesis, which feed the animal polyp providing 90 % of its energy needs. At night, the polyp extends its tentacles and feeds on plankton. The algae give their host corals their unique colours (Fig. 4). It is this animal-algae symbiosis that allows corals to live in the nutrient poor waters of the tropics and speeds up the production of calcium carbonate to form reefs. However, when the water temperature rises 2° C above the maximum temperatures normally experienced by the corals, the polyps expel the zooxanthellae turning the coral white. This event is known as coral bleaching. If the warming is brief, corals can reabsorb the zooxanthellae and survive. If the warming event lasts for more than two weeks, corals die of starvation.



Figure 4 Close-up of coral polyps (translucent white), with symbiotic zooxanthellae (golden green dots) living inside the gut of the polyps. The calcium carbonate chalice where coral polyps hide during the day is shown on the lower left corner. Photo credit: Smithsonian Institution

Following a bleaching event, and depending on its intensity, coral colonies die rapidly and become algal covered, with the reef's structure, topography and productivity declining and even disappearing. The long-term impact of bleaching events and the extent of recovery of corals also depend on local pressures that negatively affect coral reefs such as over-fishing, nutrient enrichment, increased turbidity and sedimentation, and damage from boats and visitors.

Coral reefs are the foundation of food security and coastal livelihoods in both Mauritius and Seychelles. They are the basis of artisanal fisheries and the tourism industry. The artisanal fishery of each country relies primarily on catches of reef-associated species and, although not necessarily of high monetary value, these fisheries are a key to the health, and food and income security of coastal communities. The total abundance of demersal fish (and hence potential fisheries productivity) is strongly associated with the amount of live hard coral cover.²⁸ Similarly, the tourism industry in each country has developed primarily on account of the reefs, which not only provide the snorkelling and diving experiences that visitors specifically seek out, but also the white sandy beaches that in many parts of these islands are formed from the natural erosion of coral colonies. In both countries, the overwhelming majority of capital investments in the tourism sector are located on the coast for this reason; for example, in Mauritius, of the total 115 hotels in 2015, over 90% were on the coast²⁹.

Coral reefs, through the protection they give to the shorelines, also provide a key disaster risk reduction measure for some of the most damaging consequences of climate change: rising sea levels, increased frequency and intensity of storms and coastal erosion. An estimated 100 million or more people globally benefit directly from the risk reduction that coral reefs provide. If

²⁸ e.g. Komyakova V, Munday PL, Jones GP (2013) Relative importance of coral cover, habitat complexity and diversity in determining the structure of reef fish communities. *PLoS ONE* 8(12): e83178. doi: 10.1371/journal.pone.0083178

²⁹ Ministry of Tourism and External Communications

coral reefs were degraded, the costs of hazard mitigation and adaptation would significantly increase. Healthy coral reefs play a major role in coastal protection by serving as natural breakwaters that shield coastlines, coastal populations, properties and infrastructure against storms, flooding and erosion. The live hard coral structures on fore reef slopes and shallow reef crests dampen oncoming waves, thus sheltering the lagoons to increase beach protection (a highly valued resource in tourism) and allowing the growth of other critical habitats, including seagrass beds and mangroves. These sheltered habitats further reduce the risk of coastal erosion, through stabilizing sediments, while also providing nursery habitats for the juveniles of economically important fish and invertebrate species.

The value of coastal protection provided by coral reef ecosystems is difficult to measure but is considered significant. The value has been estimated at USD1.2 million per year in the Virgin Islands³⁰ and USD265.9 million a year in Bermuda³¹. Compared with other coastal habitats such as mangroves and salt marshes, coral reefs have been found to have the greatest potential for coastal protection³². Coral reefs reduce wave energy impacting shorelines by an average of 97%, with reef crests dissipating most (86%) of this energy³³ and reef flats dissipating approximately half of the remaining wave energy. This means that even narrow coral reef flats effectively contribute to wave attenuation. They have also been estimated to reduce wave height by on average 70%.

Furthermore, research has shown that coral reefs are critical not just for low-frequency, high-energy events such as storms and cyclones, but also for reducing coastal erosion from high-frequency, daily small wave events. Another key factor in wave attenuation is bottom friction, which is a function of bottom “roughness” and which is being reduced worldwide by coral reef degradation. For example, the loss of branching corals in the Caribbean has significantly reduced both the height and roughness of reefs, particularly the reef crests³⁴. Thus, a reduction in the amount of live hard coral cover and the loss of reef framework that occurs when a reef is degraded by anthropogenic or climate change related impacts, directly threatens the food security and livelihoods of communities dependent on reef fisheries, and puts these same people and property at further risk from climate related coastal hazards. As vulnerable SIDS, both Mauritius and Seychelles must explore all possibilities to protect food security and reduce disaster risk from climate change induced events.

Unfortunately, coral reefs and their associated coastal and marine ecosystems in Mauritius and Seychelles have been threatened by continued habitat destruction and fragmentation caused by coastal development, overexploitation of fisheries resources, destructive fishing practices, pollution, invasive alien species and bleaching events especially in 1998 and 2016. In Mauritius, coastal development has led to backfilling of wetlands, with 90% of all wetlands having been destroyed³⁵. Soil runoff and erosion leading to excess nutrients from fertilizers and domestic sewage augment eutrophication in the lagoon. This is coupled with a threat of contamination and deterioration in water quality by industrial wastes. It has been estimated that metal pollution

³⁰ BT. van Zanten, PJH. van Beukering, AJ. Wagtenonk 2014. Coastal protection by coral reefs: A framework for spatial assessment and economic valuation. *Ocean and Coastal Management* 96: 94-103

³¹ Sarkis, S., van Beukering, PJH, McKenzie, E. (eds.), 2010. Total Economic Value of Bermuda’s Coral Reefs: Valuation of Ecosystem Services. Technical Report, Department of Conservation Services, Government of Bermuda, Bermuda. 199 p.

³² Narayan S, Beck MW, Reguero BG, Losada IJ, van Wesenbeeck B, Pontee N, et al. 2016. The Effectiveness, Costs and Coastal Protection Benefits of Natural and Nature-Based Defences. *PLoS ONE* 11(5): e0154735. doi:10.1371/journal.pone.0154735

³³ Ferrario F, Beck MW, Storlazzi CD, Micheli F, Shepard CC, Airolidi L. 2014. The effectiveness of coral reefs for coastal hazard risk reduction and adaptation. *Nature Communications* 5.

³⁴ Alvarez-Filip, L., Dulvy, N. K., Gill, J. A., Cote, IM. & Watkinson, AR. 2009. Flattening of Caribbean coral reefs: region-wide declines in architectural complexity. *Proc. Biol. Sci.* 276, 3019–3025.

³⁵ Republic of Mauritius Ministry of Agro-Industry and Food Security “Fifth National Report to the Convention on Biological Diversity” April 2015

has caused a decline in coverage of live corals of 10 to 30 percent in coastal lagoons around Mauritius in 2012³⁶. The existence of invasive alien species in the lagoon has not been recorded except for the occurrence of *Caulerpa taxifolia* – an invasive marine algae – the growth of which has been stimulated by wastewater effluents which prevents the presence of almost all native marine life and affects the livelihoods of fishermen³⁷. Overfishing and destructive fishing practices are also prevalent, although a recent increase in total fishery catches are noted. These are compounded by the effects of tourism and leisure boating activities and underwater activities such as diving, snorkelling and underwater tours leading to anchor damage and other direct impact by users.

One measure to support the conservation of corals has been the establishment of Marine Protected Areas (MPAs) in strategic sites around Mauritius and Rodrigues covering 155 square kilometres, namely two marine parks and nine fishing reserves around the island of Mauritius and one MPA, six fishing reserves and four marine reserves in Rodrigues protected under the Marine Resources Act 2007 and the Marine Protected Areas Regulation 2001. Management plans have been developed for the two marine parks and the MPA in Rodrigues under the UNDP-GEF project *Partnerships for Marine Protected Areas in Mauritius and Rodrigues*.

Seychelles also faces numerous challenges³⁸ related to the preservation and management of its marine ecosystems and coral reefs. Overall, these threats represent a barrier to achieving sustainable development in Seychelles. These include:

- Chronic coastal erosion from increased demand for construction in the marine environment or on sandy beaches
- Coastal flooding from poorly planned coastal development
- Destruction and alteration of marine and coastal habitats from increase human use of marine and coastal areas
- Over-fishing from unsustainable level of fishing effort
- Invasive alien species (IAS) from lack of education, awareness and concern, and ineffective border control
- Marine and coastal littering due to increased use of non-biodegradable products and improper management of solid waste
- Coral reef degradation from anchor damage and outbreak of plague organisms

The Government of Seychelles has been addressing the above through a series of national initiatives as well as partner-supported projects, including a number of UNDP projects. Most notably, the Seychelles established five Marine National Parks in the 43 inner islands that make up the 'inner islands' of the Seychelles, Sainte Anne Marine National Park, Baie Ternay Marine National Park, Curieuse Marine National Parks, Silhouette island Marine National Park and Port Launay Marine National Park, covering 24.63 km², one Marine Protected Areas (0.01 km²), 4 Shell Reserves (7.3 km²) and several Special Reserves, including Cousin Island Special Reserve (0.27 km²).

Additionally, marine protected areas in Mauritius and Seychelles form part of a network of MPAs of the Western Indian Ocean comprising also the MPAs of the Comoros, Madagascar and Reunion. This network was established to enhance the effectiveness of conservation through a regional approach in addition to the efforts already undertaken by each country in order to encourage a regional ecological vision and cooperation beyond the geographic, economic,

³⁶ Ibid.

³⁷ Ibid.

³⁸ MFF Resilience Analysis 2015

social and cultural diversity of these countries³⁹. This is complemented and reinforced by regional approaches and initiatives in integrated coastal zone management (ICZM).

Unfortunately, climate change poses a significant risk to the long-term viability of these marine conservation interventions due to the effects of rising sea-surface temperatures leading to coral bleaching. Coral reef restoration offers promise as a means to adapt to rising sea temperatures leading to more frequent coral bleaching events, increased extreme weather events and eroding coastlines.

4. Climatic change context

Mauritius and Seychelles are highly vulnerable to climate change in several ways, specifically the impact that elevated sea surface temperature is having on their coral reefs. Environmental pressures are significant, compounded by climate change and the specificity of being a Small Island Developing State (SIDS). Coral reefs provide a wealth of ecosystem services including food, coastal protection, recreational use, biodiversity benefits, and regulating services, all of which are vital to the local economies and food security of human populations living in vulnerable Small Island Developing States (SIDS) such as these two countries. Healthy and robust coral reefs, through the provision of these ecosystem services, ensure that coastal populations of tropical countries have increased resilience to the adverse impacts of climate change.

4.1. Past and current climate change:

The adverse impacts of climate change are already being experienced in terms of temperature rise, changes in rainfall/precipitation patterns, ocean acidification, sea level rise, accentuated beach erosion and increase in frequency and intensity of extreme weather events such as flash floods.

Climate records over the period 1951-2014 show a significant **warming temperature trend** of about 1.2°C in Mauritius and Rodrigues. Analysis of temperature records indicate that the observed rate of temperature change is on average 0.020°C/yr. and 0.023°C/yr. for Mauritius for the period 1951-2014 and for Rodrigues for the period 1961-2014 respectively.

The warming in the Seychelles region, over the period 1972-1997, is estimated to be of the range of 0.25°C. The number of very warm days and nights is increasing dramatically, while the number of very cool days and nights are decreasing. The annual maximum temperature warming in the past 34 years is estimated to be +0.33°C and is linked to the southern summer season. The annual minimum temperature warming in the past 34 years is estimated to be +0.82°C. The minimum temperature is warming faster than maximum temperature as a result of the 'urban heat island' effect and the warming is higher during the southeast monsoon.

The **sea surface temperature** observations at the Seychelles International Airport, Pointe Larue, show that SST is characterised by two maxima and minima linked to the transition period associated with the reversal of the monsoon winds and the equatorial ocean currents. The extreme minimum occurs in August at a time when the southeast monsoon is at its peak with the sun in the northern hemisphere. The extreme minimum temperature dropped from 25.8°C in August 2000 to 24.9°C in August 2005. In contrast, the extreme maximum of SST in April 2000

³⁹ Commission de l'Océan Indien. "Network of the AMP". Retrieved from <http://commissionoceanindien.org/publications/archives/aires-marines-protegees/marine-protected-area/the-network/>

has warmed up to a maximum of 30.1°C in April 2001 following the 1999-2000 La Nina event. In Mauritius, sea surface temperature anomalies have led to coral bleaching events in 1998, 2003, 2004, 2009 and 2015⁴⁰.

Sea level rise has been observed to be accelerating at an average rate of 5.6 mm/year in the last decade for both Mauritius and Rodrigues, much higher than the global average of 3.2 mm/yr. The Republic of Mauritius is also situated in the tropical cyclone belt of the South Western Indian Ocean (SWIO) where rapid formations of high intensity tropical cyclones and super cyclones have been observed. It is therefore highly exposed to such extreme climatic phenomenon with serious risks to life and hard-won development gain, which includes basic amenities and properties. In Seychelles, an annual sea-level trend anomaly of +0.146 has been observed on one monitoring station⁴¹.

Analysis of rainfall over the period 1951-2014 shows a **decreasing trend in rainfall** amount of about 8% for Mauritius. For Rodrigues, a water scarce island, a downward trend has also been observed in the rainfall. Over the same period, the central plateau, the main recharge zone of the island, has witnessed a decrease in annual precipitation from a maximum of 4000 mm/year to 3800 mm/year with drying being more pronounced to the north and west.

Extreme precipitation and flooding is now of great concern for Seychelles. However, only few studies are available mainly because of an absence of a network of rainfall intensity observation instruments. The existing manual voluntary network of rain gauge only measures 24 hours rainfall. Heavy rainfall events have been the major contributor to the increase in rainfall (Lajoie, 2004). However, further observations and rainfall intensity analysis are recommended to draw firm conclusions. Infrastructure properties, buildings and roads have been affected or damaged due to flooding, erosion and landslide in Mauritius. For instance, the Port's operations were suspended for 10 days in 2014 due to adverse weather conditions leading to USD 54M loss.

Accentuated **beach erosion** has shrunk the width of beaches around certain coastal areas in Mauritius by up to 10 meters over the eight years. Coral reefs are in a state of deterioration. Sea level has been rising at a rate of 5.6 mm per year since 2003. Most of the exposed locations in Seychelles are being affected by coastal erosion. Coastal erosion may be classified as a major problem especially to those properties, infrastructure and people situated on the coastal plains and shoreline. Some coastlines have been retreating for a long time. At Anse Kerlan (Praslin) for instance, old resident's estimate that approximately 10,000 square metres of coastlines have been washed away. Erosion-sensitive sites on Mahe and Praslin are being lost at an average of 1-3 m per year (Tsunami Disaster Task Force, 2005; Seychelles Nation, 1998). Increased recession of the coastline also takes place because of the destabilising nature of the high tide levels. Flooding in the low-lying areas becomes more pronounced with the occurrence of storms coinciding with the annual spring tides.

4.2. Future climate change

Mauritius

⁴⁰ Mauritius Third National Communication.

⁴¹ Seychelles Second National Communication.

The projected changes in climate in Mauritius include an increase in mean annual temperature but no significant variations in rainfall pattern. Projections made on the basis of RCP 4.5 and RCP 8.5 (the business as usual scenario and the worst-case scenario respectively) indicate an increase in temperature of up to 2°C over both Mauritius and Rodrigues for the period 2051-2070. Projections for RCP 4.5 and RCP 8.5 scenarios do not show significant variation with respect to the present rainfall pattern.

A series of projections have been made for the future effect of climate change in Mauritius and Rodrigues, as follows:

- Reduction in rainfall and an increase in evapotranspiration may lead to as much as 15 to 25% decline in agricultural production by 2050. With a decrease in rainfall of 10 to 20 % and an increase in temperature of 2°C, reductions in cane yield is expected to range from 34 to 48% while reductions in sugar yield is expected to range from 47 – 65 %.
- An increase in mean annual temperature extremes coupled with beach erosion can lead to a reduction in tourist arrivals accounting for a revenue loss of up USD 50 million by 2050. In Rodrigues, more severe bleaching may lead up to 75% mortality of corals at some sites resulting in a decline in fish population, loss of the protective function of the reef, and loss of sandy beaches of the order of about 5 m every decade.
- Utilizable water resources may decrease by up to 13 % by 2050 if no action is taken to restore catchment areas.
- There will be a greater proliferation of invasive alien species at the expense of native species, a decrease in pollinator activity due to shifts in plant phenology and coastal vegetation, turtle nesting, and wader visitation on low lying islets will be affected.
- Increase in the occurrence of coral bleaching, would reduce coral biodiversity and fish species for both Mauritius and Rodrigues while algal blooms due to high sea surface temperature would result in mass mortality of marine biodiversity and resources.
- Climate change may increase the vulnerability of the health sector in the coming decades leading to higher disease burden with associated health cost and impaired socio-economic development in the Republic of Mauritius.
- There will be accelerated softening and deterioration of bituminous pavement, surface and thermal cracks to concrete, increased corrosion of steel, scouring of foundations and embankment collapse and damage to buildings and power transmission masts in both Mauritius and Rodrigues.

Seychelles

Projections made with climate models suggest the following future climate change scenarios. Air temperature for both Mahe and Aldabra area warming by +3.0°C. The relative warming will occur mainly during the cooler southeast monsoon. Rainfall patterns will be more extreme, with extreme dry (i.e. prolonged dry spells) during the dry season and more wet (i.e. likely flooding) and hot episodes during the wet season. An annual sea level trend anomaly of +1.46 mm (\pm 2.11 mm) per year is suggested for Mahe Island. These results are in line with the global measured average mean sea level rise (from 1961 to 2003) of 1.8 ± 0.5 mm/year.

Of relevance to both Mauritius and Seychelles, the frequency of mass coral bleaching events is predicted to increase in the coming decades as seawater temperatures will continue to rise. It

has been estimated that, by 2100, live coral cover globally could be reduced by 30-88% through impacts such as bleaching and reduced calcification in the event of 1.1°C to 2.6°C rise in temperature (RPC4.5 scenario)⁴². Climate change is predicted to increase the frequency of high-intensity storms in selected ocean basins depending on the climate model. However, the tropical cyclone damage from climate change tends to be concentrated in North America, East Asia and the Caribbean–Central American region⁴³

In the future, it is projected that the sea level rise will affect almost all of the economic sectors of the Seychelles. The main granitic islands rise up to 300m, have steep hill slopes which are prone to landslides, and have a very narrow strip of coastal plain. According to the IPCC Fourth Assessment Report, 2007, the average rate of sea-level rise is 1.6 mm/year; the global average sea-level rise for the end of the 21st century (2090-2099) ranges from 0.19 to 0.58 m.

Sea level rise is expected to affect Seychelles in the following ways:

- Destroy properties and infrastructure located on the coastal plains and reclaimed land;
- Inundate agricultural areas, wetlands and the lowlands;
- Cause several low-lying islands, especially the sand cays to disappear;
- Erode the shorelines and beaches;
- Enhance coastal flooding, especially during severe rainstorms and high tides;
- Increase salinity of mangrove swamps and raise groundwater level thus affecting plant growth;
- Threat groundwater aquifers and coral island fresh water lens;
- Alter tidal ranges in the rivers and bays;
- Alter sediment deposition patterns; and
- Affect the coastal and the marine ecosystems.

4.3. Coral reef and climate change

Coral reefs in the Western Indian Ocean (WIO), as elsewhere in the world, have suffered from a range of negative human-induced impacts but climate-change associated bleaching has caused particularly serious degradation, notably in the islands. The WIO was severely affected by the first major global bleaching episode caused by the 1997/1998 El-Niño/Indian Ocean Dipole event, which resulted in extensive and sustained high seawater temperatures. Coral mortality ranged from 10% in Mauritius to 80-95% on the worst affected coral reefs in the Seychelles⁴⁴, with live coral cover reduced to less than 3% in some areas⁴⁵. While some coral reefs recovered naturally within 5-10 years, others remained as rubble wastelands even within well-established MPAs, often impacted by other local factors. Further outbreaks of coral bleaching occurred in 2004 and 2009 and although in many sites bleached corals recovered, many others have died⁴⁶.

⁴² IPCC 2014: Arent et al. 2014: Cross-chapter box on the water–energy–food/feed/fiber nexus as linked to climate change. In: *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*.

⁴³ Mendelsohn R., Emanuel K., Chonabayashi S., Bakkensen L. (2012). The impact of climate change on global tropical cyclone damage. *Nature Climate Change* 2, 205–209

⁴⁴ Obura D (2005) Resilience and climate change: lessons from coral reefs and bleaching in Western Indian Ocean. *Estuarine, Coastal and Shelf Science* 63: 353–601 372.

⁴⁵ Graham NAJ, Wilson SK, Jennings S, Polunin NVC, Bijoux JP, Robinson J (2006) Dynamic fragility of oceanic coral reef ecosystems. *Proc. Nat. Acad. Sci. USA* 103 (22): 8425–8429. doi:10.1073/pnas.0600693103.

⁴⁶ Moothien-Pillay, S., Bacha Gian, S., Bhoyroo, V. and Curpen, S. 2012. Adapting coral culture to climate change: the Mauritian experience. *Western Indian Ocean J. Mar. Sci.* 10(2): 155-167.

Figure 5 shows the trends in live coral cover since 1997, up to 2007⁴⁷. Mauritius showed a major reduction (up to 70%) in live coral cover between 1997 and 2007, with a slightly smaller decline for Rodrigues. Coral cover at monitoring sites on Rodrigues in 2008 averaged just under 40%, and on Mauritius in 2009, between 10-20%⁴⁸, with a range of local impacts impeding recovery⁴⁹. Although not shown on this graph, there was also a major decline in Seychelles, particularly in the inner granitic islands⁵⁰. Coral cover declined by 50–90% after 1998, such that many reefs had cover of less than 10% while others had moderate recovery but experienced further coral mortality after bleaching in 2002–2003. The loss of live coral was so extensive and widespread that sources of coral larval influx for recruitment were greatly reduced and the spread of algae coverage limited coral recruitment and development. The increase in coral cover shown in Figure 5 for Seychelles is largely due to the recovery of reefs in the outer islands, which are subject to fewer local impacts.



Figure 5 Trends in live coral cover in the COI countries, 1997-2007. Legend: Red line= Mauritius; yellow line = Rodrigues; brown line – Seychelles

In 2015-2016, the largest and most intense El Niño-coral bleaching event on record occurred worldwide⁵¹. Coral monitoring on bleaching extent, mortality and recovery potential is currently underway, but preliminary information from Mauritius and Seychelles indicates that coral reefs in both countries were badly affected, and that the initial recovery from the 1998 mass bleaching was reversed in many locations. At two monitored sites in Mauritius (Ile aux Benitiers and Flic en Flac) live coral cover was about 70% in 2012 but dropped to 32-38% in 2015⁵². In Seychelles, on the inner granitic island reefs, which by 2012 were in many places dominated by macroalgae, coral recovery has been shown to be constrained by unsuccessful settlement or poor post-settlement survivorship; and equally on rubble dominated reefs high densities of

⁴⁷Hamada, S.; Bijoux, J.; Cauvin, B.; Hagan, A.; Harris, A.; Koonjul, M.; Mercier, S.; Quod, J. P. 2008. Status of coral reefs of the South-West Indian Ocean Island States: Comoros, Madagascar, Mauritius, Reunion, Seychelles. In: *Status of Coral Reefs of the World*. p 105-118.

⁴⁸ Cauvin et al, 2010. Synthèse régionale 2010. Suivi de l'état de santé des récifs coralliens des Îles du Sud -Ouest de l'Océan Indien. COI/ReCoMap.

⁴⁹ Moothien-Pillay, S., Bacha Gian, S., Bhojroo, V. and Curpen, S. 2012. Adapting coral culture to climate change: the Mauritian experience. *Western Indian Ocean J. Mar. Sci.* 10(2): 155-167

⁵⁰ Chong-Seng KM, Graham NAJ, Pratchett MS (2014) Bottlenecks to coral recovery in the Seychelles. *Coral Reefs* 33 (2): 449–461. doi:10.1007/s00338-014-1137-2.

Harris A, Wilson S, Graham NAJ, Sheppard C (2014) Scleractinian coral communities of the inner Seychelles 10 Years after the 1998 Mortality Event. *Aquatic Conservation* 24 (5): 667–679. doi:10.1002/aqc.2464.

⁵¹ Eakin, CM et al., 2016. Global coral bleaching 2014-2017 – status and appeal for observations. *Reef Encounter* 31(1): 20-26.

⁵² MOI 2016. Presentation by MOI during consultant's mission.

juvenile corals failed to translate into high cover of adult corals because of the lack of a conducive environment⁵³. By 2014, the inner Seychelles hard coral communities were assessed as having lower generic diversity and lower abundance of adult hard corals than other coral reef regions of the Indian Ocean for which comparable data were available⁵⁴.

Coral bleaching is now recognized as one of the major threats to coral reefs and their associated communities. The frequency of such events is predicted to increase in coming decades as seawater temperatures continue to rise. It has been estimated that, by 2100, live coral cover globally could reduce by 30-88% through impacts such as bleaching and reduced calcification in the event of 1.1°C to 2.6°C rise in temperature (RPC4.5 scenario)⁵⁵. In both countries, over-fishing, land-based sources of sediments from erosion of agricultural land and deforested slopes, nutrients from sewage and fertilisers, and tourism-based activities and anchor damage have also prevented recovery. Natural threats include cyclones and tropical storms and sporadic outbreaks of the coral predator, the Crown of Thorns Starfish, *Acanthaster planci*. The combination of these threats is resulting, as on reefs globally, in progressive replacement of reef building corals with soft corals and algae that have less ecological and socio-economic value⁵⁶. Seychelles is planning to address this problem (at a pilot scale) through the upcoming *GEF-6 Ridge-to-Reef project*.

The recurrence of mass bleaching events means that securing a future for coral reefs ultimately requires urgent and rapid action to reduce global warming⁵⁷. However, waiting for worldwide action to reduce global warming before implementing coral reef restoration is a luxury that cannot be afforded. In the Anthropocene era, there are corals that survive bleaching events, and these corals offer an opportunity to restore coral reefs to maintain ecological function, while the human population drastically reduces burning of fossil fuels⁵⁸.

5. Selection of coral reef restoration sites

Mauritius

The **Blue Bay Marine Park** (fig.6) has been earmarked as a site for the implementation of the project. Blue Bay Marine Park was among two of the first marine parks to be declared in Mauritius, and enjoys a high number of visitors with an active management in place; with coast guards and fisheries officers patrolling the area, a newly-built marine park centre providing a venue for education and research, and a management committee which includes NGOs and other major stakeholders. Blue Bay has also been the site of pilot projects in coral reef restoration.

⁵³ Chong-Seng KM, Graham NAJ, Pratchett MS (2014) Bottlenecks to coral recovery in the Seychelles. *Coral Reefs* 33 (2): 449–461. doi:10.1007/s00338-014-1137-2

⁵⁴ Harris A, Wilson S, Graham NAJ, Sheppard C (2014) Scleractinian coral communities of the inner Seychelles 10 Years after the 1998 Mortality Event. *Aquatic Conservation* 24 (5): 667–679. doi:10.1002/aqc.2464.

⁵⁵ IPCC 2014: Arent et al. 2014: Cross-chapter box on the water–energy–food/feed/fiber nexus as linked to climate change. In: *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*.

⁵⁶ Thomassin A. 2011. No 5. Recommandations finales. Etude de faisabilité pour la mise en place d'une ou plusieurs AMP sur la côte sud-ouest de Maurice. MMCS/ProGeCo.54p

⁵⁷ Hughes TP et al (45 authors) (2017). Global warming and recurrent mass bleaching of corals. *Nature* 543:373-378

⁵⁸ Hughes TP et al (12 authors) (2017). Coral reefs in the Anthropocene. *Nature* 546: 82-90

The Blue Bay Marine Park is a RAMSAR Site, which covers a marine area of 353ha between Pointe Corps de Garde and Pointe Vacoas along the coast, from the lagoon to 1 kilometre seaward from the reef crest. The site provides a habitat for mangroves, algae, sea grasses, 38 species of corals, 72 species of fish and other marine organisms including occasional visits of a few specimens of marine turtles. Blue Bay Marine Park acts as a refuge, feeding, spawning and breeding grounds to various species of marine organisms.

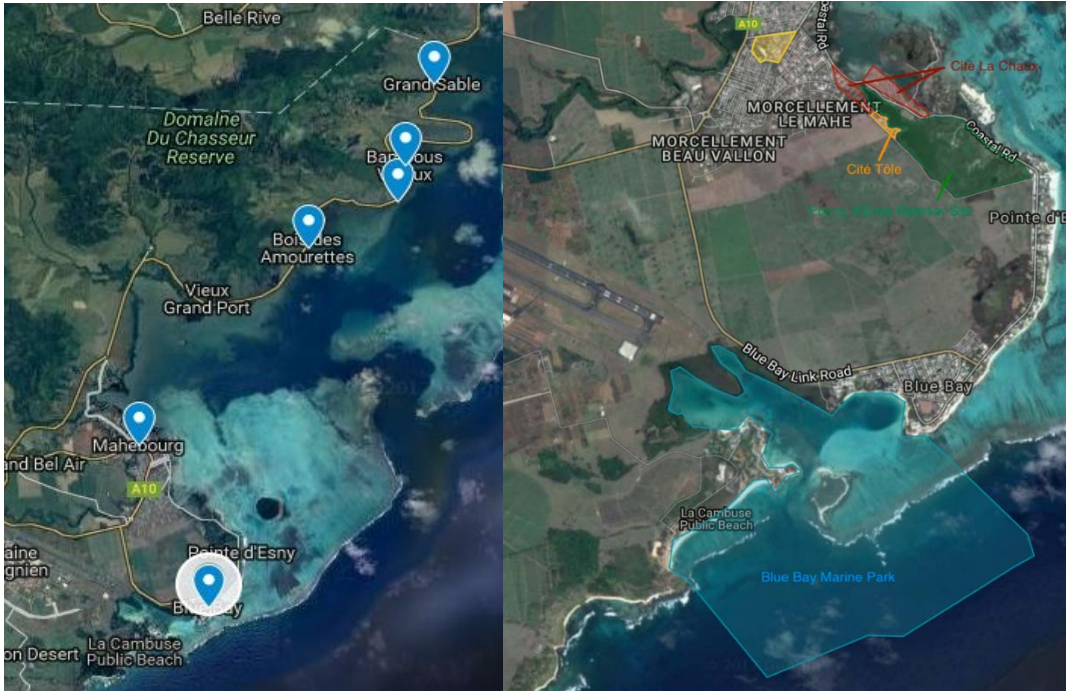


Figure 7 Location of Blue Bay Marine Park and coastal villages concerned by the project

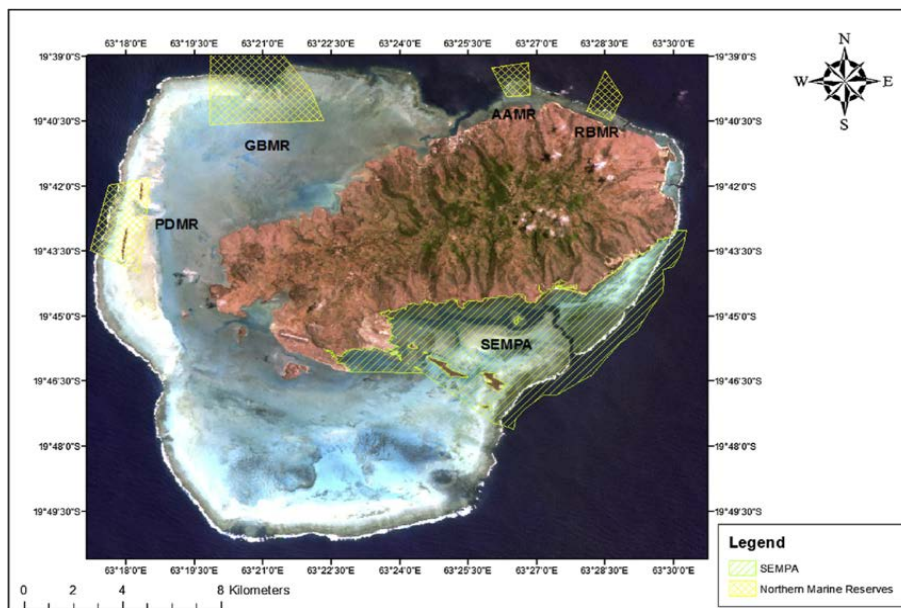


Figure 6 Location of SEMPA and Marine Reserves in Rodrigues

In Rodrigues, the **South East Marine Protected Area (SEMPA)** (fig. 7), established 2009, is the largest MPA to date in Mauritius and is the second site of operation. The MPA operates through a co-management framework between local authorities, fisher representatives and NGOs. During ecological monitoring carried out between 2009 and 2011, patchy coral bleaching was observed both inside and outside SEMPA, corresponding with higher seawater temperatures at the time. In 2016, the worst coral bleaching event was observed, with an average dead coral cover due to bleaching estimated at 51.40% and a remaining mean live coral cover of only 15.63%. Live coral cover has decreased from >35% in 2010 to 15% in 2016. Strengthening MPA management measures and using an ecosystem-based approach to adaptation is a high priority for Rodrigues.

SEMPA is situated in the South East of Rodrigues. It covers an area of approximately 80km² of marine environment (lagoon and off lagoon). It is very diverse and highly productive ecosystem, but remain relatively shallow, which make the ecosystem vulnerable to climate change.

Seychelles

In Seychelles, coral reef restoration works will be effected at Curieuse Marine National Park, Cousin Special Reserve, Ste Anne Marine National Park and at Anse Forbans.

Curieuse Island (fig. 8) is a small granitic island 2.9 km² in the Seychelles close to the north coast of the island of Praslin. In 1979, Curieuse and surrounding waters were declared the Curieuse Marine National Park in order to protect the native wildlife. It is managed by the Seychelles National Parks Authority. It is the home to a number of indigenous plants, including the rare coco de mer palms as well as a plethora of animals. Between 1978 and 1982, there have been a conservation project to relocate Aldabra giant tortoise from Aldabra to Curieuse. Today there is a volunteer group that focuses on conservation of the island and survey local



Figure 8 Location of Curieuse Marine National Park and Cousin Special Reserve

fish, coral, turtle and coco de mer number.

Cousin Island (fig. 8) is a small (34 ha) granitic island of the Seychelles, lying 2 km west of Praslin. It is a nature reserve protected under Seychelles law as a Special Reserve and is managed by Nature Seychelles, a non-profit organisation. The island was formerly a coconut plantation that had been stripped of much of its native vegetation. The island was declared special reserve in 1975, thus protecting coral reefs, which extends 400 m (1,300 ft.) into the sea from the shoreline. It is used by international research organisations and universities as a research base. It is a demonstration site for the International Coral Reef Action Network (ICRAN). The reserve attracts around 10,000 visitors each year.



Figure 9 Location of Ste Anne Marine National Park and Anse Forbans

Sainte Anne Marine National Park (fig. 9) lies about 5 km from Victoria, the capital city of the Seychelles. It was declared Marine National Park in 1973 and is one of the largest park of Seychelles (2 km²) It extends over six islands (Cerf, Ile Cachée, Long, Moyenne, Round and Sainte Anne), with the main island of Sainte Anne acting as the centre for administration. Ste. Anne Marine National Park contains one of the largest area of seagrass meadows in the granitic islands. Nowadays, the island is occupied by a five-star hotel and access is restricted. The island remains one of the most important nesting sites for hawksbill turtles in the granitic islands, requiring restriction of some beaches during nesting season.

Additionally, a pilot site (Anse Forbans) has been selected as restoration and which is outside an MPA. This site has been selected to evaluate feasibility of restoration effort outside a protected area. This coastal region has a local community that is quite dependent on artisanal fisheries. There has been also a perceived increase in beach erosion during the last decade.

Socioeconomic context around selected sites

In Mauritius, the Marine Protected Area's legal framework came into effect in 1997 first through the National Parks Act of 1993 and Blue Bay was subsequently declared a Marine Park in 2000 through the Fisheries and Marine Resources Act of 1998. Blue Bay consists mostly of a tourist village, with beach bungalows used by Mauritians and some rented out to tourists, a public beach which accommodates a large number of Mauritians on the weekends, approximately 100 boat operators registered in the park carrying out glass bottom visits in the park and other outings - though not all every day - and currently two main hotels directly adjacent to the Park: Shandrani Resort and Spa, a five star hotel, Le Peninsula Bay Resort and Spa, the construction of a new hotel on La Cambuse beach and last, a number of smaller guesthouses in the near vicinity.

In the greater SEMPA region, fishing is a core economic activity and households heavily depend on their catch for their own consumption. A socio-economic survey carried out in 2008 revealed that within the villages surrounding the SEMPA area, 66% of households responded that at least one household member is involved in fishing activities; registered fishers are present in 52% of households. The importance of fishing in the region is further accentuated by local consumption, and a vast majority of respondents of the same survey indicated that they consume seafood on a daily basis. Household use was the most important use of their catch, however 60% of households also sell seafood for income. The most important fishery is the octopus fishery; other common fishes caught are 'Cordonnier', 'Capitaine', 'Vielle' and other reef fish.

As per the Mauritian Republic's Regional Development Index, Rodrigues was estimated at 0.557 which was on par with the least developed areas of mainland Mauritius. Fishing is one of the largest employment sector on the island and is part and parcel of the island's culture, with 13% of the workforce dedicated to this activity, and the same amount engaged in fishing on a casual basis. The villages that are in the immediate vicinity of the proposed restoration site include Gravieres, Mourouk, Port Sud Est and Songes, with an estimated population of 2,700. With fisheries in serious decline, fishers have suffered from a loss of income and many have turned to other sources of income to make ends meet. Rodriguans are much more dependent on their lagoon fishery than in Mauritius, both in terms of employment, cultural practice and protein intake.

Protected Areas in the Seychelles have been established since the 70's for multiple reasons. Mostly, however, they are to protect biodiversity where it is most abundant or vulnerable and/or to protect land and sea scape values. To date, more than 47% of the total land area of the Seychelles is under legal protection. These protected areas currently fall under different pieces

of legislation. Protected areas are regulated under different pieces of legislation, notably the National Parks and Nature Conservancy Act (1969, as amended), the Wild Animals and Birds Protection Act (1961), the Wild Birds Protection (Nature Reserves) Regulations (1966), Fisheries Act (1987), Environment Impact Assessment (1994) and the Protected Areas Act (1967). Some of these protected areas have management plans. Activities are regulated, and no fishing is allowed in the Protected Areas. Seychelles is envisaging to increase and re-organise their Protected Area System (PAS) to include a range of protective mechanisms, provide a focus for the protection and restoration of both terrestrial and marine endemic species and their respective habitats in efforts to restore the representative ecosystems of the archipelago.

The inshore domestic fisheries of the Inner Islands of the Republic of Seychelles are currently fully exploited and may be locally overexploited. In response to this, MPAs have been advocated as buffers against overfishing. However, lack of fisheries enforcement is a problem common to all fisheries in Seychelles and most of the MPAs are poached to some degree, despite all being subject to no-take regulations. This is especially true for fishers based in regions in close proximity to existing MMPAs and due to the perception that there is a decline in 'legal' fish available⁵⁹.

Vulnerable groups

In Mauritius 8.5% of the population is below the national poverty line⁶⁰. Many of these groups are the most vulnerable to coastal flooding either because they live on the shoreline or in reclaimed areas of wetlands at risk of flooding or because the structures they live in are not robust enough to withstand flooding. Artisanal fishers have long been recognized as a vulnerable group⁶¹, with national average income ranging from Rs. 5,123 per month for fishers in non-motorized hand boat units to Rs. 23,770 per month over six months for seine net fishers⁶².

Many people who work in and around Blue Bay Marine Park are Mahébourg residents, a larger town with an important fisher population. Mahébourg has been designated as a vulnerable coast, with 1442 persons likely to be affected by coastal inundation by 2065⁶³. A proportion of these fishermen reside in Résidences La Chaux. The latter neighbourhood is located directly on the coast and its socio-economic structure is intimately tied to the sea. Résidences La Chaux commonly referred to as "Cité La Chaux" has been designated a pocket of poverty by the National Empowerment Foundation. Income sources in Cité La Chaux are not very varied, and the majority of its residents (54 % of men and 61% of women) earn between Rs. 4,000 and 8,000 per month, being at or below the national poverty line. Other vulnerable areas (fig.6) include Cité EDC in Beau Vallon and Cité Tôle, an extension of Cité La Chaux occupied by squatters for several decades. The latter area counts approximately 30 registered fishermen who operate at fish landing stations in both Mahébourg and Pointe d'Esny. The total number of registered fishermen in Mahébourg including Cité La Chaux and Cité Beau Vallon is 164.

⁵⁹ Wood L (2004) "Motives for poaching in Marine Protected Areas in the Seychelles", Western Indian Ocean, J. Mar. Scie Vol 3, No 2, pp 199-208

⁶⁰ <https://www.undp-aap.org/countries/mauritius>

⁶¹ Truth and Justice Commission "Volume 1: Report of the Truth and Justice Commission", 2010, 255-260

⁶² Indian Ocean Commission "Value Chain Analysis of the Artisanal Fishery in Mauritius". Smartfish Programme for the implementation of a regional strategy for the Eastern and Southern Africa and Indian Ocean Region. 2012.

⁶³ JICA "Guideline for Climate Change Adaptation Strategy - Coastal Setback" (2016) The Republic of Mauritius

Fisherfolk living in these neighbourhoods have expressed degrading fishing conditions, with some attributing decline in fish catch to illegal fishing and others to instability and climate⁶⁴.

Coastal villages further north of the project site are also considered, as their inhabitants are heavily dependent on the marine environment adjacent to Blue Bay Marine Park and Grand Port Fishing Reserve for their livelihood. These include Ville Noire, Grand Port, Grand Sable, Bois des Amourettes, Quatre-Soeurs in addition to the Blue Bay area itself. The villages north of the Park described above, namely Vieux Grand Port, Grand Sable, Bois des Amourettes have been listed among the most deprived and vulnerable in the country. They rely heavily on fishing and micro-scale farming for subsistence as well as seasonal work and cash from informal labour⁶⁵.

Moreover, at Blue Bay, an important number of coastal inhabitants who are not on the official list of registered fishermen depend on fishing in the lagoon for their livelihoods as the lagoon is open access and restrictions exist only for net fisheries and on marine protected areas. The number of such individuals has been estimated to be around 25,200 in 2003⁶⁶. This access has contributed to the overexploitation of lagoon resources and remains a management challenge due to the undocumented nature of the activity. At the same time, these fishermen do not receive the same benefits provided by the State as for registered fishermen, and often live and work in precarious conditions. Providing reliable and sustainable alternative livelihood options for all fishermen remains a priority to decrease fishing pressure on the lagoon and help lift fishermen out of poverty traps in the context of a changing climate and decreasing coral cover. Coral reef restoration efforts provide an opportunity for fisherfolk and other vulnerable groups to receive income on restoration work while ensuring that the ecosystem services providing the basis for their livelihood as fishers can be sustained.

Most of the Marine Protected Areas in Seychelles are un-inhabited but are highly visited by tourists every year (approximately 57,000/year), which represents a significant source of income and sustainable livelihoods for the islands. The nearest coastal inhabitants to the proposed restoration sites are from Praslin Island (population 8900), Victoria (population 26,450), and Takamaka (population 2,825). In Seychelles, the poorer groups within the community comprise 39.3% of the population who live under the Basic Needs Poverty Line⁶⁷. Around 10% of the households are to some extent dependent on small-scale artisanal fisheries. However, at present, socio-economic information is not well integrated in fisheries monitoring. The social systems and dynamics have been poorly understood or studied.⁶⁸

6. Barriers to be removed by the proposed project

Over recent decades, in both Mauritius and Seychelles, corals have suffered heavy mortalities from bleaching events caused by sustained warmer than usual periods. These warmer than usual periods have been intensified by climate-change. The global bleaching event of 2015/2016 has been the largest and most intense ever recorded. It has caused extensive coral bleaching, and has contributed to scientific consensus that climate change is now the pre-eminent threat to the future survival of coral reefs and the ecosystem services that they provide.

⁶⁴ EPCO "Feasibility study: developing community-based mariculture in the Barachois of Residences la Chaux/Mahebourg: final report" 2016

⁶⁵ Rambaree, Komalsingh. *A Case Study of Empowerment Interventions for the Eradication of Absolute Poverty in Southeast Rural Coastal Villages of Mauritius*. Leon Ginsberg. Social Work in Rural Communities. Alexandria: Council on Social Work Education, 2011.

⁶⁶ Indian Ocean Commission "Value Chain Analysis of the Artisanal Fishery in Mauritius".

⁶⁷ www.nsb.gov.sc National Bureau of Statistics, Seychelles. Poverty Report for the Household Budget Survey 2013

⁶⁸ ASCLME, Coastal Livelihoods in the Republic of Seychelles 2013

Without taking targeted actions to protect and restore coral reefs, the adaptation capacity of communities in tropical countries will be weakened through the degradation of reefs.

An important and innovative option available for both countries to recover reef health is to use active coral reef restoration in order to regenerate the structure and productivity of these ecosystems. Natural recovery processes on coral reefs often fail after large scale disturbances, such as bleaching caused by climate-change induced ocean warming. The loss and degradation of coral colonies leads to a reduced supply of coral larvae and often results in the substrate becoming unsuitable for settlement and/or survival of coral spat. Such failure in new coral recruitment after major loss due to coral bleaching explains why the positive impact on coral reefs of commonly used conservation interventions, such as the establishment of marine protected areas (MPAs), generally do not occur fast enough to allow recovery before a further damaging event occurs. Climate change-induced bleaching events now tend to occur at a frequency and intensity that preclude natural recovery between each event. This results in increasingly poor health of the reef and reduced resilience to both further climate-induced events and to local anthropogenic impacts. In such situations, “active” restoration becomes the only option to initiate the recovery of degraded reefs and protection of their ecosystem services (see Annex 1). Coral reef restoration, once considered a controversial intervention, is now recognized by the scientific community as an important complementary activity to more passive conservation measures, in order to both promote reef recovery and improve reef resilience.⁶⁹ Research shows that some corals (certain species, or colonies with clades of resilient zooxanthellae) are resilient or resistant to bleaching and if these are used for restoration there is a strong potential for recovering some of the key functions of reef ecosystems.

Within the Western Indian Ocean (WIO), coral bleaching has undermined existing conservation reef efforts and many countries have been unable to respond using conventional passive conservation practices. The SIDS in particular urgently need to develop new capacities to restore the ecosystem services lost after coral bleaching and build resilience. Both Mauritius and Seychelles have a number of measures underway that will indirectly or passively improve coral reef health as a part of the broader ecosystem, including the establishment of networks of MPAs, pollution mitigation projects,

Active vs. Passive Coral Restoration

Active coral restoration activities to be promoted by this project is actual in-situ coral planting and all other processes associated with it for the successful artificial coral nursing and planting.

Passive coral restoration activities are all other marine and coastal ecosystem conservation measures, many of which are in fact quite proactive as conservation measures, that will not involve active nursing and planting of corals. These activities include MPA establishment, better management of MPAs, coral conscious fishing activities, and all conservation efforts to protect existing corals and their habitats in the ocean. They are considered *passive* as they don't directly plant corals to restore coral reefs but rely largely on the coral's natural recruitment process and capacity by reducing external stresses on the existing corals.

It is critically important that passive coral restoration efforts continue and are increased in order for any active coral restoration efforts to be effective, as newly planted corals are much more vulnerable and sensitive to external stresses. Where active coral restoration activities are planned, passive coral restoration work should be strongly encouraged for better success.

⁶⁹ Gomez ED, Cabaitan PC, Yap HT, Dizon RM (2014) Can coral cover be restored in the absence of natural recruitment and reef recovery? *Restoration Ecology* 22 (2): 142–150. doi:10.1111/rec.12041.

fisheries management, introduction of Integrated Coastal Zone Management (ICZM) and coastal development regulation activities. Despite these passive measures, however, coral reefs continue to be degraded, through the increasing frequency of climate change-induced events. Without implementing active restoration, coral reefs will continue to degrade beyond their natural ability to recover, and passive measures alone will remain unable to create an adequate environment for recovery to occur. It has become clear that if coral reefs are to be able to continue providing the key ecosystem services of fisheries, tourism and coastal protection, active coral reef restoration should be implemented.

A regional approach will be essential, given the comparatively recent development of coral reef restoration technologies (see Annex 1 for terminology and a summary of progress to date globally and within each country). Sharing experiences and expertise between the two countries will help to accelerate progress. However, it will be important to take account of national differences. Research indicates that coral reefs in the two countries have different susceptibilities to bleaching⁷⁰. Those in the Seychelles have amongst the highest susceptibilities to bleaching, out of five WIO countries that have been assessed: over 70% of the Seychelles coral reefs lie in moderate to highly susceptible geographical areas and are exposed to low currents and high solar radiation, which makes them more prone to thermal stress. In contrast, susceptibility estimates for reefs in Mauritius are low compared to the rest of the region, attributed to the comparatively high temperature fluctuations and wind velocities experienced in this country, with cool periods caused by storms and cloudy periods, a consequence of the country's more southern geographical location.

A regional project provides an opportunity to test out different responses to the implementation of coral reef restoration. Country-specific responses will need to be integrated into the regional approach. The socioeconomic and ecological conditions as well as long-term climate predictions in each country must be well understood because they will dictate the range of interventions that are feasible. Research suggests that although Seychelles has high adaptive capacity⁷¹, the high susceptibility of its coral reefs to bleaching means that passive conservation measures may be too slow for reefs to recover before a further damaging event; therefore, implementing an active and innovative technologically advanced coral reef restoration programme to recover the ecosystem and provide adaptation to climate change may be appropriate here. Mauritius has moderate adaptive capacity which, combined with its low environmental susceptibility to bleaching, means that protectionist conservation policies, such as MPAs, can be effective coral reef restoration measures even under the climate change scenario and greater effort should be made to ensure these are put in place. Nevertheless, the current situation is such that more active measures, such as coral reef restoration, are needed as well, oriented also to helping to improve livelihoods.

The project will take account of such insights and ensure that the two countries learn from each other's strengths and weaknesses. The proposal is that Mauritius should develop a more community-based management and low tech coral reef restoration approach while Seychelles should build on its field experience to date and undertake wider scale, tech-based coral reef restoration that could potentially be mainstreamed into productive sectors. Both countries aim to involve tourism, on an innovative commercial basis.

⁷⁰ Maina J, Venus V, McClanahan TR, Ateweberhan M. 2008. Modeling ecological susceptibility of coral reefs to environmental stress using remote sensing, GIS and in situ observations: a case study in the Western Indian Ocean. *Ecol Mod* **212**, 180–199,

⁷¹ McClanahan TR, Cinner JE, Maina J, Graham NAJ, Daw TM, Stead SM, Wamukota A, Brown K, Ateweberhan M, Venus V, & Polunin NVC. 2008. Conservation action in a changing climate. *Conservation Letters* 1: 53–59.

In both countries, resilient corals will be propagated in nurseries in various partnership arrangements to supply a cost effective and continuous stock of corals for transplantation into areas degraded by climate change with the long-term aim of restoring the ecosystem services that healthy coral reefs normally deliver. The restoration efforts will provide alternative employment for local fishers, thus reducing current fishing pressure on the coral reefs, and for others providing improved livelihoods⁷². The project will capture lessons from these activities and disseminate them to the wider region and will provide the opportunity to upscale and mainstream the experiences to date.

Initially, the restored areas will have a lower coral diversity than prior to bleaching events, and it will take a number of years for a comprehensive coral reef community to develop. However, research is showing that some species, particularly fish, return quickly to restored coral reefs. It must also be understood that coral reefs have changed, are changing and will continue to change. Scientific consensus is that it is unlikely that future coral reefs will return to historical conditions⁷³ and it is becoming clear that the “restored ‘reefs of tomorrow’ will be different from reefs of the recent and more distant past⁷⁴.”

However, as was agreed by the 2,500 scientists attending the 13th International Coral Reef Symposium (ICRS) in 2016, restoring coral reefs with resilient corals is a better strategy than leaving them to extinction. The analogy is with forest and wetland restoration, which are now well-established interventions bringing a range of conservation and socio-economic benefits and the restoration of essential ecosystem services.

7. Barriers to ensuring that coral reefs provide an effective ecosystem-based adaptation measure

Both countries have developed national frameworks for climate change mitigation and adaptation responses (Part II, section E) and have paid increasing attention to the role that coastal ecosystems play in determining the vulnerability of communities to climate change and mitigating its adverse impacts. Nevertheless, unless further action is taken, barriers remain that will prevent degraded reefs recovering sufficiently to ensure food security and shoreline protection for coastal communities. The speed with which climate change is resulting in negative impacts means that additional interventions are required to ensure sufficient adaptive capacity. Despite the current major investments in protecting coral reefs, including the creation and improved management of MPAs and the improved regulation of coastal development, this is still insufficient to maintain the role of coral reefs in food and income security and disaster risk mitigation. For example, in Mauritius, in 2009 only 14% of coral reefs fell within Fishery Reserves and 2% within Marine Parks, leaving over 83% with no protective designation⁷⁵.

⁷² If the government(s) successfully manage to establish a system through which propagated corals nurtured at nurseries by fishermen and community members are bought by those whose business are dependent on the healthy coral reefs, such as hotels, dive operators, and alike; then, it would be a Payment-for-Ecosystem-Services (PES) scheme for coral restoration, which would be ideal to bring in private investments and partnership in coral restoration efforts and reduce financial burden born by the governments. The project will explore this PES potential.

⁷³ Rinkevich B (2015) Climate Change and Active Reef Restoration—Ways of Constructing the “Reefs of Tomorrow.” *J. Mar. Sci. Eng.* 3:111–127

⁷⁴ Rinkevich B (2014) Rebuilding coral reefs: Does active reef restoration lead to sustainable reefs? *Curr. Opin. Environ. Sustain.* 7:28–36

⁷⁵ NWFS Consultancy 2009. Environmentally Sensitive Areas Classification Report, Republic of Mauritius. Final Report.

The limited experience in and the lack of knowledge on coastal ecosystem restoration both in these countries and more widely hinders the application of ecosystem-based climate change adaptation measures. Lack of knowledge and insufficient awareness of climate change impacts and the urgency of addressing ecosystem restoration and resilience as an adaptation measure are further barriers. Therefore, the main barrier the project is targeting is the lack of standardized technical capacity between Mauritius and Seychelles to implement large-scale coral reef restoration

B. Project / Programme Objectives:

The overall objective is to reduce the impact of climate change on local communities and coral reef-dependent economic sectors in Mauritius and Seychelles by implementing coral reef restoration with thermal tolerant corals as adaptation to climate change.

There are three specific objectives, the first two objectives are addressed by each country, and the third objective is regional:

1. To improve food security and livelihoods and mitigate disaster risk through active restoration of coral reefs degraded by coral bleaching as a result of climate change in Mauritius, in order to restore their essential ecosystem services.
2. To improve food security and livelihoods and mitigate disaster risk through active restoration of coral reefs degraded by coral bleaching as a result of climate change in Seychelles, in order to restore their essential ecosystem services
3. To generate knowledge and understanding about the use of coral reef restoration as an adaptation measure for dissemination within the two countries, to other SIDS and also countries within the WIO and other regions, and to build capacity for this intervention in the WIO. By adopting a regional approach, it is expected that the stakeholders involved will develop technical and scientific partnerships as well as a common understanding that will enable them to promote the use of effective natural solutions in adaptation and disaster risk reduction.

The project responds to two of the three thematic focal areas: food security and disaster risk reduction.

Food security:

Both Mauritius and Seychelles produce fish for its own consumption and for exportation. There are four main types of fisheries in Mauritius and Seychelles, namely: coastal/artisanal, aquaculture, offshore demersal, and tuna. Although the majority of the fish produced are from offshore demersal and tuna fishing, an important number of coastal inhabitants depend on fishing in the lagoon for their livelihoods and as a source of food. In Mauritius, the total fish production in 2014 was 12 329t and coastal/artisanal catch represent 13.4%⁷⁶ and in Seychelles the total artisanal catch was 3,632.5 tonnes (84.3% in Mahe and 15.7 % in Praslin and La Digue).

The fisheries sector is indirectly influence by climate change. It is documented that live coral cover provides habitat for coastal fishes. Observed dynamics include variations in meteorological parameters (e.g. water temperature and ocean acidification) that affect ecosystem which eventually disturb fisheries dynamics. The increased sea surface temperature

⁷⁶ Government of Mauritius, Third National Communication 2016

(SST) are mostly responsible for coral bleaching that reduces coral biodiversity and fish species, with only resilient species surviving. Algal blooms due to high SST and nutrient rich seepage into lagoons are also known to be the cause of mass mortality of coral and fish. More frequent and intense rainfall is expected to cause increased sedimentation of the lagoons thus smothering the corals.

This correlation has been observed through the long-term data collected by Government of Mauritius, whereby it was noted that between 1995 to 2016, there has been a 50% decrease in artisanal fish catches (from 1443t to 614t) and that during the same period, the mean percentage of live cover has halved, i.e. from 45% to around 20% cover. In Seychelles, prior to the bleaching of 1998, species targeted by the artisanal fisheries such as Snapper (Lutjanidae), Groupers (Epinephelinae) and Emperors and Breams (Lethrinidae) were found to be more common at Cousin Island than in other MPAs indicating predatory high trophic levels were present at Cousin Island and enforcement of the no-take reserve was being effective, as these species are usually the first to disappear or diminish in abundance when fishing occurs. After the 1998 mass bleaching event, major reductions in fish populations were found at the reserve.

The restoration of degraded reefs will increase coral cover and thus restore fish habitats and spawning/nursery sites, thereby encouraging the recovery of reef associated fish communities which are important as food to the local communities in Mauritius and, in Seychelles, to the national economy as a whole. As the corals grow in the ocean nurseries, and they eventually get transplanted to the reefs under restoration, both the coral nurseries and transplantation sites themselves facilitate the recruitment of new fish and aggregate fish species contributing to the protection of fish populations which can contribute to the local fishery.

For example, research in Seychelles has shown that density of blue-yellow damselfish *Pomacentrus caeruleus* was 12–16 times higher when corals were present at a coral nursery than in nurseries with no corals; furthermore, fish assemblages recruited into the nurseries were diverse in that they included three trophic levels, from herbivores to omnivores, in six families⁷⁷.

During a previous coral reef restoration project in Seychelles (2012), it was observed that one year after the first coral transplantation phase, fish density (as number of fish counted per in 154 m² circles) increased by 100 % compared to the control sites. By the end of the transplantation phase in 2014, fish diversity (number of species and abundance) in the restored reef became similar to the fish diversity at the control healthy reef. The reef fish community structure at the restored site resembled the structure found at a healthy coral reef. These results confirm that the coral reef restoration action increased the richness, diversity and abundance of fish communities and restored the fish community structure to a level similar to a healthy coral reef.

If the same coral transplantation density (4-5 corals per square meter) and coral size at transplantation (20 cm diameter) is maintained and the reef sites respond in the same way in Mauritius as in Seychelles, it is expected that the fish population and density will be increased with the restoration of coral reef at all project sites and thus will enhance fish catch in the area in the medium to long term.

In Mauritius, the proposed project will also link up with the Government's budgetary measure in 2017⁷⁸ to promote development of alternative livelihood opportunities for coastal communities through coral farming by fishermen and SMEs. A budget of USD 242,000 has been earmarked

⁷⁷ Frias-Torres S, Goehlich H, Reveret C, Montoya-Maya PH. 2015. Mid-water coral nurseries recruit reef fish assemblages in Seychelles, Indian Ocean. *African Journal of Marine Science* 2338:1–6. doi: 10.2989/1814232X.2015.1078259.

⁷⁸ Government of Mauritius, Budget Speech 2017-2018

for this purpose. This project will enable the setting up of ocean-based coral farms for developing ornamental corals for the tourism sector, aquarium market and high-end jewellery manufacturing. This will therefore generate considerable employment benefits along the coastal zone. In addition, the restored reefs will benefit the tourism industry, through greater aesthetic value and consequently higher visits by snorkelers and divers. This will create more opportunities for employment in the tourism industry and thus an increased source of livelihoods and greater food security.

Disaster risk reduction:

The coastline of mainland Mauritius extends over 322 km and that of Seychelles extends over 491km. These coastal areas support a number of activities including tourism, recreation, fishery, trade and industry.

The coastal areas are under constant threat. In Mauritius, based on the coastal erosion study⁷⁹, carried out by the JICA in collaboration with the Government of Mauritius, it has been found that 17% of the beaches of Mauritius are suffering from long term erosion (representing about 13 km of beaches). As a result of climate change, different parts of Mauritius are likely to be affected by a sea level rise of 1 m⁸⁰, the beach erosion is expected to accelerate due to sea-level rise between 52 and 98 cm by 2100 if no mitigating action is taken⁸¹. Furthermore, it is estimated⁸² that 12.2 km² of built-up land, 11.8 km² of expansion areas, 60km of primary and 80 secondary roads are at risk from coastal inundation, due to sea level rise as a result of climate change.

In Mauritius, the targeted coastlines to be protected include:

- the Mahebourg region (Mauritius) – It is located next to the Blue Bay Marine Park which was earmarked as a rehabilitation site. It has been designated as a vulnerable coast, with 1442 persons likely to be affected by coastal inundation by 2065.
- the SEMPA Region (Rodrigues) – The population of the region is 4,661.

The above target areas host small businesses comprising tourism enterprises and hotels, which are at risk from flooding from increased storm surges due to climate change, and in a long-term, from the sea level rise. According to a DRR study carried out in 2012 in Mauritius, some 12.2 km² of built-up land and c. 11.8km² of expansion area in the Mauritius Island are exposed to high or very high hazard of inundation. The exposure is relatively lower in Rodrigues Island, with 0.56 km² of build-up areas being exposed to higher hazard levels. Considering the sea level rise increase scenarios (from 2.5 to 6m a.s.l), the population exposed to inundation ranges from 22,800 to 63,400 people in Mauritius and 800 to 1,800 in Rodrigues. It was estimated the annual damage cost due to extreme case of inundation in Mauritius arise to USD 25 million and USD 0.7 million in Rodrigues. The study didn't include the potential expected medium-term impacts (by floods due to storm surges, before the permanent inundation), but most of the areas that are expected to be inundated permanently (due to sea level rise) will be subject to the flood damages by storm surges.

⁷⁹ The Project for Capacity Development on Coastal Protection and Rehabilitation in the Republic of Mauritius by JICA (Japan International Cooperation Agency), 2015

⁸⁰ DRR Strategic Framework and Action plan, MOESDDBM, 2013

⁸¹ *IPCC 2013, Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, Geneva: IPCC.

⁸² DRR Strategic Framework and Action plan, MOESDDBM, 2013

Research has indicated that mass mortality over the past decade at some sites in Seychelles has resulted in a reduction in the level of the fringing reef surface, a consequent rise in wave energy over the reef and thus an increased coastal erosion. As in Mauritius, coastal inundation and coastal erosion in Seychelles will have significant impact on coastal infrastructures, especially tourism and the road network⁸³. In Seychelles, it is seen that a number of low lying islands such as south and north Cousin and Marianne are likely to experience highest extent of coastal inundation. Among the main granitic Islands, Praslin Island is most likely to be affected.

In Seychelles, the entire coastline of the nation is vulnerable to climate change and its vulnerability increasing due to the loss of coral reefs. According to the Centre for Research on the Epidemiology of Disasters database, the economic damages caused by tsunami⁸⁴ that hit Seychelles in December 2004 was estimated at approximately USD 30,000,000 . With its terrain and population distribution, most of its c. 95,000 population is vulnerable to coastal erosion, coastal floods and storm surges, but the hardest hit would be its urban dwellers (+/- 40,000 in Seychelles). Further, the World Bank estimates about 200 small businesses enterprises, especially tourism enterprises which tend to be located near the beach or waterfront establishments, is subject to the highest risk from floods resulting from increased storm surges. They are as vulnerable as coastal population; thus, would benefit equally from the adaptation interventions.

Further, the two most important economic sectors, tourism and fisheries, both depend largely on the healthy corals. There is a high dependency on tourism as a means of generating employment, foreign exchange and economic activity in Seychelles. This reliance on tourism has also spread across sectors, with resources in agriculture and forestry largely being seen as a means to generate activity in tourism, while further growth in ports and coastal transport now directly hinges on increased activity from cruise and leisure vessels. For the most part, there does not appear to be any sign that this reliance on tourism will subside. Thus, the entire nation is, but most significantly, coastal communities are, clearly vulnerable to fluctuations in tourist activity, which could most certainly decline with the lost of corals and eroded coastlines in the future. Thus, the coral restoration activities will – in a long-run – address the vulnerability of the most important economic sector of the country.

The healthy corals are also important for the country's fisheries sector, especially, for the small-scale fisheries, in which second most concentration of economic activities, just after tourism, is observed.

The target coast lines to be protected by the project are located on Anse Forbans, Ste. Anne Island, Curieuse Island, and Cousin Island, of which only at Anse Forbans (and nearby Takamaka) there reside local communities (2,825 people) directly affected by (and involved in) coral restoration activities. At Anse Forbans, climate change vulnerability of communities is increasing as they lose coral reefs. Therefore, they are committed to engaging in coral restoration activities themselves to increase natural capital's ability to reduce the impacts of climate change.

For all other locations chosen to pilot active coral restoration efforts, the locations are chosen by their high probability of coral survival, thanks to the strong level of protection measures established for the conservation and management of coastal and marine ecosystems in these areas. In order to expect the most successful and fastest coral restoration results to be

⁸³ Government of Seychelles, National Climate Change Strategy, 2009

⁸⁴ Disaster Risk Profile of Republic of Seychelles – UNDP, 2008

achieved from the pilot activities during the limited project implementation period, it was important to select these sites. Also, the corals at these sites support the high-end tourism, which is very important for the Seychelles overall economy.

As a response, various adaptation programmes have already start implementation. For example, in Mauritius, the minimum setback from high water mark has been increased from 15m to 30m for hotels and residential coastal development; an Integrated Coastal Zone Management Framework has been developed and many coastal activities are controlled through the EIA mechanism; and coastal rehabilitation works around the island, with the financial assistance of external donors. A study carried out by Japanese International Cooperation Agency⁸⁵ and the Third National Communication Report 2016⁸⁶ also recommend coral farming and growth of coral reefs as long-term adaptation measures to ensure coastal protection⁸⁷.

Coral reefs reduce wave energy impacting shorelines by an average of 97%, with reef crests dissipating most (86%) of this energy and reef flats dissipating approximately half of the remaining wave energy. This means that even narrow reef flats effectively contribute to wave attenuation. The restoration of degraded reefs will stabilise the reef substrate and increase coral cover and thus restore the protective barrier function provided by coral reefs. This has been demonstrated in Grenada⁸⁸, where innovative restoration of coral reefs has helped to stabilise the shoreline. In the long-term this project will contribute to demonstrating where, when and how healthy or restored coastal ecosystems can contribute to cost-effective solutions that address current and growing risk from natural hazards and climate change.

The full protection of all coastlines in Mauritius and Seychelles against flooding, sea-level rise and coastal erosion is beyond the scope of this project. Coral reef restoration activities will be focused on sites located at Marine Protected Areas (MPAs) in Mauritius and Seychelles. When properly restored, these sites will demonstrate how the coral reefs protect against wave energy and coastal erosion compared to sites that have not been restored. Such comparison is incorporated into the different monitoring strategies to scientifically quantify the results of the restoration effort.

Under the project, approximately 3.2 Ha of coral reefs will be restored in Mauritius and 2.5 Ha in Seychelles, as such protecting some 1 km and 1.5km of coastline in Mauritius and Seychelles, respectively. The restoration sites are Blue Bay Marine Park in Mauritius, SEMPA in Rodrigues, and the three MPAs of Seychelles found at Cousin Island, Curieuse Island, Ste Anne. Additionally, a site outside MPA (Anse Forbans) will be restored on a pilot scale.

The project will also enhance regional coordination, scientific exchange and learning across the WIO, that has been identified as one of the regions that will be most negatively impacted by climate change. This regional scaling-up and learning would not occur if two separate national projects were to be funded. In particular the Seychelles will benefit from the established scientific capacity and facilities in Mauritius; and Mauritius will benefit from the recent experience gathered in Seychelles in undertaking large scale reef restoration.

⁸⁵ The Project for Capacity Development on Coastal Protection and Rehabilitation in the Republic of Mauritius by JICA (Japan International Cooperation Agency), 2015

⁸⁶ MOESDDBM 2016, Third National Communication Report 2016

⁸⁷ UNDP, 2008 Disaster Risk Profile of Republic of Seychelles

⁸⁸ Reguero, B.G., Beck, M.W., Agostini, V.N., Kramer, P., & Hancock, B.T. (2018). Coral reefs for coastal protection: A new methodological approach and engineering case study in Grenada. *Journal of environmental management*, 210, 146-161.

Currently Disaster Risk Reduction (DRR) monitoring in Mauritius is effected by the National Disaster Risk Reduction and Management Centre (NDRRMC), supported by a number of national institutions. One such institution is the Mauritius Meteorological Services which has an ocean monitoring station in the east of the island. While Seychelles does not possess the same technology, much efforts and resources are committed to the identification and assessment of disaster risks through the Division of Risk and Disaster Management (DRDM), the Climate Adaptation and Information Division, the National Emergency Committee and National Relief Fund body. One of the regional studies to be carried out during the proposed project, is the temporal studies on wave profiles in the lagoon of Mauritius (including Rodrigues) and in Seychelles that will be carried out by the Mauritius Oceanography Institute, to find the effect of coral restoration on wave pattern and hence on coastal protection.

The project will also contribute to the cross-cutting fourth theme of regional projects supported by the Adaptation Fund in that it will support activities that can be considered as an “innovation in adaptation finance⁸⁹ towards transformational impact”, through the work that will be done to identify mechanisms for ensuring sustainable financing of coral restoration.

C. Project / Programme Components and Financing:

The table below describes indicative outputs and outcomes, and these are explained in more detail in Part II, Section A.

Table 1 Indicative outputs and outcomes of the project.

Project Components	Expected Outcomes	Expected Outputs	Responsible Authorities / Countries	Amount (USD)
Component 1: Enhancement of food security and reduction of risks from natural disasters through the restoration of degraded reefs in Mauritius.	Outcome 1.1: Improved livelihood for a sustainable partnership and community-based approach to reef restoration.	Output 1.1.1 Coastal communities benefit from improved livelihoods through employment establishing and maintaining coral nurseries and transplantation sites.	MOEMRFS UNDP Mauritius	158,161
		Output 1.1.2 Coastal communities benefit from improved livelihoods through increased revenue from alternative work including tourism (glass bottom boat tours, snorkelling and diving trips).	MOEMRFS and NGOs Mauritius	
	Outcome 1.2: Coral farming and nursery facilities established at a sufficient scale for more climate change resilient corals.	Output 1.2.1 Donor coral colonies of appropriate species (resilience, maintaining genetic diversity) available at sufficient scale (quantity, time, intervals etc.) for propagation in nurseries.	MOEMRFS Mauritius	1,660,150
		Output 1.2.2 Reports on coral reef status, water quality, and other key environmental and social parameters for potential nursery sites.	MOEMRFS MDR, RRA Mauritius	

⁸⁹ “Adaptation finance” is taken here to mean “the finance for activities that address current and expected effects of climate change” http://www.afdb.org/fileadmin/uploads/afdb/Documents/Generic-Documents/Common_Principles_for_Climate_Change_Adaptation_Finance_Tracking_-_Version_1__02_July__2015.pdf

Project Components	Expected Outcomes	Expected Outputs	Responsible Authorities / Countries	Amount (USD)
		Output 1.2.3 A land-based nursery and 2 or more ocean nurseries established and maintained on a regular basis.	MOEMRFS Mauritius	681,689
		Output 1.2.4 Stock of farmed corals available for transplantation	MOEMRFS MDR, RRA Mauritius	
	Outcome 1.3 The health of degraded reefs restored, through active restoration work, maintenance and monitoring efforts, leading ultimately to greater protection of shore from flooding and storm damage	Output 1.3.1 Rugosity and structure of reefs restored, leading ultimately to greater protection of shore from erosion.	MOEMRFS MDR, RRA, NGO Mauritius	
		Output 1.3.2 Recovery of fish population and other reef associated fauna and flora, leading ultimately to improved food security in Mauritius and Rodrigues.		
Component 2: Enhancement of food security and reduction of risks from natural disasters through the restoration of degraded reefs in Seychelles.	Outcome 2.1: Improved livelihood for a sustainable partnership to coral reef restoration	Output 2.1.1 Coastal communities benefit from improved livelihoods through employment establishing and maintaining coral nurseries and transplantation sites.	MEECC, Nsey, SNPA, MCSS Seychelles	93,340
		Output 2.1.2 Coastal communities benefit from improved livelihoods through increased revenue from alternative work including tourism (glass bottom boat tours, snorkelling and diving trips)		
	Outcome 2.2 Coral farming and nursery facilities established at a sufficient scale for more climate change resilient corals.	Output 2.2.1 Donor coral colonies of appropriate species (resilience, maintaining genetic diversity) available at sufficient scale (quantity, time, intervals etc.) for propagation in nurseries	MEECC, Nsey, SNPA, MCSS Seychelles	1,811,985
		Output 2.2.2 Reports on coral reef status, water quality, and other key environmental and social parameters for potential nursery sites		
		Output 2.2.3 A land-based nursery established, and 2 or more ocean nurseries are established and maintained on a regular basis	MEECC, Nsey, SNPA, MCSS Seychelles	
		Output 2.2.4 Stock of farmed corals available for transplantation		
	Outcome 2.3: The health of degraded reefs restored, through active restoration work,	Output 2.3.1 Rugosity and structure of reefs restored, leading ultimately to greater protection of shore from erosion	MEECC, Nsey, SNPA, MCSS Seychelles	594,675

Project Components	Expected Outcomes	Expected Outputs	Responsible Authorities / Countries	Amount (USD)
	maintenance and monitoring efforts, leading ultimately to greater protection of shore from flooding and storm damage	Output 2.3.2 Recovery of fish population and other reef associated fauna and flora, leading ultimately to improved food security in Seychelles		
Component 3: Knowledge management and sharing, training and sensitization to build regional capacity for sustainable reef restoration.	Outcome 3.1: Improved understanding and knowledge management of use of reef restoration as an adaptation measure	Output 3.1.1 Comparative review and analysis of coral restoration initiatives in the region and globally, with gaps in knowledge identified	MOEMRFS MDR, RRA, MEECC, Nsey, SNPA, MCSS Mauritius and Seychelles	412,005
		Output 3.1.2 Based on past and ongoing coral restorations efforts undertaken by the project and others, science-based best practice and methodologies (e.g. factors determining success in coral restoration are known; cost-effective approaches, etc.) developed, constraints and challenges identified, and lessons learned documented.		
		Output 3.1.3 Research undertaken to provide information to guide restoration and enhance reef resilience where required (e.g. genetic connectivity of coral species, spawning seasons and coral recruitment patterns, resistant/ resilient species and clades)		
	Outcome 3.2: Improved understanding within the WIO and globally of successful approaches to reef restoration, the constraints and challenges, with lessons learned incorporated into new initiatives	Output 3.2.1 Lessons learned in reef restoration documented and shared	MOEMRFS MDR, RRA, MEECC, Nsey, SNPA, MCSS Mauritius and Seychelles	1,037,823
		Output 3.2.2 Reef Restoration tool kit and manual for use in the WIO published and disseminated		
	Outcome 3.3: Regional capacity developed for sustainable and climate resilient coral restoration.	Output 3.3.1 Regional training workshops undertaken on monitoring, DNA-based approach for the identification of resilient corals, and other topics as appropriate.	MOEMRFS MDR, RRA, MEECC, Nsey, SNPA, MCSS Mauritius and Seychelles	1,387,495
Output 3.3.2 Sustainable long-term monitoring programme developed and underway for restored reefs, based on international/regional protocols and best practice.				

Project Components	Expected Outcomes	Expected Outputs	Responsible Authorities / Countries	Amount (USD)
	Outcome 3.4: Monitoring and Evaluation		UNDP/PMT	427,310
Project Execution Cost				867,787
Total Project Cost				9,132,420
Project Cycle Management Fee charged by the Implementing Entity				867,580
Amount of Financing Requested				10,000,000

D. Projected Calendar:

Table 2 Projected milestone

Milestones	Expected Dates
Start of Project/Programme Implementation	January 2019
Mid-term Review (if planned)	June 2022
Project/Programme Closing	December 2024
Terminal Evaluation	December 2024

PART II: PROJECT / PROGRAMME JUSTIFICATION

A. Project Components

The project will use the approach of ecosystem-based adaptation, which involves the management and restoration of ecosystems in such a way that the services provided by these ecosystems reduce the vulnerability of communities and also increase the resilience of ecosystems to human induced climate change. The project will use the “coral gardening” concept for active restoration of coral reefs in a two-step process: First, coral fragments or nubbins are raised in nurseries. Second, after reaching a target size, the nursery corals are harvested and transplanted onto degraded reef areas⁹⁰. Specifically, the project will support the “up-scaling” of coral reef restoration, using best available science and knowledge gained in both countries from pilot initiatives and from research undertaken globally. The focus will be on coral colonies that have survived coral bleaching and that are therefore either resistant (i.e. do not bleach as a result of elevated temperatures), or resilient (i.e. despite bleaching, the colony recovers).

Nurseries and restoration sites have been targeted to be within Marine Protected Areas (MPAs) in both countries, so as to ensure the sustainability of coral reefs restoration works. The MPAs:

- 1) provide a protected environment so the effects of the coral reef restoration activity can be scientifically quantified without interference from confounding factors (i.e. fishing, anchor

⁹⁰ Rinkevich B. 2006. The coral gardening concept and the use of underwater nurseries; lessons learned from silvics and silviculture. In: Precht WF, ed. Coral reef restoration handbook. Boca Raton: CRC Press, 291–302.

damage from boats, runoff pollution, etc), and the coral reefs restored there will also be protected as per MPA regulations;

- 2) have an existing ecotourism infrastructure so any increase in job opportunities and benefits to locals can be incorporated quickly within the MPA system; and
- 3) are ideal locations to showcase the coral reef restoration work for educational, capacity building and ecotourism purposes because there's already a communication infrastructure in place for them.

Although country-specific responses are needed to facilitate adaption to climate change, capacities to address these challenges in the SIDS are limited. Mauritius and Seychelles, two of four SIDS in the WIO region (the others are Comoros and Maldives), both share the geographically common challenges and climate-induced threats of rising seawater temperatures, sea level rise, and ocean acidification. The focus of the project will thus be on consolidating and sharing best practices and expertise in coral reef restoration and the most cost-effective measures for this approach, between the two countries and more widely across the WIO region.

Existing international and regional platforms will be used, including those established specifically for ensuring the future survival of coral reefs (e.g. WIO Coral Reef Monitoring Network, International Coral Reef Initiative) and those established to ensure that information and knowledge related to climate change adaptation is widely available and shared. An important aspect of the project is that it will demonstrate south-south co-operation. Coral reef restoration has been trialled in a number of other countries in the WIO, notably in the Maldives. Presentations at the 13th International Coral Reef Symposium (ICRS) in June 2016 indicated that great strides have been taken around the world in the development of the science of coral reef restoration, techniques tailored to the specific needs of each region, and in understanding the obstacles, constraints and factors in success, particularly in developing countries which now have greater experience. Although a few developed countries are advanced in coral reef restoration (e.g. USA) this is not usually undertaken with the primary purpose of restoring reefs as an adaptation measure, and so this project will be innovative at the global, as well as the regional level by implementing coral reef restoration as adaptation to climate change.

The three project components will run in parallel and are closely interlinked. Components 1 and 2 address Mauritius and Seychelles respectively and concern the establishment of new, or expansion of existing, coral farming facilities and nurseries, and the restoration of selected degraded reefs. This measure (restoration of degraded coral reefs with thermal tolerant species), if successfully implemented, will ultimately lead to both an increase in food security and in disaster risk reduction. The project has therefore been designed with a coral reef restoration component for each country. The activities will be broadly similar in each country but adapted to the different national environmental and socio-economic characteristics, and to the previous experiences in coral reef restoration and development of adaptation measures of each country. However, throughout implementation, there will be extensive regional networking and exchange through Component 3, in order to use the knowledge generated in both countries. Component 3 is entirely regional in nature and will ensure sharing of knowledge, resources and the joint development of capacity. It will be important to allow for flexibility in planning and implementation through the adaptive management so that the project can make full use of the rapidly accumulating new research on the most appropriate way to undertake coral reef restoration.

Component 1: Enhancement of food security and reduction of risks from natural disasters through the restoration of degraded reefs in Mauritius

Outcome 1.1. Improved livelihood for a sustainable partnership and community-based approach to reef restoration

Output 1.1.1. Coastal communities benefit from improved livelihoods through employment establishing and maintaining coral nurseries and transplantation sites.

The involvement of coastal communities in establishing and maintaining coral nurseries and transplantation sites can become a new source of revenue for these communities. Such involvement will rely on stakeholders willing to participate in the training required to perform such activities. In Mauritius and Rodrigues, the approach will be to work with small coastal communities and local NGOs, with the involvement of tourism enterprises (hotels, dive centres, boat operators etc.) where appropriate. The technical work will be led by AFRC and MOI (under the aegis of MOEMRFS). The community/NGO will be selected through a call for proposals, with the selection of organizations and communities to take part based on a careful assessment. The interest of coastal communities in coral farming in Mauritius was assessed in 2014⁹¹, and many would be willing to participate. **During the preparation phase, as stakeholder analysis and Gender assessment was carried out (see Annex 7 and 8).** There are also a number of NGOs with relevant experience including Reef Conservation, the Mauritius Marine Conservation Society (MMCS), Eco-Mode, Eco-Sud and, on Rodrigues, possibly TerMer Rodrigues and the Shoals Rodrigues Association. Each of the NGO recruited will also include a project site coordinator and a project site assistant, who will oversee the implementation of the project at restoration site.

Activities include:

1.1.1.1 Stakeholder analysis

1.1.1.2 Training of community members in establishing and maintaining coral nurseries in Mauritius and Rodrigues

1.1.1.3 Awareness campaign on coral restoration in Republic of Mauritius

1.1.1.4 Training of direct beneficiaries in snorkelling and advance PADI or other relevant diving qualification.

Output 1.1.2. Coastal communities benefit from improved livelihoods through increased revenue from alternative work including tourism (glass bottom boat tours, snorkelling and diving trips)

Restored sites will be located in MPAs and nursery sites can generate new income opportunities for coastal communities by increasing tourist activities. To support the development of a coral reef restoration economic and financial strategy, a report on sustainable financing mechanisms for the maintenance and monitoring of coral restoration work will be completed. This Output requires the development of coral restoration economic and financial strategy for the sustainable financing and maintenance of both the nurseries and the transplantation sites. These strategies will consider the potential sources of funding and what remuneration is needed for labour, as well as the costs of maintenance and monitoring programmes and equipment purchase. The project will provide an opportunity to develop partnerships with the diving and hotel industries and to take advantage of Corporate Social Responsibility (CSR) opportunities to leverage funding. In several countries (such as Maldives and Malaysia) hotels have “adopt-a-reef” programs through which they involve their clients in coral reef conservation activities and also generate new funding opportunities; these activities might provide new funding models for the project. The environmental impact of the revenue generation activities identified will be carefully assessed; for example, it will be important not to

⁹¹ Nazurally, N. and Rinkevich, B. 2014. A Questionnaire-based Consideration of Coral Farming for Coastal Socio-economic Development in Mauritius. *Western Indian Ocean J. Mar. Sci.* 12 (1): 47-56.

promote or encourage collection and sale of wild grown corals. This is also in line with the Mauritian Governmental budgetary measure in 2017⁹² to promote development of alternative livelihood opportunities for coastal communities through coral farming by fishermen and Small and Medium Enterprises (SMEs). In the long run, this budgetary measure is expected to provide a viable source of income for inhabitants along the coastal zone.

Activities include:

- 1.1.2.1 Development of a coral restoration economic and financial strategy.*
- 1.1.2.2 Establishing partnership agreement with community groups*
- 1.1.2.3 Livelihood survey to evaluate impact of project on beneficiaries.*

Outcome 1.2. Coral farming and nursery facilities established at a sufficient scale for more climate change resilient corals

Output 1.2.1. Donor coral colonies of appropriate species (resilience, maintaining genetic diversity) available at sufficient scale (quantity, time, intervals etc.) for propagation in nurseries

This Output includes a technical assessment and selection of coral species for transplantation based on thermal tolerance (survivors of previous coral bleaching events) and genetic analysis of thermal-tolerant *Symbiodinium* clades.

Coral reef restoration will be implemented within Marine Protected Areas (MPAs). In Mauritius, the MPAs selected are: Blue Bay Marine Park and in Rodrigues-SEMPA (South East Marine Protected Area). Within the MPAs, nursery sites will be selected based on the reports on coral reef status, water quality, current pattern and key environmental and social parameters. The preliminary locations of the restoration sites are indicated in figures 10 and 11. Surveys will also be completed to identify coral donor sites for locally threatened species in both Mauritius and Rodrigues.

Activities include:

- 1.2.1.1 Technical assessment and selection of resilient coral species.*
- 1.2.1.2 Identification of donor sites*
- 1.2.1.3 Survey for identification of ocean-based nurseries*

⁹² Government of Mauritius – Budget Speech 2017-2018.



Figure 10: Restoration site at Blue Bay Marine Park, Mauritius



Figure 11 Restoration site at SEMPA, Rodrigues

Output 1.2.2. Reports on coral reef status, water quality, and other key environmental and social parameters for potential nursery sites

Sea based nurseries will be set up within the MPAs, i.e. BBMP in Mauritius and SEMPA in Rodrigues. These sites will be selected based on the reports on coral reef status, water quality and key environmental and social parameters.

Activities include:

1.2.2.1 Monitoring of sea water quality and other key environmental parameters at donor and nursery sites.

1.2.2.2 Carrying out the Environmental and Social Impact Monitoring.

Output 1.2.3. A land-based nursery and 2 or more ocean nurseries established and maintained on a regular basis

Mauritius will be using both land-based and ocean nurseries. In Mauritius, building on previous experience, one land-based coral nursery will be built in the premises of MOI. This nursery will be used to propagate locally threatened species and selected massive corals. The land-based nursery will also be used to propagate mother coral colonies so as to minimise collection from donor sites. Additionally, colonies in land-based nurseries are a safeguard to the project, in case of an unexpected severe bleaching event occurs. An experimental land-based set-up will also be used to obtain new coral recruits from collecting coral spawn, that can settle on pre-conditioned plates for a future relocation to the ocean nurseries. The objective of this experimental nursery is to identify the optimal conditions for obtaining recruits on a large scale, for future restoration works nationally.

Small-scale ocean-based nurseries including table nursery bottom attached model (for culture of up to 100 corals per nursery) (see Annex 1) and multi-layered rope nursery (for culture of up to 1000 corals per nursery) will be built for community-based coral farming at each MPA site and additional sites as per interest of adjacent hotels. It is aimed that at least 30% of the communities involved will be women. These ocean nurseries will be filled with nubbins from asexual propagation and eventually will also include nubbins obtained from sexual propagation in the land-based nursery.

Activities include:

1.2.3.1 Setting up of a large-scale land-based nursery at MOI

1.2.3.2 Setting up, populating and maintenance of 100 table nurseries and 100 multi-layered rope nurseries in BBMP

1.2.3.3 Setting up, populating and maintenance of 50 table nurseries and 40 multi-layered rope nurseries in SEMPA

Output 1.2.4. Stock of farmed corals available for transplantation

Different species of corals will be farmed (see Annex 1) and total numbers will depend on sites and nursery method. In Mauritius, the project target is producing 15,000 coral fragments from land-based nursery, 20,000 from the table nurseries, and 100,000 from the multi-layered rope nursery units. In Rodrigues, the target is producing 10,000 nursery-reared corals in table nurseries and 40,000 from the multi-layered rope nursery units. The target is 140,000 farmed coral (75% survival rate) by the end of the project.

The nurseries will be set up during the first year and will have a 6 months acclimatization period. The farmed corals will reach the appropriate size for transplantation by the end of the third year.

Activities include:

1.2.4.1 Collection of coral fragments cultures in land-based nurseries and ocean-based nurseries in Mauritius and Rodrigues

Outcome 1.3. The health of degraded reefs restored, through active restoration work, maintenance and monitoring efforts, leading ultimately to greater protection of shore from flooding and storm damage

Output 1.3.1. Rugosity and structure of reefs restored, leading ultimately to greater protection of shore from erosion.

Farmed corals will be cemented at sites targeted for restoration within the Blue Bay Marine Park (Mauritius) and SEMPA (Rodrigues) by the NGOs and the communities. The density of restoration (number of corals per square meters) will depend on the size of corals at transplant time and the status of the degraded reef (See Annex 1). It is however estimated that approximately 4 nursery grown corals will be transplanted per square meter. As such it is estimated that approximately 2.5 Ha of coral reef will be restored in Mauritius and approximately 0.7 Ha in Rodrigues. The approximate beach area that is potentially protected is 1.5 Ha and 1 Ha respectively (see figures 10 and 11). Monitoring of the current pattern and coast at the restoration works in Mauritius and Rodrigues will be partly implemented in output 1.3.1 and partly in Component 3.

Activities include:

1.3.1.1 Transplantation of farmed corals at restoration sites in Mauritius and Rodrigues

1.3.1.2 Part of the spatio-temporal study of the coast and restoration site in Mauritius and Rodrigues.

Output 1.3.2. Recovery of fish population and other reef associated fauna and flora, leading ultimately to improved food security in Mauritius and Rodrigues.

Under this output, standardized long-term monitoring programs will record the effects of the coral reef restoration effort, mainly coral survival, growth rates and abundance and diversity of reef-associated species. It is expected that the restored sites located in MPAs will have an increase in fish biomass and fish species as a result of the coral reef restoration actions. It is foreseen that these reef fish increases will eventually spill over from the MPAs and become available to fishers. Nearby control sites will also be selected to scientifically quantify the results of the coral reef restoration efforts

Activities include:

1.3.2.1 Monitoring and maintenance of the restoration sites

1.3.2.2 Monitoring of the restoration site for water quality, live coral cover, fish and other fauna and flora density.

1.3.2.3 Updating the inventory of the corals in Mauritius and updating the booklet describing the corals of Mauritius and Rodrigues.

Component 2: Enhancement of food security and reduction of risks from natural disasters through the restoration of degraded reefs in Seychelles

Outcome 2.1. Improved livelihood for a sustainable partnership to coral reef restoration

Output 2.1.1. Coastal communities benefit from improved livelihoods through employment establishing and maintaining coral nurseries and transplantation sites.

In Seychelles, during the preparation phase, as stakeholder analysis and Gender assessment was carried out (see Annex 9 and 10), there are few local coastal communities and the focus here will be more on NGOs, and the tourism industry. The project will be implemented by SNPA (under the aegis of MEECC), and the two NGOs, Nature Seychelles and Marine Conservation Society of Seychelles (MCSS). Other NGOs with little or no experience in coral reef restoration

will participate as part of the capacity building effort. Consideration will be given to involving students from the University of Seychelles as part of their work-study activities, notably the Blue Economy Research Institute (BERI) which was established in 2015 to provide the knowledge and technical input for the development of the Seychelles Blue Economy. The National Institute of Science, Technology and Innovation (NISTI) might also play a role by contributing to the innovative approaches that will be needed to develop coral restoration as a sustainable enterprise.

Activities include:

2.1.1.1 Training of community members in establishing and maintaining coral nurseries

2.1.1.2 Awareness campaign in Seychelles on coral restoration.

2.1.1.3 Scuba training of volunteer students.

Output 2.1.2. Coastal communities benefit from improved livelihoods through increased revenue from alternative work including tourism (glass bottom boat tours, snorkelling and diving trips)

In Seychelles, the focus will be on large-scale coral reef restoration. This will be achieved in two steps: updating the strategic plan for the management of MPAs and the development of a business plan. The strategic plan will be upgraded so as to involve the local communities and local businesses that will benefit from the coral restoration works. The plan will consider the potential sources of funding and what remuneration is needed for labour, as well as the costs of maintenance and monitoring programmes and equipment purchase.

Seychelles will also develop a business plan focusing on making long-term, large-scale coral reef restoration financially viable, with several strategies that generate income to be invested again in the coral reef restoration effort:

- Mass-Production and sell of farmed fast-growing corals for reef restoration and for the aquarium trade (CITES compliant)
- Leverage other opportunities in mariculture, notably low trophic level species, with facilities and capacity available
- Attract other marine research & development projects, partners, researchers and students (with facilities and capacity available) to establish platform and knowledge hubs.
- Provide training and boot camp learning programs for national and international trainees in coral mariculture and coral reef restoration.
- Explore science and technology opportunities for uses of farmed corals
- Partner with hotel resorts and other private sector businesses for coral reef restoration using CSR funds

The USAID-funded Reef Rescuers project (2011) initiated by Nature Seychelles included research, development, implementation and teaching. Results from this project can be used to reach the next level through the AF project and expand coral propagation and restoration to foster a sustainable coral aquaculture enterprise, which in turn reverts into more resources for coral reef restoration.

The mariculture activity will focus on corals and live rock⁹³ during the AF project, and sponges will be investigated for future implementation. Such activity is tailored to the needs and capabilities of Seychelles as a SIDS⁹⁴ (Figure 12). The trade in live corals for aquariums has grown at approximately 9 % per annum since 1990, and on average coral retails at \$56 a piece in the US. Traditionally, the Fiji Islands have been the main source of live rock for import to the US. The value of this trade is \$50 million globally. In the case of sponges, large specimens attract a premium for the bath sponge market and take approximately two years to grow to market size.

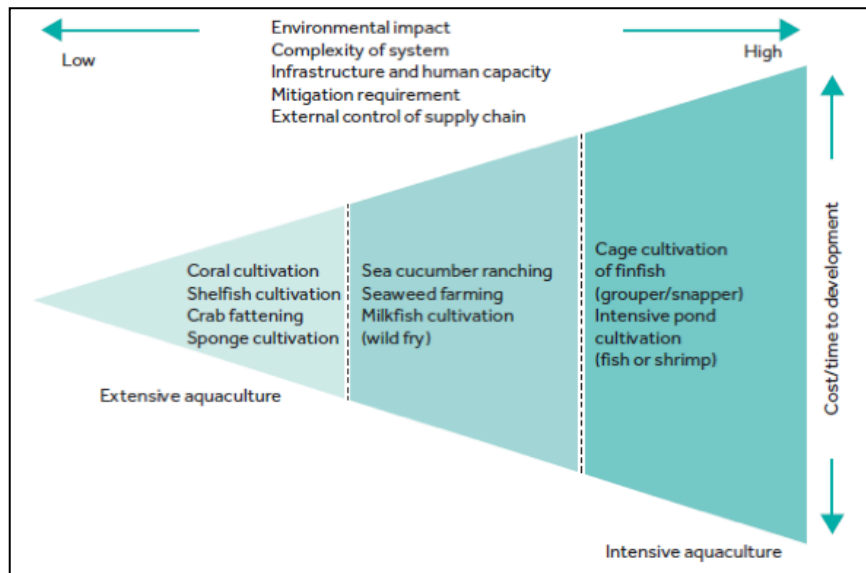


Figure 12 The relationship between the complexity of an aquaculture operation and not it fits into a blue economy framework (adapted from Hughes et al.2016)

The live coral trade will open a potential market for Seychelles maricultured corals. When corals die in the nursery, they can be re-purposed to be sold as live rock, and as part of the development part of the project, sponge species can be tested for mariculture activities

Additional income generating opportunities in the Seychelles business plan include:

- Use of farmed coral carbonate extractions for the medical/pharmaceutical industry
- New projects with the private sector: Thai Union; COI,
- Upcoming project with a 5-star resort as pilot to test feasibility of using CSR funds for long term restoration
- Potential new call for proposals for AF project in Seychelles, using the Sey Debt-for-Adaptation Swop funding mechanism (SeyCCAT), linked to Blue Bonds mechanism

Activities include:

2.1.2.1 Development of a Business Plan and update of MPA strategic plan.

⁹³ Live rock is fragmented pieces of old coral reefs that broke off during storms or by wave action. These pieces then washed into shallower water where they were naturally colonized by marine life such as invertebrates, corals, sponges, and bacteria

⁹⁴ Hughes A, Day JG, Greenhill L, Stanley MS (2016). Aquaculture. Commonwealth Blue Economy Series No. 2. Commonwealth Secretariat, London

Outcome 2.2 Coral farming and nursery facilities established at a sufficient scale for more climate change resilient corals

Output 2.2.1. Donor coral colonies of appropriate species (resilience, maintaining genetic diversity) available at sufficient scale (quantity, time, intervals etc.) for propagation in nurseries

This output includes a technical assessment and selection of coral species for transplantation based on thermal tolerance (survivors of previous coral bleaching events) and genetic analysis of thermal-tolerant *Symbiodinium* clades. In Seychelles, coral reef restoration and nurseries will be implemented within the MPAs, except for one site (Anse Forbans). The other sites are the Curieuse Marine National Park, Cousin Special Reserve, and Ste Anne Marine National Park. The nursery sites will be selected based on the reports on coral reef status, water quality and key environmental and social parameters. Surveys will also be completed to identify coral donor sites. The preliminary locations of the restoration sites are indicated in figures 13, and 14. Surveys will also be completed to identify coral donor sites for locally threatened species.

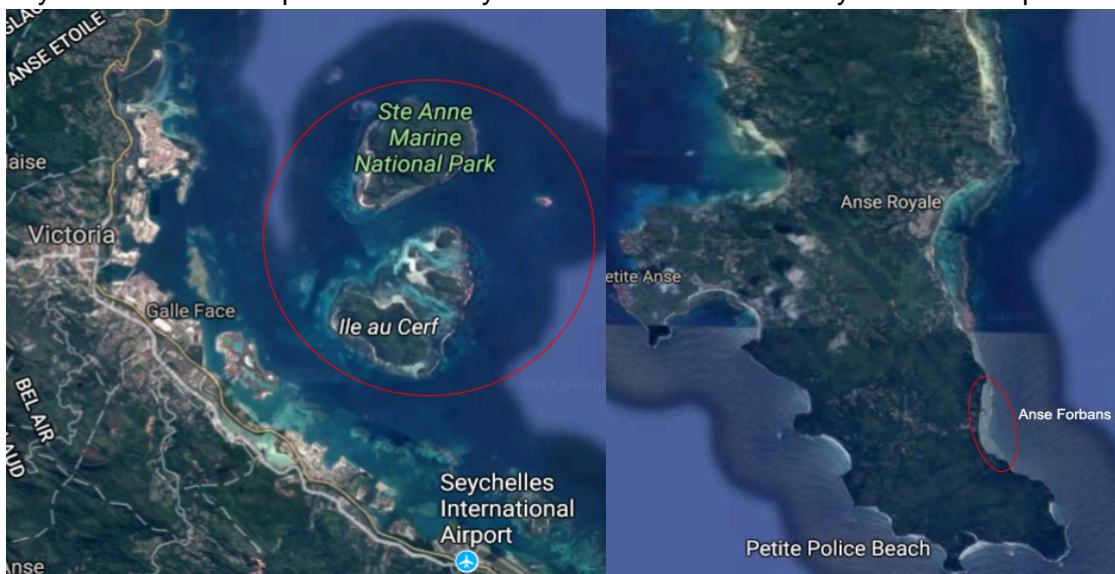


Figure 13 Location of Nurseries at Ste Anne Marine National Park and Anse Forbans reef restoration site

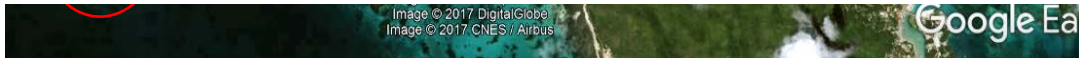


Figure 14: Location of restoration sites at Cousin Nature Reserve and Curieuse Marine National Park (Curieuse and St Pierre islands)

Activities include:

2.2.1.1 Technical assessment and selection of resilient coral species.

2.2.1.2 Identification of donor sites

2.2.1.3 Survey for identification of sea based nurseries

Output 2.2.2. Reports on coral reef status, water quality, and other key environmental and social parameters for potential nursery sites

Sea based nurseries will be set up within the MPAs, i.e. Curieuse Marine National Parks, Ste Anne Marine National Parks and Curieuse Special Reserve. The nursery sites will be selected based on the reports on coral reef status, water quality and key environmental and social parameters.

Activities include:

2.2.2.1 Monitoring of sea water quality and other key environmental parameters at donor and nursery sites.

2.2.2.2 Carrying out the Environmental and Social Impact Monitoring.

Output 2.2.3. A land-based nursery established, and 2 or more ocean nurseries are established and maintained on a regular basis

A land-based nursery will be set up on Praslin. The land-based nursery will be used to propagate massive corals (micro-fragmentation and fusion) and to obtain new coral recruits from collecting coral spawn that can settle on pre-conditioned plates for a future relocation to the ocean nurseries. The ocean nurseries will be filled with nubbins from asexual propagation and eventually will also include nubbins obtained from sexual propagation in the land-based nursery.

Activities include:

2.2.3.1 Setting up of a land-based nursery on Praslin

2.2.3.2 Setting up, populating and maintenance of ocean nurseries (midwater rope type); 10 in Cousin Island; 20 in Curieuse Island and 8 in Ste Anne Island.

Output 2.2.4. Stock of farmed corals available for transplantation

Different species of corals will be farmed (see previous outputs) and total numbers will depend on sites and nursery method. In Seychelles, the project target is to produce at least 20500 coral fragments per year targeting a total of 102,500 corals growing in midwater ocean-based rope nurseries and 1,000 corals growing in the land nursery derived from massive coral micro-fragmentation and asexual reproduction (See Annex 1) by the end of the project.

Activities include:

2.2.4.1 Collection of coral fragments cultures in land-based nursery in Praslin and ocean-based nurseries in Ste Anne, Cousin and Curieuse Islands.

Outcome 2.3 The health of degraded reefs restored, through active restoration work, maintenance and monitoring efforts, leading ultimately to greater protection of shore from flooding and storm damage

Output 2.3.1. Rugosity and structure of reefs restored, leading ultimately to greater protection of shore from erosion.

Farmed corals will be cemented at sites targeted for restoration within the Cousin Island Special Reserve, Curieuse Island Marine National Park, Ste Anne Marine National Park and Anse Forbans. The density of restoration (number of corals per square meters) will depend on the size of corals at transplant time and the status of the degraded reef (see Annex 1). It is however estimated that approximately 4 nursery grown corals will be transplanted per square meter. As such it is estimated that approximately 1 Ha will be restored at Cousin Island, 1 Ha in Curieuse Island (including St Pierre), 0.25 Ha at Ste Anne and 0.25 Ha at Anse Forbans, which totals to 2.5 Ha for Seychelles. It is estimated that around 200m of beach at Curieuse Island, 500m of Cousin Island, 200m at Ste Anne Island and 600m at Anse Forbans will be potentially protected due to the restoration works, in the long term. Monitoring of the coast and the current pattern will be effected in Component 3.

Activities include:

2.3.1.1 Transplantation of farmed corals at restoration sites in Curieuse Island, Cousin Island, Ste Anne Island and Anse Forbans

Output 2.3.2. Recovery of fish population and other reef associated fauna and flora, leading ultimately to improved food security in Seychelles

Under this output, standardized long-term monitoring programs will record the effects of the coral reef restoration effort, mainly coral survival, growth rates and abundance and diversity of reef-associated species. It is expected that the restored sites located in MPAs will have an increase in fish biomass and fish species as a result of the coral reef restoration actions. It is foreseen that these reef fish increases will eventually spill over from the MPAs and become available to fishers. Nearby control sites will also be selected to scientifically quantify the results of the coral reef restoration efforts.

Activities include:

2.3.2.1 Monitoring and maintenance of the restoration sites

2.3.2.2 Monitoring of the restoration site for water quality, live coral cover, fish and other fauna and flora density.

Component 3: Knowledge management and sharing, training and sensitization to build regional capacity for sustainable reef restoration

This component focuses around the need to ensure that experiences built up through Components 1 (Mauritius) and 2 (Seychelles) contribute to the development of a solid base of knowledge on best practices in the use of coral reef restoration as an adaptation measure at both international and regional levels, with particular emphasis on the SIDS. Discussions with stakeholders indicated a need for a better understanding of work undertaken to date in each country, particularly relative strengths and weaknesses of different approaches and their application in different marine environments. The proposed Regional Scientific Advisory Committee (see implementation arrangements) would play an important role in the planning of any research under this component.

The Coastal Oceans Research and Development in Indian Ocean (CORDIO⁹⁵) already has an existing and active Coral Specialist Group. This Group consists of international specialists in coral protection and restoration and is also affiliated to the International Union for Conservation of Nature (IUCN). The project will look into the possibility for the Coral Specialist Group to act as the Regional Scientific Advisory Committee. Further, the project will collaborate with CORDIO on knowledge management and sharing at the Indian Ocean level regarding coral restoration efforts as an adaptation mechanism. The project will share its knowledge products widely with other Indian Ocean states, in particular, with SIDS, while the project expects to learn experience of others through the coral specialist group network established by CORDIO.

In addition, the project will collaborate closely with the Nairobi Convention and the two regional projects that the Nairobi Convention Secretariat is executing, funded by the Global Environment Facility; namely, UNEP-GEF WIOSAP and UNDP-GEF SAPPHERE. Both projects are

⁹⁵ CORDIO was initiated in 1999 as a response to the El Nino related mass bleaching and mortality of corals in the Indian Ocean in 1998. This non-profit research organisation has supported and collaborated in various coral related project in the eastern Africa, Western Indian Ocean islands (including Mauritius and Seychelles), South Asia, Red Sea and Andaman Sea

supporting the WIO coastal and island states on their coastal habitat restoration efforts, including coral reefs, through effective management on the ground. Their interventions may form part of the baseline activities for this adaptation project at least indirectly when the knowledge on climate change adaptation through coral restoration generated by this project is shared widely across WIO countries.

Outcome 3.1 Improved understanding and knowledge management of use of reef restoration as an adaptation measure

Output 3.1.1. Comparative review and analysis of coral reef restoration initiatives in the region and globally, with gaps in knowledge identified.

A review of coral reef restoration initiatives in the region and globally will be undertaken at the start of the project to identify factors determining success, constraints and obstacles, lessons learned, and cost/benefits of different approaches. Emphasis will be given on assessing applicable methods and experiences in scaling up successful approaches as adaptation measures. Understanding of restoration as a coral reef conservation intervention, and increasingly as an adaptation measure, is evolving rapidly. During the inception phase of the project it will be important to take stock of progress made in order to learn the most recent lessons and adapt the planning for project activities accordingly.

Activities include:

3.1.1.1 Comprehensive review of coral reef restoration in the region and globally.

Output 3.1.2. Based on past and ongoing coral reef restorations efforts undertaken by the project and others, science-based best practice and methodologies (e.g. factors determining success in coral restoration are known; cost-effective approaches, etc.) developed, constraints and challenges identified, and lessons learned documented.

In this output, a comprehensive review of past and ongoing coral reef restoration efforts will be developed and disseminated, including constraints, challenges and lessons learned.

Activities include:

3.1.2.1 Development and publishing of methodology/guidelines for coral restoration in Mauritius and Seychelles, based on past restoration efforts, best available science and practices.

Output 3.1.3. Research undertaken to provide information to guide restoration and enhance reef resilience where required (e.g. spawning seasons and coral recruitment patterns, resistant/resilient species and clades)

Knowledge gaps in the taxonomy and ecology of corals will be identified and research will be undertaken to fill these, where this is necessary, for successful coral reef restoration (e.g. identification of coral species that are resistant or resilient to bleaching; genetic connectivity of species; spatial and temporal variations in coral spawning and recruitment). It will be useful to develop a better understanding of why adjacent sites may have widely different coral cover and be affected in very different ways by bleaching events.

Previous studies⁹⁶ on ocean currents and seasonal currents in the Indian Ocean suggest that there is connection between the different islands in the SWIO region. If some coral species are found to be genetically identical, the propagation and maintenance of common coral stocks in

⁹⁶ Smith WH and Sandwell DT (1997) Global seafloor topography from satellite altimetry and ship depth soundings. *Science* 277: 1957-1962

both countries could spread the risk during future disturbance events. On the other hand, in case the coral stocks from the different islands are unique, then these stocks should be preserved.

In addition to using species already shown to be resilient, further studies will be undertaken (e.g. identification of bleaching-resistant clades of zooxanthellae) to identify other suitable species and strains. This will also enable information on the coral fauna of both countries to be updated and coral distributions mapped. A regional WIO field guide would be a useful output and could contribute to the development of coral reef restoration in other parts of the region. In both countries, the maintenance of coral nurseries will be critical to success and this component will also address the need for rigorous maintenance programmes at each nursery site. Coral nurseries attract biofouling which is a major impediment to the growth of the corals, but research undertaken through the Nature Seychelles project has shown that increased presence of fish, attracted by the nursery, helps to control biofouling and thus can reduce the person-hours needed for nursery cleaning. Higher abundance of large fish (total number of individuals) resulted in 2.75 times less person-hours spent in nursery cleaning⁹⁷.

Activities include:

3.1.3.1 *Study in genetic connectivity among Mauritius, Rodrigues and Seychelles*

3.1.3.2 *Study in the coral spawning and recruits in Mauritius, Rodrigues and Seychelles*

3.1.3.3 *Study in the identification of bleaching resistant clades of zooxanthellae.*

Outcome 3.2. Improved understanding within the WIO and globally of successful approaches to reef restoration, the constraints and challenges, with lessons learned incorporated into new initiatives

Output 3.2.1. Lessons learned in coral reef restoration documented and shared

The lessons learned in each country will be compiled, documented and shared and made available widely, both in the region and globally, and will contribute to the existing documentation on coral reef restoration (e.g. Caribbean restoration manual⁹⁸, World Bank guidance⁹⁹; papers presented at 13th International Coral Reef Symposium, ICRS, in 2016).

Activities include:

3.2.1.1 *Creation and maintenance of project website*

3.2.1.2 *Short clips and documentary film on the project implementation in Mauritius and Seychelles. Same will be used for showcasing the project nationally, regionally and globally.*

3.2.1.3 *Participation in relevant international symposium.*

Output 3.2.2. Coral Reef Restoration Tool Kit and manual for use in the WIO, published and disseminated

⁹⁷ Frias-Torres S, Goehlich H, Reveret C, Montoya-Maya PH. 2015. Mid-water coral nurseries recruit reef fish assemblages in Seychelles, Indian Ocean. *African Journal of Marine Science* 2338:1–6. doi: 10.2989/1814232X.2015.1078259.

⁹⁸ Bowden-Kerby, A. 2014. Best Practices Manual for Caribbean Acropora Restoration. Punta Cana Ecological Foundation, 40pp.

⁹⁹ Edwards AJ (2010) Reef rehabilitation manual. Coral Reef Targeted Research and 530 Capacity Building for Management Program. St Lucia, Australia. ii + 166 pp.

During the USAID-funded Reef Rescuers Project, Nature Seychelles produced a Coral Reef Restoration Toolkit¹⁰⁰ for the methodology that it is currently using at Cousin Island. The Toolkit will be updated with guidance for wider applicability in the WIO, including a broader discussion of approaches and methodologies. The updated Coral Reef Restoration Toolkit will be published online, and available to the public.

Activities include:

3.2.2.1 Updating and online publishing of the Coral Reef Restoration Toolkit

Outcome 3.3. Regional capacity developed for sustainable and climate resilient coral restoration

Output 3.3.1. Regional training workshops undertaken on monitoring, DNA-based approach for the identification of resilient corals, and other topics as appropriate

Regional technical training workshops, involving individuals from other countries in the Indian Ocean (particularly the SIDS) will be held on a range of relevant topics as determined during the project. Priority will be given to training on methods of coral farming and transplantation, using the experiences and lessons learned gathered in Mauritius and Seychelles. If appropriate, the training programme could be developed in such a way that a Certificate of Competence could be awarded to participants.

Mauritius has the institutional capacity to undertake genetic research of coral *Symbiodinium* clades, while currently Seychelles does not – hence the advantage of a regional approach. Seychelles will be involved in this component, providing assistance and building research capacity through knowledge exchange with Mauritius. Moreover, Mauritius will carry out a feasibility study for setting up of genetic laboratories in Seychelles, namely at the Seychelles Fisheries Authority and the University of Seychelles. Until Seychelles sets up its own genetic laboratory, an MOU will be signed between Mauritius and Seychelles so as genetic analysis could be effected by Mauritius for Seychelles at a preferential cost.

Seychelles will provide for a regional training on micro fragmentation and fusion of massive corals to the Mauritian counterpart.

Activities include:

3.3.1.1 Regional training on genetic/clade analysis

The scope is to build capacity of stakeholders from Mauritius and Seychelles in carrying out genetic/clade analysis to identify resilient coral species and also the feasibility of sexual propagation of corals in land-based nurseries. A genetic expert will be recruited to assist in the study and build capacity of the Mauritian and Seychelles Stakeholders. The lead government institute will be Mauritius Oceanography Institute (MOI). Beneficiaries will include staff of the Ministry of Ocean Economy, Marine Resources, Fisheries and Shipping (MOEMRFS) of Mauritius, the Seychelles National Park Authority (under the Ministry of Environment and Climate Change of Seychelles), Nature Seychelles, MCSS and some participants from the WIO region who are active in coral restoration work in the region.

¹⁰⁰ Frias-Torres S, Montoya-Maya PH, Shah N.J (Eds.) 2015. Coral Reef Restoration Toolkit: A Field-Oriented Guide Developed in the Seychelles Islands. Nature Seychelles, Mahe, Republic of Seychelles.

3.3.1.2 *Regional training on coral farming and transplantation*

A regional training on coral reef restoration using standardized methodology and lessons learned and best techniques used, to representative of the WIO region countries involved in coral reef restoration. The lead institution will be MOEMRFS in Mauritius

3.3.1.3 *Regional training on micro-fragmentation*

Building capacity of Mauritian counterparts on proper method of micro-fragmentation. The lead institution is Nature Seychelles.

3.3.1.4 *Feasibility study of setting up of genetic laboratory in Seychelles.*

MOI will carry out a feasibility study for setting up of genetic laboratories in Seychelles, namely at the Seychelles Fisheries Authority and the University of Seychelles, for capacity transfer.

Output 3.3.2. Sustainable long-term monitoring programme developed and underway for restored reefs, based on international/regional protocols and best practice

Comparative monitoring across both countries will increase knowledge about the effectiveness of the propagation and restoration methods. This will assist in the evaluation of the project. Appropriate indicators must be selected, building on global experience and ensuring that socio-cultural, economic, and governance considerations are included so that the efficacy of coral restoration as a tool to promote coral reef resilience and ensure the sustainable delivery of coral reef ecosystem services is assessed.¹⁰¹

Mauritius and Seychelles will develop a Regional Coral Reef Restoration Plan, which will include national components. This Plan will enable both countries (i) to have a long-term National plans for coral reef restoration works for the whole country; (ii) to improve policy, institutional framework and enforcement of coral reef protection in each country and in the region; (iii) set up long-term monitoring of restoration and coral reef ecosystem; (iv) to devise a sustainable financial mechanism to future restoration works; and (v) establish a domestic and regional network and collaboration for regional research, knowledge and expertise exchange, and transfer of knowledge, expertise and equipment (e.g. GIS, drone, ADCP, WTR etc.).

The study in current pattern and spatio-temporal study of the coasts in Mauritius and Seychelles will be used as planning tool for the regional coral reef restoration plan. These will enable to identify strategic location for future restoration works, without having negative impacts on the coast. Furthermore, it will also enable to identify location where hybrid reef structures could be used for future coastal protection works and thus enhancing coastal protection.

Activities include:

3.3.2.1 *Carrying out a spatio-temporal study of the coast at the restoration sites to monitor the long-term impact of the restoration works on the coast.*

3.3.2.2 *Carrying out the current pattern for Mauritius, Rodrigues and Seychelles, which will be a planning tool to be included in the Regional Coral Reef Restoration Plan.*

3.3.2.3 *Review the legislative and legal framework of each country*

3.3.2.4 *Preparation of a Regional Coral Reef Restoration Plan.*

Outcome 3.4. Monitoring and Evaluation

Project Monitoring and Evaluation has been detailed in Section III: D.

¹⁰¹ Hein, M. Y., Willis, B. L., Birtles, R. A., Beeden, R., 2016. Characterising coral restoration effectiveness: a review of current limitations and challenges at a socio-ecological scale. Paper presented at Int Coral Reef Symp, Hawaii.

B. Promotion of new and innovative solutions to Climate Change Adaptation

As Small Island Developing States (SIDS), Mauritius and Seychelles are very vulnerable to climate change. For several decades, it was observed that accentuated beach erosion has shrunk the width of beaches around certain coastal areas, coral reefs are in a state of deterioration and there has been a steady decrease in fish catches, especially in artisanal fisheries partly due to climate change. As such, there is an urgent need to develop new capacities to restore the ecosystem services lost after coral bleaching and build resilience.

When reefs have been damaged by human use or misuse, removing or mitigating the anthropogenic stressors responsible for decline may enhance natural recovery. Both Mauritius and Seychelles have a number of measures underway that will indirectly or passively improve coral reef health, including the establishment of networks of MPAs, pollution mitigation projects, fisheries management, introduction of ICZM and coastal development regulation activities. Mauritius has established 3 Marine Protected Areas (MPAs) protecting 51.5 km² of the lagoon and 82.7 km² of Fishing Reserves; and Seychelles has established 6 Marine National Parks covering 61.77 km² and 3 Special Reserves covering 350.98 km².

It has been however observed that the recovery of the coral reefs ecosystem, even in MPAs, do not occur fast enough before an unpredicted damaging event occurs, such as coral bleaching. This results in increasingly poor health of the reef and reduced resilience to both further climate-induced events and to local anthropogenic impacts. In such situations, “active” restoration becomes the only option to initiate the rehabilitation of degraded reefs and protection of their ecosystem services. It has become clear that if reefs are to be able to continue providing the key ecosystem services of fisheries, tourism and coastal protection, a more active form of reef restoration should be attempted. In this project, the restoration of the reef ecosystem will be through implementation of both passive as well as active restoration measures.

The project will provide for active restoration of coral reefs, through coral nurseries / gardening. This will help prevent further degradation and advance the natural recovery process in injured or damaged habitats. The coral gardening concept consists of *in situ* and *ex situ* mariculture of coral fragments, followed by transplantation into degraded reef sites, using a two-step restoration strategy. In the first step, large *in situ* pool of farmed corals will be established in both Mauritius and Seychelles. These nurseries will be installed in sheltered zones, and the different types of coral recruits will be maricultured. In the second step, nursery-grown coral colonies will be transplanted to degraded reef sites.

To further increase the success rate of transplantation, corals will also be harvested *ex situ* in land-based nurseries through sexual and asexual reproduction. Farming corals on land reduces risks that ocean-based nurseries are exposed to, such as storms, or warming events. Moreover, many coral species that serve as critical building blocks for reefs (such as Brain or Great Star corals) grow too slowly to be feasible for restoration projects using only ocean-based nurseries. To accelerate this growth, Seychelles will be using microfragmenting process so as to grow these corals in months rather than decades. Both countries will be “seeding” reefs with sexually reproduced coral offspring, with the aim to help maintain corals' genetic diversity which in turn maximizes their ability to adapt to future conditions. Furthermore, working with sexual coral restoration has the great potential to produce huge numbers of coral offspring from one coral spawning event.

Coral reef restoration activities will be focused on sites located at Marine Protected Areas (MPAs) in Mauritius and Seychelles since:

- i) they provide a protected environment, so the effects of the coral reef restoration activity can be scientifically quantified without interference from confounding factors (i.e. fishing, anchor damage from boats, runoff pollution, etc), and the coral reefs restored there will also be protected as per MPA regulations;
- ii) they have an existing ecotourism infrastructure so any increase in job opportunities and benefits to locals can be incorporated quickly within the MPA system, and
- iii) they are ideal locations to showcase the coral reef restoration work for educational, capacity building and ecotourism purposes because there's already a communication infrastructure in place for them

The work in Mauritius will be innovative in that it will demonstrate how this relatively new adaptation measure could be rolled out in a larger number of communities on a sustainable basis. Involving communities fully in reef restoration programmes is a key component of the project. Local communities will be actively involved in the process, providing local partners with outreach tools to facilitate community engagement. Integrating the communities that are impacted by this work is critical to making any restoration and conservation efforts successful in the long-term. In Seychelles, coral transplantation will be based from its previous large-scale coral reef restoration experience to target larger scale, sustainable, business approach to coral restoration.

Since coral reef ecosystems are complex and the processes affecting recovery potential are varied (e.g. water quality, local disturbances, habitat structure), the project will be undertaking a multifaceted, research-based approach to developing successful restoration tools and methodologies. The regional and international community will be engaged for the evaluation of the restoration efforts through convening session on coral reef restoration at major international symposia; and publishing peer-reviewed articles and technical documents and hosting websites on damage assessment, mitigation, and restoration approaches and the efficacy of various restoration projects.

Some restoration projects have been previously implemented in Mauritius and Seychelles. However, these efforts have been sporadic, disparate, lacked coordination and there has been an absence of a harmonized monitoring methodology. This project aims to study and apply coral restoration techniques and practices on a larger scale, integrating coordinated conservation, education and outreach efforts. The project will establish a Regional Coral Reef Restoration Plan, which will include national components. This Plan will enable both countries (i) to have a long-term National plans for coral reef restoration works for the whole country; (ii) to improve policy, institutional framework and enforcement of coral reef protection in each country and in the region; (iii) set up long-term monitoring of restoration and coral reef ecosystem; (iv) to devise a sustainable financial mechanism to future restoration works; and (v) establish a domestic and regional network and collaboration for regional research and knowledge and expertise exchange.

C. Economic social and environmental benefits

Table 3 Specific expected benefits of the proposed project outlined for Component 1–3.

Component	Economic benefits	Social benefits	Environmental benefits
1. Enhancement of food security and reduction of risks from natural disasters through the restoration of degraded reefs in Mauritius	Coral nursery set up and maintenance provides tourism value-addition and income Restoration of ecosystem	Reduction of coastal inundation risk for vulnerable communities on the coast Increase in skills and	Increase resilience of coral reefs Protection of reef biodiversity

Component	Economic benefits	Social benefits	Environmental benefits
	<p>services provided by reefs increase availability of commercial reef fish in the long term</p> <p>Ecosystem services provided by healthier and more resilient reefs continue to provide coastal protection services of a substantial value plus reduce the infrastructural costs of adaptation (i.e. sea walls, beach replenishment) in the long term</p>	<p>expertise as well as employment opportunities and alternative livelihood options for local fishers, women and youth in coral reef restoration</p> <p>Increase in fish catches lead to improvements in (1) food security and livelihoods (2) health and quality of life indicators (3) help maintain social cohesion and the traditional artisanal fisheries sector.</p>	<p>Maintenance and restoration of essential ecosystem provisioning and regulating services</p>
2. Enhancement of food security and reduction of risks from natural disasters through the restoration of degraded reefs in Seychelles	<p>Coral nursery set up and maintenance provides tourism value-addition and income</p> <p>Restoration of ecosystem services provided by reefs increase availability of commercial reef fish in the long term</p> <p>Ecosystem services provided by healthier and more resilient reefs continue to provide coastal protection services of a substantial value plus reduce the infrastructural costs of adaptation (i.e. sea walls, beach replenishment) in the long term</p>	<p>Reduction of coastal inundation risk for vulnerable communities on the coast</p> <p>Increase in skills and expertise as well as employment opportunities and alternative livelihood options for local fishers, women and youth in coral reef restoration</p> <p>Increase in fish catches lead to improvements in (1) food security and livelihoods (2) health and quality of life indicators (3) help maintain social cohesion and the traditional artisanal fisheries sector</p>	<p>Increase resilience of coral reefs</p> <p>Protection of reef biodiversity</p> <p>Maintenance and restoration of essential ecosystem provisioning and regulating services</p>
3. Knowledge management and sharing, training and sensitization to build regional capacity for sustainable reef restoration	<p>Increase in availability of regional expertise decreases the costs for external know-how</p> <p>Regional expertise increases and becomes a valuable resource within the WIO and on the global stage.</p>	<p>Adaptive capacity of coastal communities to climate change increased</p> <p>General raising of awareness of importance of ecosystems services to the community and the need for an enhanced role by the community in their maintenance.</p>	<p>Increased regional scientific knowledge on coral reef restoration in the face of climate change leading to a better understanding and delivery of an effective ecosystem-based management approach for the marine environment.</p>

Economic benefits

The introduction of an ecosystem-based adaptation measure in the form of coral restoration will have a range of long-term economic benefits. Coral reef restoration will ensure that the majority of the population in Mauritius and Seychelles who depend on reef fishes for protein, will still have such critical source of food and income. It will ensure that the aesthetic value of coral reefs, which are an important component of the tourist industry in both countries is retained, while maintaining ecosystem function for the provision of beaches and marine-based leisure

activities. In both countries, direct beneficiaries will include not only those employed directly in the tourism industry, but also their dependents (as a result of job security and the maintenance of current quality of life).

Tourism value-addition and commercialisation of grown corals

In Mauritius, the project lays great emphasis on a partnership approach, which the hotels will be able to benefit from through Outcome 1.1 “Improved livelihoods for a sustainable partnership and community-based approach to reef restoration”. Over the past few years, hotels have expressed a very keen interest in engaging in coral reef restoration efforts. By building the capacity of local stakeholders – scientists in the concerned government agencies, NGO researchers and university graduates as well as community members – the project will provide hotels with the opportunity to tap into a larger and stronger pool of expertise and skilled workers in coral reef restoration. At the same time, supporting coral reef restoration efforts provides value addition to the hotels, which can market this as part of their social responsibility efforts.

The proposed project will link up with the Mauritian Governmental budgetary measure in 2017¹⁰² to promote development of alternative livelihood opportunities for coastal communities through coral farming by fishermen and Small and Medium Enterprises (SMEs). A budget (Government budget) of USD 242,000 has been earmarked for this purpose. In the long run, this budgetary measure is expected to provide a viable source of income for inhabitants along the coastal zone.

Through the Seychelles business plan, large-scale coral reef restoration will generate income through:

- Mass-Production and sell of farmed fast-growing corals for reef restoration and for the aquarium trade (CITES compliant)
- Leverage other opportunities in mariculture, notably low trophic level species, with facilities and capacity available
- Provide training and boot camp learning programs for national and international trainees in coral mariculture and coral reef restoration.
- Partner with hotel resorts and other private sector businesses for coral reef restoration using CSR funds
- Use of farmed coral carbonate extractions for the medical/pharmaceutical industry

Restoration of ecosystem services provided by reefs increases availability of commercial reef fish in the long term

In Mauritius, fisheries related to coral reefs has been estimated to contribute USD 12.16 million annually to GDP and in Seychelles artisanal fisheries represent an average of 1-2% of the annual GDP. With the presence of other management measures, the anticipated long-term improvement in reef-based fisheries as a result of coral restoration will also have economic benefits with the artisanal fishery sector most directly concerned.

Ecosystem services provided by healthier and more resilient reefs reduce the infrastructural costs of adaptation (i.e. sea walls, beach replenishment) in the long term

The project will also provide economic benefits in terms of savings on coastal infrastructural solutions for climate change adaptation. Reef building corals form solid calcium carbonate skeletons, which act as an effective method of dissipating destructive wave energy. Currently,

¹⁰² Government of Mauritius – Budget Speech 2017-2018.

12.2 km² of built-up land, 11.8 km² of expansion areas, 60 km of primary and 80 secondary roads are at risk of coastal inundation¹⁰³. It is estimated that up to 36 hotels are considered potential elements at inundation risk, 6 at landslide risk and 8 at flood risk, while 17 percent of beaches representing 13% of the coastline are suffering from long-term erosion¹⁰⁴. Pointe d'Esny, a locality located close to Blue Bay Marine Park earmarked as a rehabilitation site, has been designated as vulnerable for coastal erosion at a rate of over 0.2 meters per year¹⁰⁵.

Rates of sea level rise around Mahe in Seychelles have been measured at 1.46 mm a year¹⁰⁶. Flooding in the coastal areas of Seychelles is already increasing, affecting many of the most populated locations because these are concentrated on the low-elevation coastal areas, and there are predicted to be large relative increases in flooding in the small island region of the Indian Ocean¹⁰⁷. Of the 86% of the Seychelles population living on Mahe, around 60% of people live in coastal areas; the remaining 14% of the population live mostly on Praslin and La Digue and almost all people live in the narrow coastal plains. Thus around 75% of the population may be considered vulnerable to climate change risks and in need of adaptation measures.

Not only does coral reef act as a regenerating protective barrier in regions prone to strong currents and harsh weather, but it also creates vast quantities of beach material to counteract the erosion of land. The protected land and waters benefit economically via tourism and cultivation of habitats for fisheries.

Social benefits

The project will respond to the needs of vulnerable groups in each country. In Mauritius 8.5% of the population is below the national poverty line¹⁰⁸. In Seychelles, the poorer groups within the community comprise 39.3% of the population who live under the Basic Needs Poverty Line¹⁰⁹.

Many of these groups are the most vulnerable to coastal flooding either because they live on the shoreline or in reclaimed areas of wetlands at risk of flooding or because the structures they live in are not robust enough to withstand flooding. Infrastructure that is immediately adjacent to the beach is at risk, and there is clear evidence of this in some areas, with seawalls collapsing and erosion of roadbeds, especially after storms. Beaches are critically important as a first line of defence for coastal infrastructure, and the restoration of coral reefs will help to maintain these through the provision of coral sand.

¹⁰³ Japan International Cooperation Agency Kokusai Kogyo Co. Ltd., "Guideline for Climate Change Adaptation Strategy - Coastal Setback" (2016) The Republic of Mauritius Ministry of Environment, Sustainable Development, And Disaster and Beach Management

¹⁰⁴ Republic of Mauritius "Third National Communication", 2016

¹⁰⁵ The Project for Capacity Development on Coastal Protection and Rehabilitation in the Republic of Mauritius by JICA (Japan International Cooperation Agency), 2015

¹⁰⁶ Chang-Seng, D. 2007. Climate Change Scenario Assessment for the Seychelles, Second National Communication (SNC) under the United Nations Framework Convention on Climate Change (UNFCCC), National Climate Change Committee, Seychelles.

¹⁰⁷ Nicholls, R.J. & Hoozemans, F.M.J. 2002. *Global Vulnerability Analysis*. In Schwartz, M. (Ed). Encyclopedia of Coastal Science, Kluwer Academic Publishers.

¹⁰⁸ <https://www.undp-aap.org/countries/mauritius>

¹⁰⁹ www.nsb.gov.sc National Bureau of Statistics, Seychelles. Poverty Report for the Household Budget Survey 2013

The project will also provide some alternative livelihood options for those communities and individual in the vicinity of the MPAs or even from neighbouring areas who can work at the nurseries and on the restoration process (see below).

Disaster risk reduction for vulnerable communities on the coast

In Mauritius, the targeted coastlines to be protected include:

- the Mahebourg region (Mauritius) – It is located next to the Blue Bay Marine Park which was earmarked as a rehabilitation site. It has been designated as a vulnerable coast, with 1442 persons likely to be affected by coastal inundation by 2065.
- the SEMPA Region (Rodrigues) – The population of the region is 4,661.

The above target areas host small businesses comprising tourism enterprises and hotels, which are at risk from flooding from increased storm surges due to climate change, and in a long-term, from the sea level rise. According to a DRR study carried out in 2012 in Mauritius, some 12.2 km² of built-up land and c. 11.8km² of expansion area in the Mauritius Island are exposed to high or very high hazard of inundation. The exposure is relatively lower in Rodrigues Island, with 0.56 km² of build-up areas being exposed to higher hazard levels. Considering the sea level rise increase scenarios (from 2.5 to 6m a.s.l), the population exposed to inundation ranges from 22,800 to 63,400 people in Mauritius and 800 to 1,800 in Rodrigues. It was estimated the annual damage cost due to extreme case of inundation in Mauritius arise to USD 25 million and USD 0.7 million in Rodrigues. The study didn't include the potential expected medium-term impacts (by floods due to storm surges, before the permanent inundation), but most of the areas that are expected to be inundated permanently (due to sea level rise) will be subject to the flood damages by storm surges.

In Seychelles, the entire coastline of the nation is vulnerable to climate change and its vulnerability increasing due to the loss of coral reefs. According to the Centre for Research on the Epidemiology of Disasters database, the economic damages caused by tsunami that hit Seychelles in December 2004 was estimated at approximately USD 30,000,000. With its terrain and population distribution, most of its c. 95,000 population is vulnerable to coastal erosion, coastal floods and storm surges, but the hardest hit would be its urban dwellers (+/- 40,000 in Seychelles). Further, the World Bank estimates about 200 small businesses enterprises, especially tourism enterprises which tend to be located near the beach or waterfront establishments, is subject to the highest risk from floods resulting from increased storm surges. They are as vulnerable as coastal population; thus, would benefit equally from the adaptation interventions.

Further, the two most important economic sectors, tourism and fisheries, both depend largely on the healthy corals. There is a high dependency on tourism as a means of generating employment, foreign exchange and economic activity in Seychelles. This reliance on tourism has also spread across sectors, with resources in agriculture and forestry largely being seen as a means to generate activity in tourism, while further growth in ports and coastal transport now directly hinges on increased activity from cruise and leisure vessels. For the most part, there does not appear to be any sign that this reliance on tourism will subside. Thus, the entire nation is, but most significantly, coastal communities are, clearly vulnerable to fluctuations in tourist activity, which could most certainly decline with the lost of corals and eroded coastlines in the future. Thus, the coral restoration activities will – in a long-run – address the vulnerability of the most important economic sector of the country.

The healthy corals are also important for the country's fisheries sector, especially, for the small-scale fisheries, in which second most concentration of economic activities, just after tourism, is observed.

The target coast lines to be protected by the project are located on Anse Forbans, Ste. Anne Island, Curieuse Island, and Cousin Island, of which only at Anse Forbans (and nearby Takamaka) there reside local communities (2,825 people) directly affected by (and involved in) coral restoration activities. At Anse Forbans, climate change vulnerability of communities is increasing as they lose coral reefs. Therefore, they are committed to engaging in coral restoration activities themselves to increase natural capital's ability to reduce the impacts of climate change.

For all other locations chosen to pilot active coral restoration efforts, the locations are chosen by their high probability of coral survival, thanks to the strong level of protection measures established for the conservation and management of coastal and marine ecosystems in these areas. In order to expect the most successful and fastest coral restoration results to be achieved from the pilot activities during the limited project implementation period, it was important to select these sites. Also, the corals at these sites support the high-end tourism, which is very important for the Seychelles overall economy.

Increase in skills and expertise as well as employment opportunities and alternative livelihood options for local fishers, women and youth in coral reef restoration

Under Outcomes 1.1 and 2.1, fishers, women and youth from local communities will be trained in the establishment and maintenance of coral nurseries and the importance of maintaining corals and coral reef. The vast majority of registered fisher folks are men, although there are some fishing villages that include registered fisherwomen. Although most are not at sea on fisher pirogues, women have traditionally been active users of coastal resources through gleaning, including crabs and bivalves which provide complimentary source of food for the household. Moreover, octopus fishing is an important economic activity among women in Rodrigues. These activities have been gradually decreasing as resources have been degrading and economic and social structures as well as cultural habits have changed. However, these types of activities remain alive in some areas of the country, particularly in more remote coastal communities with direct access to the sea.

The interventions under this project in both countries will increase the skill set and expand employment opportunities available to these coastal communities who may be able to provide their services to private sector stakeholders beyond the duration of the project. It will also reduce their dependency on fishing while protecting the very resources they depend on.

Increase in fish catches lead to improvements in (1) food security and livelihoods (2) health and quality of life indicators (3) help maintain social cohesion and the traditional artisanal fisheries sector

Women and men in coastal villages have historically relied on fishing as their main source of income before the advent of tourism. Coastal fisheries include lagoon and outer reef areas are the main source of fresh fish supply. The project will lay special emphasis on local fishers and boat operators who reside in socio-economically deprived neighbourhoods adjacent to the sites. Fishers and tourist boat operators are particularly at risk for the consequences of climate change and coral bleaching as these impacts threaten the very basis of their revenue.

Increased shoreline protection as a result of the proposed interventions, as well as improved biodiversity indicators will help preserve traditional artisanal fishing and coastal gleaning and

secure coastal food security. The inclusion of women in local decision-making forums will help support progress towards gender equality goals and gender considerations in climate change.

Local targeted communities in Mauritius, Rodrigues and Seychelles will also benefit from awareness raising activities. The resulting mobilization around coral reef restoration can act as a focal point for reef and lagoon resource management and empowerment and expand the coral restoration effort nationwide.

In Mauritius and Seychelles, the extensive progress in improving human development conditions risk being rolled back by climate change. With the proposed project, reef restoration will in the long-term build the adaptive capacity of coastal communities to climate change (reducing the need for investment in costly structural solutions, such as coastal sea walls). As a result of this approach, finance can be diverted to increase social welfare e.g. education and health. In the absence of this project, the country would have been forced to make continuous reactive and ad-hoc expenditures to address the loss and damage to infrastructure.

Environmental benefits

Increase resilience of coral reefs

Environmental benefits are inherent in the ecosystem-based adaptation approach proposed in the project, as it will result in increased resilience of coral reefs, protection of reef biodiversity and maintenance and restoration of essential ecosystem provisioning and regulating services.

Protection of reef biodiversity

Marine Protected Areas have been established in Mauritius and Seychelles to maintain the marine ecosystem, including the reef ecosystem and conservation of marine biodiversity, amongst other. Carrying out coral reef restoration activities in MPAs will boost the conservation factor since these areas are already legislated. This will provide opportunity for capacity building of reef restoration in the region.

Maintenance and restoration of essential ecosystem provisioning and regulating services

Mauritius will benefit from Seychelles experiences in the professional training in reef restoration techniques. Seychelles will benefit from Mauritius experiences in setting up a land-based nursery and community ventures, and laboratory facilities (e.g. coral genetics, identification of resistant clades and larval propagation). The advantage of the regional approach will thus reside principally in the development of real cooperation within a sector where long term success and capacity building requirement need to be ensured.

The project is compliant with the Environmental and Social Policy of the Adaptation Fund. As described in Section II: L, it will avoid negative impacts relating to the environmental and social principles identified by the Fund. For details on how the project will adhere to the Environmental and Social Policy of the Adaptation Fund, please see Section II: L.

Regional and Global Benefits

The project will have some regional and global benefits in terms of training opportunities, enhance expertise, replicability in the region and transfer of skills, amongst others.

The development and implementation of regional capacity building and training programme will be aiming at strengthening the local expertise, institutional capacities and training for scientific and managerial skill, etc. Best lessons learned and practices from this project could be transferred and replicated throughout the region as well as globally to benefit of many countries needing to address climate change adaptation.

This project will under-pin the broad geographic approach put in place by other regional projects (e.g. WIOSAP IMP, ASCLME and UK SOLSTICE-WIO¹¹⁰) but more specifically focused on the protection, restoration and management of critical coral reefs, and the engagement of communities in the process. The AF coral reef restoration project will provide a tried, tested and proven demonstrations and technology and would provide valuable knowledge and lessons for upscaling and coordinating various restoration efforts, which are required to realize the expected adaptation benefits at scale in the region.

The project will also look into the genetic connectivity of coral species between Mauritius, Rodrigues and Seychelles. It is suspected that this connectivity goes beyond just the Mascarene Islands and is almost certainly driven by the South Equatorial Current which may bring larval renewal from Chagos and, as it 'hits' Mauritius first, means, that Mauritian corals may be of vital significance to seeding other parts of the WIO.

To ensure the sustainability as well as the cost effectiveness to realize potential regional benefits beyond Mauritius and Seychelles, the dissemination of knowledge, best practices and lessons learned in the region will be done in partnership with existing relevant regional organizations and institutions such as the Nairobi Convention, CORDIO, WIOMSA and the Indian Ocean Commission. The AF investments through this project will provide useful information on climate change adaptation benefits through coral restoration activities, on socioeconomic benefits to coastal communities and on scalability of various coral restoration efforts, which are all critical to successfully upscale ongoing coral restoration activities in the region. While there are a number of more location specific, often once-off, coral restoration efforts in the region, few had focused on its climate change adaptation impacts or their scalability with community and stakeholder engagement.

D. Cost-effectiveness analysis

The project is designed to up-scale coral reef restoration using best practices and to build national and regional capacity for using this adaptation measure more widely to reverse the trend of rapid decline in reef health and thus ultimately improve shore protection and food security ecosystem services that coral reefs provide. Ecosystem restoration is increasingly recognised as being a more cost-effective approach to building long-term adaptation to climate change impacts, than developing hard engineering and expensive technological solutions. Therefore, the proposed project is considered as a key catalytic investment in climate change adaptation.

The cost of coral reef restoration varies significantly according to method, objective and location, as does the cost effectiveness of the methods used, but as the number of initiatives increase and further research is undertaken, costs are reducing as greater experience is

¹¹⁰ Implementation of the Strategic Action Programme for the protection of the Western Indian Ocean from land-based sources and activities started in 2017); Agulhas and Somali Current Large Marine Ecosystems Project (ASCLME, 2008-2014); WIO LME SAP Policy Harmonization and Institutional Reform (SAPPHIRE, 2017-2023); and other initiatives such as Sustainable Oceans, Livelihoods and food Security Through Increased Capacity in Ecosystem research in the Western Indian Ocean (SOLSTICE-WIO) started in 2017.

gathered. Preliminary costs of restoration have been assessed in Mauritius (USD100/m² rehabilitated reef; USD565/nursery unit)¹¹¹ and Seychelles (approx. USD153/ m²)¹¹² based on work to date, but these figures are not directly comparable as they have been estimated in different ways. Nevertheless, they are broadly comparable with estimates obtained from meta-analyses of studies which have resulted in costs of about USD115/m² according to one study of 52 coastal restoration efforts¹¹³. A more detailed study of 71 coral reef restoration efforts¹¹⁴ is also available which provides a range of estimates for different situations.

The cost of global coral reef restoration is only a fraction of the annual revenue generated by coral reefs. The value of coral reefs globally ranges from US \$ 30 Billion/year to \$ 375 Billion/year. The costs of restoring coral reefs globally range from US \$ 1.2 Billion/year to US \$ 22.5 Billion/year. Variations in value and costs depend on how the calculations are done. Therefore, at the lowest estimate, the value vs. cost ratio between value of coral reefs and cost of restoration is 4% and the highest 6 %. Meaning, only 4 -6 % of the value globally generated by coral reefs every year is needed to restore these valuable ecosystems¹¹⁵.

The cost of restoring one square meter of coral reef has been steadily decreasing since 1990 (Fig. 15).

Artificial approaches are more costly in the long term, requiring the installation of shoreline defences, and the development of more costly alternative food sources for coastal communities, such as offshore fisheries or mariculture. A meta-analysis¹¹⁶ of the costs of coral reef restoration versus construction of artificial defences found that the former was significantly less than the costs of building breakwaters. Cost-effectiveness of coral reefs for coastal defence was higher than artificial systems when maintenance costs for breakwaters was compared to the benefits of coral reefs in terms of fisheries, recreation and economic values of ecosystem goods and services. In addressing coastal erosion and flooding, structural engineering options include artificial barriers constructed to diminish wave action out at sea, barriers on the beach and groynes out to sea. However, these measures are costly – for a 500 m stretch of coast the cost of seawall construction can be USD40,000 – 80,000, plus annual maintenance costs. Further, tourism is dependent on natural beauty and aesthetic values, which such artificial barriers will affect adversely, whereas careful science-based coral reef restoration adds attraction for divers

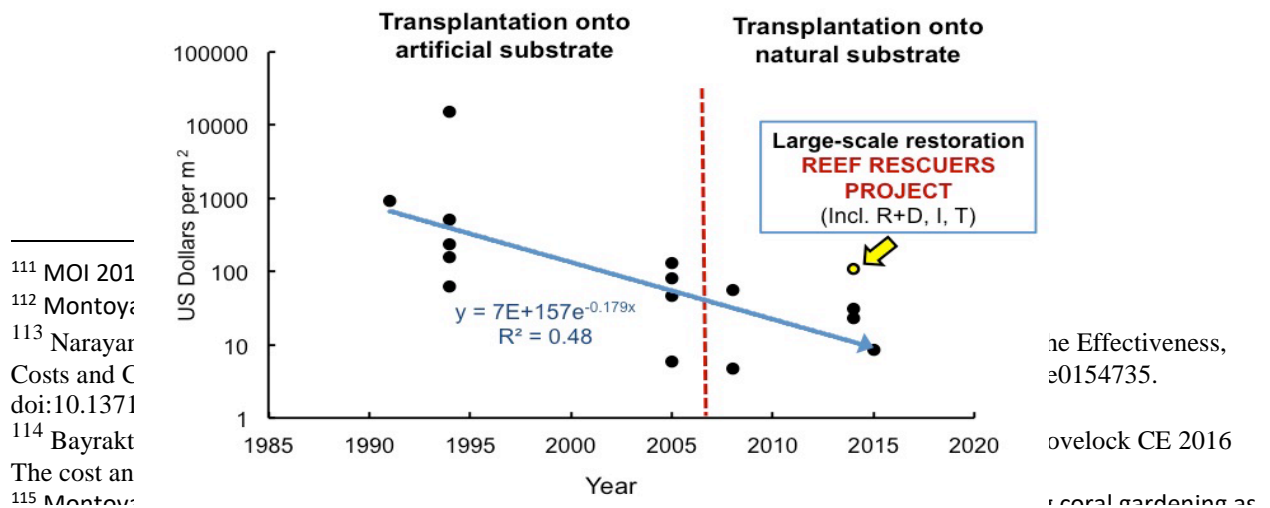


Figure 15 Costs of restoring one square meter of reef from 1990 to 2015. The cost of coral reef restoration has been decreasing steadily since 1990. The USAID-funded Reef Rescuers project implemented in Seychelles included research, development, implementation and training, not just restoration, hence the price per square meter was higher than other restoration only projects. The Y-axis is in year 2012 Unit costs. Cost estimates from Ferse et al (2008), Ferrario et al (2014), Mbije et al (2013), Guest et al (2014), Horoszowski-Fridman et al (2015). Modified from Montoya-Maya & Frias-Torres (2016) Reef restoration meets reef conservation: proposing coral gardening as an MPA management tool, IMCC 2016.

and snorkelers.

Coastal protection using artificial hardening structures is perceived as an immediate solution to coastal erosion problems. However, in the long term, living shorelines (restoring wetlands, mangroves, coral reefs, etc) outperform grey infrastructure (artificial hardening). The most comprehensive literature review contrasting living shoreline restoration with artificial hardening concluded that natural alternatives, such as living or nature based shore protection or biogenic habitat restoration, can reduce erosion while also enhancing other ecosystem services¹¹⁷ (Gittman et al. 2016); the superiority of nature-based shore protection over artificial hardening has been shown restoring oyster reefs on intertidal marshes (Meyer et al 1997¹¹⁸; Scyphers et al. 2011¹¹⁹), natural marshes in estuarine shorelines (Gittman et al 2014¹²⁰), and in 89 restoration assessments in a wide range of ecosystem types across the globe where ecological restoration increased provision of biodiversity and ecosystem services by 25% to 44 % (Benayas et al. 2009¹²¹).

For the specific case of Mauritius and Seychelles, the availability of hard substrate (carbonate rock, granite) is not a limiting factor for new coral recruitment. However, coral reefs have reached such a state of degradation that human intervention is needed in the form of coral reef restoration, so coral reefs continue to provide shoreline protection and other ecosystem services to people.

Several coast protection initiatives have been carried out in Mauritius (parapet wall, rock revetment) and Seychelles (retaining walls, rock armouring, groyne and timber piling). It is estimated that the cost of rehabilitating 1km of coastal line in Mauritius using hard structures (rock revetment, parapet walls, etc) will be approximately USD 2 million. In Seychelles the cost for rehabilitating 1.5 km of coast using hard structure will range from USD 2.5 million to USD 5.7 million. Mauritius is presently testing the use of reef balls to protect a northern coast in Mauritius using 900,000 concrete reef balls (hybrid measure) over approximately 0.4 Ha, which cost some USD 2.5 million. Therefore, if hybrid measures were to be used to cover the targeted 3.2 Ha in Mauritius and 2.5 Ha in Seychelles, will cost approximately USD 20 million and USD 15.6 million, respectively.

The activities under the project will not be solely coral restoration, it will also be adopting a community-based strategy for coral restoration. Communities (will be sensitised on the importance of coral reefs as a habitat for fish and understanding that the destruction of corals can contribute in the longer-term loss of fisheries productivity. This will develop a community stewardship for the protection of the coral reefs. Communities will also be trained in the coral reef restoration techniques. With the assistance of the Government initiative alternative, livelihood to coastal communities will be promoted.

¹¹⁷ Gittman RK, Scyphers SB, Smith CS, Neylan IP, Grabowski JH (2016) Ecological Consequences of Shoreline Hardening: A MetaAnalysis. *BioScience* 66: 763773

¹¹⁸ Meyer DL, Townsend EC, Thayer GW. 1997. Stabilization and erosion control value of oyster cultch for intertidal marsh. *Restoration Ecology* 5: 93–99.

¹¹⁹ Scyphers SB, Powers SP, Heck KL Jr., Byron D. 2011. Oyster reefs as natural breakwaters mitigate shoreline loss and facilitate fisheries. *PLOS ONE* 6 (art. e22396).

¹²⁰ Gittman RK, Popowich AM, Bruno JF, Peterson CH. 2014. Marshes with and without sills protect estuarine shorelines from erosion better than bulkheads during a category 1 hurricane. *Ocean and Coastal Management* 102: 94–102

¹²¹ Benayas JMR, Newton AC, Diaz A, Bullock JM. 2009. Enhancement of biodiversity and ecosystem services by ecological restoration: A meta- analysis. *Science* 325: 1121–1124

The project will invest in long term planning and monitoring of coral reef in both countries. Through the project, a baseline data on spatio-temporal study of the coast dynamics and the current wave pattern would be effected. This will be used as a planning tool for the strategic positioning and planning of future restoration works in both countries, thus reducing the cost of potential negative impact on coast erosion, due to lack of planning. Mauritius and Seychelles will review the existing legislation and institutional framework for the development of a Regional Coral Reef Restoration Plan that will also include Coral Management Plan, improve enforcement in both countries, and promote coral farming at the community levels, and promote regional studies on coral reef restoration. Through the study on genetic connectivity between Mauritius and Seychelles, the biodiversity of the corals will be enhanced, and could be applied in decision making regarding the managing and enhancing of coral reef resources.

The project is also cost effective in that through the component on knowledge sharing and dissemination, and capacity building there will be multiple add-on impacts for the WIO region as a whole. A coral reef restoration Toolkit has already been produced by Nature Seychelles¹²². As part of the scaling up of activities the Toolkit will be revised throughout the project to provide a resource for the region. The regional approach is a major approach for ensuring the cost-effectiveness of the project, through the sharing of experience, knowledge, research facilities, and other resources.

E. Consistency with other strategies

The proposed project is fully consistent with the national development policies and associated strategies, programmes of action and other instruments of each country, and well as to relevant regional strategies and agreements.

Mauritius

Table 4: Consistency with Mauritian strategies

Policy	Consistency with strategy
Republic of Mauritius Three Year Strategic Plan 2017/18-2019/20	The strategic plan provides an overview of key development areas for the country for the next three years. One of the key sectors in the development of the Ocean Economy, in which coral farming was identified as a main sector for growth in the near future.
Climate Change Information, Education and Communication Strategy and Action Plan 2014, and National Climate Change Adaptation Policy Framework 2013:	<p>Components 1 and 3 and related outcomes are in alignment with the key principles laid out in the National Climate Change Adaptation Policy Framework, namely, to</p> <ul style="list-style-type: none"> • “do all possible to enhance and maintain environmental quality, recognizing that the resilience of the natural environment (i.e. ecosystem service flows, including coral reef restoration) is key to coping with climate change” and • “Create an enabling environment for the adoption of appropriate technologies and practices that will assist in meeting national and international commitments with respect to the causes and effects of climate change”. <p>The Framework Policy Sectoral Policy Directives, more specifically concerning fisheries and marine ecosystems “Promote and facilitate the</p>

¹²² Frias-Torres S, Montoya-Maya PH, Shah N.J (Eds.) 2015. Coral Reef Restoration Toolkit: A Field-Oriented Guide Developed in the Seychelles Islands. Nature Seychelles, Mahe, Republic of Seychelles.

Policy	Consistency with strategy
	<p>undertaking of ongoing multi-disciplinary assessment of coastal and marine ecosystems, to ensure that needs of marine life are understood and taken into account for fisheries and coastal zone management” support outcomes 1.2 and 1.3</p> <p>Activities under Outcome 1 of the project, involve the development of partnerships and business plans calls for the inclusion of the hotel industry and relates to the policy’s Sectoral Strategy and Action Plan, namely</p> <ul style="list-style-type: none"> • T1 “Provide national guidance for protecting existing critical ecosystems, existing coastal development and future investment” • T2 “Engage the tourism sector in adaptation and sustainable development”. <p>In the same Strategy and Action Plan, Outputs 1.1.2 and 1.1.3 relate to the F1 “sustainable utilization of fisheries resources”, F2 “protect critical habitats and plan for future hazards” and F3 “support essential data collection and information sharing”.</p>
<p>National Environmental Policy (NEP) 2007, which defines the overarching environmental objectives and strategies for the country</p>	<p>Component 1 of the project aligns with Objective (i) of the NEP, “Conservation of Environmental Resources” relating to protecting and conserving critical ecological systems and resources essential for life-support, livelihoods, economic growth and human well-being. It also aligns with Objectives (ii), (iii) namely intra and inter-generational equity, (iv) integration of environmental concerns in economic and social development, (vii), enhancement of partnerships across society and (viii) development of environmental ethics in the citizen. Component 1 also closely aligns with the thematic areas of the NEP strategies in priority areas, namely conservation and sustainable use of biodiversity, marine and coastal zone management, energy and environment, natural and man-made disasters management, and capacity building, research and innovation.</p>
<p>National Tourism Policy (2005/6) and Strategy Paper (2016)</p>	<p>Component 1 of the project aligns with the latest Tourism Strategic Paper namely to enhance the local tourism product and to uplift the attractiveness of iconic places around the island including beaches and lagoons.</p>
<p>Integrated Coastal Zone Management (ICZM) Framework (2010)</p>	<p>The ICZM Framework places emphasis on “living within environmental limits” and more importantly, the maintenance of basic ecological integrity of coastal habitats such as coral reefs, seagrass beds, mangroves and wetlands” which links to Component 1 of the project and more specifically outcomes 2 and 3.</p> <p>ICZM priorities identified include focus on information provision, more specifically “survey and monitoring” (3.3.2) which relates to outcome 1.3 output 1.3.3 “Long-term maintenance and monitoring programmes in place, recording survival and growth rates of transplanted corals, and abundance and diversity of other reef-associated species” and “Monitoring of survival and bleaching of natural, donor and transplanted colonies before, during and after restoration actions”.</p>

Policy	Consistency with strategy
Reef Environment Conservation Plan (2015)	The policy calls for active reef restoration given the declining health of coral reefs and recommends that further work builds on the experiences gained to date, that local communities and other stakeholders are involved, and that collaboration and co-operation between the various organisations are essential if measures are to be effective. The Japan International Cooperation Agency (JICA) project <i>Capacity Development on Coastal Protection and Rehabilitation in the Republic of Mauritius</i> ¹²³ this project undertook an analysis of coastal erosion in the RM and developed coastal management plans for 14 sites in Mauritius, with guidelines for reef conservation and coral farming as one option for erosion control. Component 1 is consistent with the coastal management plan development therein.
Intended Nationally Determined Contribution ¹²⁴ (INDC)	Consistent with component 1, the proposed INDC for Mauritius mitigation contributions aims for a smart use of marine resources. Adaptation measures proposed, namely the Disaster Risk Resilience Strategy and its focus on investing and resilience and Marine and Terrestrial Biodiversity Resilience calls for the improvement of the management of marine and terrestrial protected areas, the expansion of the protected area network and the restoration of coral reefs.
Country Strategy Paper	The country strategy paper provides a roadmap for achieving economic growth. Within the strategy objectives of the paper, objective 1 which is to enhance competitiveness for increased investment and sustainable development, increasing resilience to weather/climate and natural hazards is identified as a strategy. This aligns with component 1 outcomes 1.1, 1.2 and 1.3.
Third National Communication for Republic of Mauritius to UNFCCC 2016	In order to address sea level rise, coral reef decline and temperature increases and the resulting impacts on coastal erosion, lagoon quality, tourism and local leisure activities, the third National Communication Report has proposed some adaptation policies and strategies. Activities under Components 1 and 3 will address strategies to ensure coastal protection by encouraging coral nursery and growth of coral reefs, restoration and expansion of coral reefs and Incentivise eco-tourism, with the valorisation of natural capital, in Mauritius and Rodrigues.
National Programme on Sustainable Consumption and Production (SCP)	Community participation and empowerment under Component 1 is in line with the National Programme on SCP which consist of 'greening' the tourism sectors and capturing for resource efficient green goods and services and supporting local green entrepreneurs in starting up and developing green business ventures.

¹²³ JICA 2015. Reef Environment Conservation Plan. Chap. 6. Final Report. The Project for Capacity Development on Coastal Protection and Rehabilitation in the Republic of Mauritius

¹²⁴ Government of Mauritius 2015. Intended Nationally Determined Contribution for the Republic of Mauritius

Policy	Consistency with strategy
National Biodiversity Strategy and Action Plan (NBSAP) 2017 – 2025	Component 1 aligns with the National Conservation Strategy, namely: (i) to maintain essential ecological processes and life support systems; (ii) to preserve genetic diversity, on which depend the breeding programmes necessary for the protection and improvement of cultivated plants and domesticated animals, as well as for scientific advancement; (iii) to ensure the sustainable utilisation of species and ecosystems One of the National Target is that by 2025, at least 20% of degraded coral reef areas are sustainably managed and /or rehabilitated.
Protected Area Network Expansion Strategy (2016-2026)	Component 1 covers partly 3 of the four major areas of competency the need to be developed, namely: <ul style="list-style-type: none"> • Conservation planning • Biodiversity stewardship; and • Nature-based tourism development
Other relevant laws and policies	<ul style="list-style-type: none"> • Fisheries and Marine Resources Act 2007 • Environment Protection Act 2002 • Beach Authority Act 2002 • Removal of Sand Act 1982 and Removal of Sand (amendment) Act 1997 • Merchant Shipping (civil Liability for Oil Pollution Damage and International Fund for Compensation for Oil Pollution Damage) Regulations 1996 • Prohibition of Removal of Coral and Sea-shell Regulations 2006 (GN No 95 of 2006) • Marine Protected Areas Regulations 2001 (GN No 172 of 2001)

Seychelles:

Table 5: Consistencies with strategies of Seychelles

Policy	Consistency with strategy
National Biodiversity Strategy and Action Plan (NBSAP) 2015-2020	Components 2 and 3 aligns with some of the strategies developed in the NBSAP for Seychelles: <ul style="list-style-type: none"> • Economic valuation of Seychelles' biodiversity (including marine ecosystem) e.g. ecotourism • Capacity Building on biodiversity conservation and sustainable use of natural resources • To protect through a network of viable ecological representative and effectively manage protected coastal and marine areas • To maintain the genetic diversity • To enhance ecosystem resilience and the contribution of biodiversity to carbon stocks through ecosystem

Policy	Consistency with strategy
	<p>conservation and restoration, including coral reef restoration.</p> <ul style="list-style-type: none"> To improve, share, transfer and apply the knowledge, science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss
Seychelles National Climate Change Strategy 2009	<p>Component 2 is consistent with the following objectives:</p> <ul style="list-style-type: none"> <i>Objective 1</i> - to advance understanding of climate change, its impacts and appropriate responses; <i>Objective 2</i> - to put in place measures to adapt, build resilience and minimize vulnerability to the impacts of climate change, including: developing and implementing pilot scale effective adaptation measures and tools at community level, including coastal ecosystem restoration approaches; demonstrating of adaptation technology implementation, with focus on nature-based methods; enhancing the management of coral refugia and resilient areas; and exploring and developing micro-insurance, risk reduction and financing mechanism and private sector financing options for adaptation; <i>Objective 5</i> - to build capacity and social empowerment at all levels to adequately respond to climate change; promote ongoing stakeholder/community involvement in decision making regarding climate change education, awareness and training at national and district level; and develop communication and awareness strategies to engage the community in responding and adapting to climate change.
Seychelles Mariculture Master Plan	<p>Although focusing primarily on fish and sea cucumbers, the principles and approaches identified through the Seychelles Mariculture Master Plan are likely to be applicable to coral farming as well.</p>
Seychelles Strategic Land Use and Development Plan	<p>The country's strategic plan promotes Blue economy, eco-tourism, marine tourism, protection of the environment and protected areas, responding to climate change and improving resilience,</p>
Intended Nationally Determined Contribution (INDC) Under the United Nations Framework Convention on Climate Change (UNFCCC) 2015	<p>Consistent with component 2, the proposed INDC for Seychelles mitigation contributions aims for a smart use of marine resources. Adaptation measures proposed include ecosystem-based approach to agriculture, mariculture for food security and water security, protection of the biodiversity and set up a Blue Economy Research Institution for proper marine resource management.</p>
Seychelles Sustainable Development Strategy (SSDS) 2012-2020	<p>The SSDS comprises of thirteen thematic areas, which covers the main areas of sustainable development intervention in Seychelles. Component 2 of the project covers the following thematic areas:</p> <ul style="list-style-type: none"> Biodiversity Conservation, Agriculture and Food Security

Policy	Consistency with strategy
	<ul style="list-style-type: none"> • Fisheries and Marine Resources. • Tourism and Aesthetics • The economics of Sustainability (the green economy) • Climate Change • Education for sustainability,
The Seychelles Sustainable Tourism Master Plan 2012-2020	The project is in line with one of the priority are identified, namely: to respond adequately tot the challenges generated by the rapid development of coastal and marine – based tourism activities.
National Report for Republic of Seychelles for UNCSO Rio 2012	<p>Component 2 and 3 align with the recommendations of the Seychelles National Report, namely:</p> <ul style="list-style-type: none"> • Establishment of necessary mechanism for increased involvement/participation and action of stakeholders and civil society organisation in the participatory decision-making and implementation of sustainable development. • Strengthen coordination and integration of education for sustainable development at all levels and in all forms, encompassing both formal and non-formal approaches. • Expedite efforts to further mainstream climate change adaptation and disaster risk reduction in all relevant sectors. • Strengthen regional cooperative mechanisms, which address national priorities and needs as well as regional targets and commitments. • Encourage the development and adoption of innovative schemes to build resilience in the fisheries and agricultural sector for long-term food security on islands.
Second National Communication for Republic of Seychelles to UNFCCC 2016	<p>Component 2 aligns with some of the recommendations of the Second National Communication:</p> <ul style="list-style-type: none"> • Encourage residents to gradually participate by raising awareness and education on the Climate Change and anthropological impacts on coral reef habitat • Continue the coral reef monitoring network that was set up in 1998 • Encourage research, build capacity, developing local expertise and strengthening institutional capacity to better understand the coral reef ecosystem amongst others.
Other relevant laws and policies	<ul style="list-style-type: none"> • Environment Protection Act 2016 (Act 18 of 2016) • Environment Impact Assessment Regulations

Regional Strategies

Table 6: Consistency with regional strategies

Regional policy or strategy	Consistency with Strategy
<p>Barbados Programme of Action (1994), Mauritius Strategy for Implementation of Small Island Developing States (2004) and the Samoa Pathway (2014)</p>	<p>As Small Island Developing States (SIDS), the Mauritius and Seychelles are committed to meeting the sustainable development goals and priorities of the Barbados Programme of Action and the Mauritius Strategy for Implementation (MSI)¹²⁵ and the Samoa Pathway; the project will contribute to meeting the goals of these programmes. The consistencies and linkages between the proposed project and the Samoa Pathway include but are not limited to:</p> <ul style="list-style-type: none"> • The Samoa Pathway encourages “Designing and implementing participatory measures to enhance employment opportunities, in particular of women, youth and persons with disabilities, including through partnerships and capacity development, while conserving their natural, built and cultural heritage, especially ecosystems and biodiversity”. The gender and youth assessment developed during project preparation phase is in line with this measure. • The Samoa pathway also calls for building resilience to the impacts of climate change and improving adaptive capacity. All project components and outcomes are consistent with this approach. • Component 3 outcome 3.3, output 3.3.3 calls for sustainable long-term monitoring which is consistent with “improving the baseline monitoring of island system”, while components 1 and 2 are also linked with raising awareness and communicating climate change risks, “including through public dialogue with local communities, to increase resilience to the longer-term impacts of climate change”. • The project is also consistent with all resolutions concerning oceans and seas as well as disaster risk reduction. • Last, components 1 and 2 contribute to achieving food security and nutrition as identified in the Samoa Pathway.
<p>Nairobi Convention for the Protection, Management and Development of the Marine and Coastal Environment of the Western Indian Ocean Region (1985) - Draft Climate Change Strategy for the Nairobi Convention Area (June 2015)</p>	<p>The project will contribute to meeting the commitments of both countries under the Nairobi Convention, particularly the recommendations relating to marine and coastal biodiversity developed at the 8th Conference of the Parties held in June 2015¹²⁶.</p> <p>Part of the mission identified in the Draft Climate Change Strategy for the Nairobi Convention Area is to support governments, civil society, the private sector and coastal</p>

¹²⁵ National Report of the Republic of Mauritius; Third International Congress on Small Island Developing States, September 2014, Western Samoa. UNDP/UNDESA

¹²⁶ <http://www.unep.org/NairobiConvention/Meetings/COP8/index.asp>

Regional policy or strategy	Consistency with Strategy
	<p>communities in the Western Indian Ocean in the process of adaptation to climate change. The project emphasis a partnership approach to coral reef restoration as an ecosystem-based adaptation approach and is exemplified in Component 1 outcome 1.1, outputs 1.1.1 and 1.1.4 and Component 2, outcome 2.1, outputs 2.1.1 and 2.1.2.</p> <p>Strategic outcome 1 ‘Improved Adaptation Policymaking’ and associated key result 1.3 (mainstreaming adaptation) relates to outcomes 1 in components 1 and 2 and component 3 in terms of involvement of private sector stakeholders, local communities and regional knowledge dissemination and management.</p> <p>Key results 2.1 and 2.3 of the Draft Strategy are to improve the ecological understanding of the impact of climate change and to effectively communicate knowledge about climate change. Component 3 of the project and all of its outcomes and outputs relate to these key results directly in terms of knowledge management and sharing, training and sensitization to build regional capacity for sustainable reef restoration.</p>
<p>Strategic Action Programme for the protection of the Western Indian Ocean from land-based sources and activities (WIO-SAP); and</p> <p>Strategic Action Programme for the sustainable development of the Western Indian Ocean Large Marine Ecosystems (WIO LME SAP)</p>	<p>Both countries endorsed WIO SAP and WIO LME SAP. Coastal and marine ecosystem restoration as well as livelihood improvement of coastal communities are among the transboundary priorities identified for WIO states. Coral restoration will bring positive impacts on both ecosystem restoration and coral livelihood improvement.</p>
<p>Western Indian Coastal Challenge</p>	<p>The project will support the Western Indian Ocean Coastal Challenge (WIOCC)¹²⁷, which is a Global Island Partnership (GLISPA) initiative led by Seychelles and launched in 2012 that promotes actions for climate resilient development that achieves effective conservation of biodiversity, enhanced livelihood and economies for greater social security among coastal communities.</p>
<p>Agenda 2030</p>	<p>The project is consistent with:</p> <ul style="list-style-type: none"> • SDG 3 – Good health and wellbeing: Ensure healthy lives and promote well-being for all at all ages relating to components 1 and 2 outcome 1. • SDG 13 – Climate action: Take urgent action to combat climate change and its impacts <ul style="list-style-type: none"> ○ 13.1 Strengthen resilience and adaptive

¹²⁷ <http://glispa.org/11-commitments/32-western-indian-ocean-coastal-challenge-wio-cc>
<https://sustainabledevelopment.un.org/partnership/?p=8020>

Regional policy or strategy	Consistency with Strategy
	<p>capacity to climate-related hazards and natural disasters in all countries</p> <ul style="list-style-type: none"> ○ 13.3. Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning ○ 13.B Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities <ul style="list-style-type: none"> ● SDG 14 – Life below water: Conserve and sustainably use the oceans, seas and marine resources for sustainable development <ul style="list-style-type: none"> ○ 14.7 - By 2030, increase the economic benefits to Small Island developing States and least developed countries from the sustainable use of marine resources, including through sustainable management of fisheries, aquaculture and tourism ○ 14. B. Provide access for small-scale artisanal fishers to marine resources and markets
Other relevant laws and policies	<ul style="list-style-type: none"> ● Nagoya Protocol on Access to Genetic Resources ● UN Convention on the Law of the Sea ● Ramsar Convention

The project will also complement and assist in meeting the goals of a number of regional projects and programmes as described in Section II: G.

F. Project alignment with technical standards

All UNDP supported donor funded projects are required to follow the mandatory requirements outlined in the UNDP Programme and Operational Policies and Procedures (UNDP POPP). This includes the requirement that all UNDP development solutions must always reflect local circumstances and aspirations and draw upon national actors and capabilities. The project will comply with the Environmental and Social Policy of the Adaptation Fund as described in Section L.

In addition, all UNDP projects are appraised before approval. During appraisal, appropriate UNDP representatives and stakeholders ensure that the project has been designed with a clear focus on agreed results. The appraisal is conducted through the formal meeting of the Local Project Appraisal Committee (LPAC) established by the UNDP Resident Representative. During the LPAC meeting, as per the UNDP’s Social and Environmental Screening Procedure, social and environmental risks identified are presented together with the proposed management measure(s) for each risk identified to ensure the social and environmental safeguard system is in place during the project implementation. A signed copy of the Social and Environmental Screening Report is at Annex 2.

In addition, regional technical standards will be developed for the establishment of coral propagation nurseries and transplantation activities, and the selection of the locations of these activities will be guided by criteria developed through the project which will take account of zoning, MSP and MPA regulations and other relevant requirements in each country. Where required, EIAs will be conducted prior to implementation of activities.

Coral restoration techniques and methodologies are evolving and advancing rapidly in the past few years with the growing scientific interests and body of evidence; thus, there are not yet fixed technical standards that govern coral restoration activities even internationally. The project will support the two countries to stay updated with discussions among the international communities for coral restoration and any guidelines or standards emerging from such bodies, based on the best available science. In the meantime, the project activities in the two countries are regulated and guided by a set of existing relevant standards, regulations, policies, and acts listed below. It is to note that all the relevant legislations, standards and guidelines will be triggered when project intervention takes place.

Mauritius

- The Environment Protection Act (EPA) 2002 (as consequently amended) covers pollution prevention measures, development of environmental standards and guidelines. For some listed undertaking, an Environment Impact Assessment (EIA) studies or Preliminary Environmental Reports (PER) are warranted and environmental clearances are required prior to commencement of work of these undertakings.
- The Fisheries and Marine Resources Act 2007 (amended 2008) provides for: the management, conservation, protection of fisheries and marine resources and protection of marine ecosystems and covers the establishment of aquaculture enterprises and MPAs. The Fisheries Division of the MOEMRFS is the responsible authority for placement of structures at sea and would ensure compliance with its regulations.
- The 2009 draft proposed bill on Environmentally Sensitive Areas (ESAs) Conservation and Management and the associated ESA study, the recommendations of which address the conservation and sustainable use of biodiversity and ecosystem services in the coastal zone, with particular reference to coral reefs and other threatened habitats, will be reviewed as part of the forthcoming UNDP/GEF project Mainstreaming biodiversity into the management of the coastal zone in the Republic of Mauritius. The review and assessment may result in relevant amendments to legislative approaches, which will make legislative and institutional environment more favourable to activities such as coral restoration for DRR and food security benefits.
- Fisheries and Marine Resources (Prohibition of Removal of Coral and Sea-shell) Act 2006 prohibits the removal of corals from any maritime zone of Mauritius unless the person holds a permit. MOEMRFS is the only government body that can issue such permits.
- Guidelines for coastal water quality, which defined the coastal water quality requirement for various activities around the Republic of Mauritius. The MOEMRFS is also the responsible authority, with laboratory facility that would ensure compliance with standards prescribed. The monitoring of the water quality at nurseries and transplanted site form an integrated part of the proposed project interventions.
- Environment Protection (standards for Effluent discharge into the ocean) Regulations 2003. This legislation provides the permissible standards for parameters in effluents

discharged into the ocean. The coral reef restoration activity will not produce effluent. However, monitoring of the water quality will be ensured and budget has been earmarked.

- Relevant guidelines and policies in the Aquaculture Master Plan would be adhered to. The Fisheries and Marine Resources Act of 2006 authorizes MOEMRFS to issue a written permit with a set of conditions to a promoter or an institution to carry out a coral farming/rehabilitation project after the review of the application for such permit. The permit is normally given on a pilot basis for 1 year maximum and is renewable upon satisfactory reporting. The set of conditions have slight variations depending on the project target and objectives. The normal set of conditions (template) is at Annex 14 for reference. The permit holders are required to send monitoring report biannually, and AFRC, on behalf of MOEMRFS, conducts annual monitoring on site before the permit renewal. Coral fragmentation activities, if approved in the permit, can be only performed in the presence of an officer from MOEMRFS..

Seychelles

- The Environmental Protection Act (EPA) 2016 provides for the protection, preservation and improvement of the environment and for the control of hazards to human beings, other living creatures, plants and property.
- Environmental Impact Assessment (EIA) is dealt with under the EPA 2016 as well as Environmental Protection (Impact Assessment) Regulations [EP (EIA) Regulations]. The legislation requires that an EIA study be carried out and that an environmental authorisation is obtained if any person commences, proceeds with, carries out, executes or conducts construction/ development. This legislation is being strengthened under the Adaptation Fund, *Ecosystem Based Adaptation to Climate Change* project with a view to improving climate change risk management and strengthening the public consultation process.
- Fisheries Act 1987, prohibit the blasting of coral unless permit is obtained from Seychelles Fisheries Authority (SFA). SFA will be a stakeholder and member of the project steering committee.
- The National Parks and Nature Conservancy Act (1969), designate National Parks or Reserves and regulates the type of activities permissible within these boundaries. This legislation is enforced by Seychelles National Environment Commission.
- Environment Protection (Seychelles National Parks Authority) Order provide for the establishment of the Marine Parks Authority as a body corporate. This Authority is vested with the posers and duties of the Seychelles Environment Commission for purposes of carrying out the functions of the commission under National Parks and Nature Conservancy Act. The Authority is responsible for the management and protection of marine parks and other specified areas. The Seychelles National Parks Authority is one of the Responsible Party of the project and will thus ensure that all activities are being carried out according to the law.
- Relevant guidelines and policies in the Mariculture Master Plan would be adhered to.

G. Project duplication

There is no duplication of the proposed project with other initiatives or funding sources. However, the project will complement a number of on-going and planned initiatives, which will result in added value and complementarity. Note that there is no overlap with projects underway or planned for the Seychelles Outer Islands, as the focus of the coral restoration is the granitic inner islands, where reef restoration is most feasible and cost effective.

Relevant on-going and upcoming initiatives are described in the following table:

Table 7 Relevant on-going and upcoming initiatives

Project & Funding Institution	Objective	Potential Synergies
Mauritius – on-going		
ROM/UNDP/AFB <i>Climate Change Adaptation Programme in the Coastal Zone of Mauritius:</i> 2012-2018. Implemented by MoSSNSESD.	To increase climate resilience of communities and livelihoods in coastal areas of Mauritius.	This project is aimed at combating beach erosion and flood risk at selected sites with different forms of hard infrastructure and natural protection mechanisms, and helping to ensure that all policies, strategies, plans, and regulations recognize climate change impacts in the coastal zone over the next 50 years. It will directly complement the coral restoration project in that it will provide an enabling environment for the work to be undertaken in terms of policy and will sensitize the public to the urgency of climate change. The project has a component on reef and seagrass restoration at Mont Choisy, the results of which will provide useful experience to feed into the new project.
UNDP/GEF FSP <i>Mainstreaming biodiversity into the management of the coastal zone in the Republic of Mauritius.</i> Started in 2017 Implemented by MOI	To mainstream the conservation and sustainable use of biodiversity and ecosystem services into coastal zone management and into the operations and policies of the tourism and physical development sectors in the Republic of Mauritius through a 'land- and seascape wide' integrated management approach based on the Environmental Sensitive Areas' (ESAs) inventory and assessment.	This project directly complements the new project in that it will include activities that will contribute directly to the passive conservation of coral reefs (e.g. improved management of marine protected areas; a "reef-to-ridge" approach to coastal planning; sustainable management of tourism activities) and will also help to create the environmental conditions (good water quality, reduced sediment run-off, reduced damage from boats and tourism) that will facilitate the survivorship of transplanted corals.
GEF SGP UNDP - Eco-Sud (NGO) "Community Based Coral and Voluntary Marine	The main goal of the project is to locally enhance communities' capacity to contribute to management, conservation and rehabilitation of coral reefs	This project also directly complements the new project. The coral nurseries on mainland Mauritius will be adjacent to the coral nurseries developed through this SGP-funded project, and will benefit from lessons learned, both in terms of coral

Project & Funding Institution	Objective	Potential Synergies
Conservation Area" Started in 2017	'ecosystems in order to improve their resilience for sustainable livelihoods and economic development. This will be achieved through the set-up of a coral nursery and a voluntary no-take zone.	farming and involvement of local communities of the region.
Mauritius – upcoming		
Smart Agriculture Project. Mauritius Chamber of Commerce funded by Agence Francaise de Developpement	To reduce the use of pesticides at national level.	The project aims at controlling the use of pesticide, sensitise agriculturalists about the impact of the use of pesticide; this will reduce land-based pollution and ultimately improve lagoon water quality.
EU/Global Climate Change Alliance (GCCA) + Initiative supporting climate smart agriculture for small holders in Mauritius	To increase the resilience of non-sugar small holders to climate change by building their capacity to develop and sustain climate smart agriculture practices and techniques in Mauritius.	The project will build institutional capacity to promote the adoption of climate smart agricultural practices that make minimal use of agrochemicals (fertilisers and pesticides) in crop production and will thus complement this project as it will help address one of the key causes of coral reef degradation. In reducing the amount of agrochemicals being washed into the sea this project will create the required enabling lagoonal environment for coral restoration and will thus increase likelihood of success of the restoration project.
Seychelles - Ongoing Projects		
GOS/UNDP/GEF Seychelles <i>Protected Areas Finance Project</i> 2016-2020	To improve the financial sustainability and strategic cohesion of Seychelles protected area system, while addressing emerging threats to biodiversity	This will have close synergy with the proposed project, in relation to find ways to make interventions financially sustainable. In Seychelles, many of the restoration sites are likely to be within protected areas and will benefit from work undertaken through this finance projects. Both projects will be working with the tourism industry and will be able to build on shared lessons learned and activities.
GOS/Adaptation Fund, <i>Ecosystem Based Adaptation to Climate Change</i> 2012-2018	To incorporate ecosystem-based adaptation into the country's climate change risk management system to safeguard water supplies, threatened by climate change induced perturbations in	This project takes a broader approach than the restoration project to restoring ecosystem functionality and enhancing ecosystem resilience, addressing watershed and coastal processes in order to secure critical water provisioning and flood attenuation ecosystem services from

Project & Funding Institution	Objective	Potential Synergies
	rainfall and to buffer expected enhanced erosion and coastal flooding risks arising as a result of higher sea levels and increased storm surge.	watersheds and coastal areas. One of the activities has direct relevance to the new project: a reef restoration activity involving a soft-engineering approach at North-East Point, Mahe; this will provide experience relevant to the design of the new project.
UNEP-EU <i>Building capacity for coastal ecosystem-based adaptation in SIDS</i>	To strengthen the climate change resilience and adaptive capacity of SIDS, which have high dependence on coastal ecosystems	Includes site projects in Seychelles and Grenada; the Seychelles component involves the SNPA and coral farming activities in the Curieuse Marine Park, Praslin
GEF SGP – Anba Lao (NGO); Testing methods of human induced resilience of socio-economically important coral reef sites within the Seychelles Marine National Parks 2016 -18	To promote recovery of coral reefs that is presently classed as non-resilient.	This project is looking at differential survival of coral recruits at different locations which is directly relevant to proposed project activities in Seychelles and will provide important knowledge that can be used when considering survival of transplanted corals.
UNDP-EU GCCA+ project	To ensure that the people, economy and environment of Seychelles are able to adapt to and develop resilience to climate change and its effects, thereby safeguarding the sustainable development of Seychelles	Project activities focus on La Digue Island. Integrated shoreline management will result in enhanced shoreline protection and potentially contribute to stabilization of offshore reefs. There are no coral restoration activities under the project.
TNC <i>SeyCCAT Seychelles Conservation and Climate Adaptation Trust</i> 2016 onwards	To provide a sustainable flow of funds - which supplements existing and future funds from any sources - to support the long-term management and expansion of the Seychelles system of protected areas and other activities which contribute substantially to the conservation, protection and maintenance of biodiversity and the adaptation to climate change	SeyCCAT will be used for activities to work towards the expansion of the MPA network (planned addition of 400,000 km ² new MPAs). Coral restoration is one of 8 identified priorities for SeyCCAT funding but the SeyCCAT Board expects that any funded projects will add incremental value, be synergistic and not duplicate any existing initiatives.
GOS/GEF/TNC Seychelles Marine Spatial Planning	To develop and implement an integrated marine plan to optimise the sustainable use	The MSP Initiative is an integrated, multi-sector approach to address climate change adaptation, marine protection and

Project & Funding Institution	Objective	Potential Synergies
(MSP) initiative 2014-2020	and effective management of the Seychelles marine environment while ensuring and improving the social, cultural and economic wellbeing of its people.	support the Blue Economy and other national strategies. It will demarcate areas designated for fishing, tourism and recreation, biodiversity conservation and cultural heritage, and a range of industries, taking into account the need for MPAs; it will be particularly relevant to the coral restoration project in relation to the selection of sites for nurseries and transplantation
EU/UN Environment and UNEP-WCMC - <i>Building Capacity for Coastal Ecosystem-based Adaptation in Small Island Developing states</i> 2014-2016	The overall goal of the project is to strengthen the Climate Change resilience and adaptive capacity of communities and societies in SIDS with high dependence on ecosystem services provided by healthy tropical coastal ecosystems.	A coastal EbA options guide and online decision support tool were developed and training workshops were held in Grenada and the Seychelles. Decision makers were helped to understand future threats to coastal communities and ecosystems, and how governments and civil society can together act to maintain the future health of ecosystems and buffer coastal communities from climate change impacts. These will be useful for the incorporation of EbA approaches during the preparation of the Regional Coral Reef Restoration Plan.
Seychelles - Upcoming projects		
UNDP/GEF PIF – to be prepared for a Reef to Ridge project	To address the ‘whole island’ priorities of improved management and conservation of upland forest and agricultural ecosystems as well as coastal and marine ecosystems in the Seychelles to produce global benefits in terms of conservation of globally significant biodiversity and the effective management of the large marine ecosystems (including coastal and near-shore marine ecosystems), and to arrest and reverse ecosystem degradation	The project has a focus on addressing land-based threats to coastal and near-shore marine ecosystems, including particularly reducing land-based threats to offshore coral reefs. The project will aim to enhance protection of selected resilient reef areas from further threats, subsequent to assessment of target reef areas that remain viable following the 2016 coral bleaching event.
USAID/Nature Seychelles	Potential development of a coral reef research centre	Potential 3 rd phase of Reef Rescuers Project – this would be directly relevant to the proposed project in that it would provide a much needed research base in

Project & Funding Institution	Objective	Potential Synergies
		the Seychelles
Regional – ongoing		
COI – EU <i>The coastal, marine and island specific biodiversity management in East African and Indian Ocean states.</i> 2014-2018	Strengthening national and regional capacities, at all levels, in managing coastal, marine and island-specific biodiversity resources and ecosystems.	This project has components on (1) improving and harmonising policies and institutional framework; (2) education, awareness-raising and communications particularly aimed at decision makers; (3) improving mechanisms for sharing data relating to biodiversity; (4) establishment of regional biodiversity thematic centres; and (5) a small grants programme for projects relating to biodiversity and sustainable livelihoods. Many aspects of the work undertaken through this will be of value to and support the coral restoration project. In particular the WIO Coral Reef Monitoring Network which is being established through this project, will provide a regional framework and long-term monitoring of the restored reef
COI/FFEM - <i>Project de Gestion Durable des Zones Côtieres des pays de la COI – Indian Ocean Commission (GDZCOI).</i> 2014-2017	Gathering and disseminating experiences and progress in ICZM and protection of marine and coastal biodiversity in Mauritius (Rodrigues), Madagascar and Comoros	Lesson learned and knowledge gathered through the GDZCOI project, with respect to coral reefs, will potentially be of value to the new project
UNDP/GEF <i>Western Indian Ocean Large Marine Ecosystems Strategic Action Programme Policy Harmonisation and Institutional Reform (WIO LME SAPPHIRE):</i> 2015-2020	To support and assist government institutions and intergovernmental bodies in the region to implement the activities required to deliver the Strategic Action Programme and to ensure sustainability of efforts and actions toward long-term management of activities within the LMEs and the sustainability of associated institutional arrangements and partnerships.	This large regional project includes components on policy harmonisation and management reforms, capacity building, integrating the ecosystem-based management approach into Local Economic Development Plans at selected pilot sites; ecosystem-based practices among artisanal fisheries. It will contribute to providing an appropriate policy and governance context for coral restoration in the region. SAPPHIRE also has expectations of habitat restoration built into its Results Framework with some modest targets. This current AFB Coral Restoration project could provide a vital and complementary demonstration role.
WIOMSA/MASMA–	Assess emerging knowledge	This project involves Kenya, Mauritius,

Project & Funding Institution	Objective	Potential Synergies
<i>Emerging Knowledge for Local Adaptation - Modifying the Symbiosis of Knowledge and Governance for the Adaptation of Western Indian Ocean Coastal Communities at Risk from Global Change. 2014-2017.</i>	on coastal vulnerability to inform and guide climate change adaptation at local government level; Evaluate the capacity of local government to build resilience; Devise strategies and make recommendations to strengthen knowledge management systems relating to vulnerability to climate change; Build capability of local government to implement this emerging knowledge; Test the applicability of improved knowledge systems to improve local government ability to use emerging knowledge and monitor their uptake	Mozambique, and South Africa, and will contribute to work underway in the region to build capacity for adaptation with a focus on local government; the involvement of MOI in this project will mean that knowledge and lessons learned from this project can be fed into the coral restoration project at the design stage
Regional- upcoming		
<i>WIO-SAP Partnerships for the Implementation of the Strategic Action Programme for the Protection of the Western Indian Ocean from Land Based Sources and Activities. 2nd Phase of WIO-LAB programme</i>	To reduce impacts from land-based sources and activities and sustainably manage critical coastal-riverine ecosystems through the implementation of the WIO-SAP priorities.	This project will address water pollution and degradation of critical habitats from land-based impacts and will therefore be critically important to the new coral restoration project, given that water quality will be a key issue to address. The WIOSAP project will have excellent synergies with the coral restoration project as it aims to calculate environmental flows and address compliance with effluent standards which ultimately will result in better lagoon water quality.

H. Learning and knowledge management component of the project.

Learning and knowledge management dimensions are integrated in all project components and includes the creation of knowledge products (lessons learned, data and information of the processes) that will be publicly accessible and widely disseminated, as well as increased capacity/knowledge among all stakeholders. Progress of the project will also be communicated through social media. An overview table (table 8) is given below for each component and relevant knowledge management product.

A website will be created to share information on the project regarding progress, lessons, plans and milestones of the project, amongst others. These will be leveraged for disseminating information on the process of both countries as well as lessons learned throughout the project.

This website will also be accessible through a link from the existing websites of the Ministry of Ocean Economy, Marine Resources, Fisheries and Shipping Mauritius (fisheries.govmu.org) and the Ministry of Environment, Energy and Climate Change Seychelles (meecc.seydevplus.com/) including the Seychelles National Parks Authority (www.snpa.gov.sc).

A media outreach strategy will include the invitation of both local and national media (press, radio and TV) at key project stages for contributing to awareness-raising and promoting best practices at local and national level.

The project will include systematic bottom-up dissemination of lessons learned from local to national level, whereby lessons learned from the local level will be presented at the national level and translated into useful training guidelines and recommendations for evidenced based policy making. Component 3 also includes the further refinement of the coral reef restoration Toolkit, previously developed by one of the implementing organizations in Seychelles. The project aims to disseminate the Toolkit widely and make it accessible at no cost to the public and other countries of the Indian Ocean region which are interested in coral reef restoration. The knowledge management strategy foresees to produce informative and easily accessible venues (e.g. videos tutorials etc.) that guide communities/stakeholders to use the tool without outside intervention.

The project has a dedicated component related to knowledge management (Component 3: Knowledge management and sharing, training and sensitization to build regional capacity for sustainable reef restoration). The component will focus on systematically keeping track of experiences gained from the project both to enrich the local, national, regional and global knowledge of coral reef restoration and its potential climate change adaptation. The project will also carry out regional studies, such as genetic resilience (thermal-resistant symbionts clades) of corals of the Indian Ocean, temporal studies of wave patterns at coral reef restoration sites and their effect on food security and coastal erosion. These could then be used as best practices for potential replication nation-wide and in the region. Knowledge exchange among countries affected by similar climate-related threats is at the core of the project. Regional workshops and training will be organised with a view to share lessons learned for the locally implemented coral reef restoration activities. Project key findings will be published in scientific peer-reviewed journals and presented at international conferences to enrich the field of coral reef restoration globally.

The table below gives an overview on learning and knowledge management products foreseen under this project.

Table 8: Knowledge management objectives and indicators

Expected project outputs	Learning objectives(LO) and Indicators(I)	Knowledge products
<p><i>Output 1.1.1</i> Coastal communities benefit from improved livelihoods through employment establishing and maintaining coral nurseries and transplantation sites.</p>	<p>(LO): improved understanding of the importance of coral reefs, impacts of climate change on the coral reefs and importance of coral reef restoration; capacity building of coastal communities on establishment and maintenance of coral nurseries and innovative approaches to derive alternative financing. (I): Number of local communities and stakeholders trained (data</p>	<p>Training materials (e.g. pamphlet, flyers, posters manuals, guidelines)</p>
<p><i>Output 2.1.1</i> Coastal communities benefit from improved livelihoods through employment establishing and maintaining</p>		

Expected project outputs	Learning objectives(LO) and Indicators(I)	Knowledge products
coral nurseries and transplantation sites.	disaggregated by community groups, gender and age groups).	
<i>Output 1.2.3</i> A land-based nursery and 2 or more ocean nurseries established and maintained on a regular basis in Mauritius	(LO): improved knowledge of coral reef restoration as a coastal climate change adaptation project implemented locally (I): Number of sensitisation materials shared among the coastal beneficiaries.	<ul style="list-style-type: none"> • Project reports and detailed data collected in each restoration site • Where applicable, physical demonstration sites, and sensitization material related to climate change adaptive effort and coral restoration.
<i>Output 2.2.3</i> A land-based nursery and 2 or more ocean nurseries established and maintained on a regular basis in Seychelles		
<i>Output 3.1.1</i> Comparative review and analysis of coral reef restoration initiative in the region and globally, with gaps in knowledge identified.	(LO): Improved knowledge and experience exchanged in coral reef restoration efforts undertaken by the project, science based best practices and methodologies (I): Number of publicly shared knowledge products	Studies, reports and research papers on coral reef restoration methodology and reports on past and current coral reef restoration projects locally and in the region for dissemination.
<i>Output 3.1.2</i> Based on past and on-going coral restorations efforts undertaken by the project and others, science-based best practice and methodologies (e.g. factors determining success in coral restoration are known; cost-effective approaches, etc.) developed, constraints and challenges identified, and lessons learned documented.		<ul style="list-style-type: none"> • Coral Restoration Methodologies/guidelines document • Good practices guide on coral reef restoration • Reports of country to country learning exchanges. • Articles published on project website. • Documentary film and short video clips on project progress.
<i>Output 3.1.3</i> Research undertaken to provide information to guide restoration and enhance reef resilience where required (e.g. genetic connectivity of coral species, spawning seasons and coral recruitment patterns, resistant/ resilient species and clades)	(LO): Improved knowledge and experience exchange in genetic connectivity of corals of the Indian Ocean, their resilience to climate change and their impact on food security and Disaster Risk Reduction. (I): Number of regional studies implemented.	Scientific articles published in a peer reviewed journal capturing the lessons learned from the project implementation for the global academic community.
<i>Output 3.2.1</i> Lessons learned in reef restoration documented and shared.	(LO): Improved knowledge and experience exchange around coral reef restoration and adaptation to climate change (I): Number of publicly shared knowledge products.	<ul style="list-style-type: none"> • At least one scientific article published in a peer reviewed journal capturing the lessons learned from the project implementation for the global academic audience. • One detailed report per country on project implementation, capturing lessons learned and best

Expected project outputs	Learning objectives(LO) and Indicators(I)	Knowledge products
		practices.
<i>Output 3.2.2</i> Coral Reef Restoration tool kit and manual for use in the WIO published and disseminated		<ul style="list-style-type: none"> • Coral Reef Restoration Toolkit, upgraded and available to the public.
<i>Output 3.3.1</i> Regional training workshops undertaken on monitoring, DNA-based approach for the identification of resilient corals, and other topics as appropriate	(LO): Improved capacity in monitoring, genetic identification of resilient corals and adaptation to climate change through coral reef restoration (I): Number of national officers and other beneficiaries trained.	<ul style="list-style-type: none"> • Report of regional training and workshops for project stakeholders and representative of countries of the region involved in coral reef restoration, including genetic analysis of coral zooxanthellae <i>Symbiodinium</i> clades, and techniques of microfragmentation and fusion of massive corals • Training video for coral reef restoration, capturing lessons learned and best practices.
<i>Output 3.3.2</i> Sustainable long-term monitoring programme developed and underway for restored reefs, based on international/regional protocols and best practice	(LO): Improved nation institutional and legislative framework for enabling upscaling of coral reef restoration efforts. (I): Number of policies, legislation developed	<ul style="list-style-type: none"> • Regional Coral Reef Restoration Plan, which will include National components and Coral Reef Monitoring protocol. • Baseline data on current pattern and spatio-temporal study to measure impact of coral reef restoration efforts.

I. Consultative process

A wide range of stakeholders have been consulted during the preparation of the Concept Note and full Project Proposal for this project. The proposed project's Executing Entities were consulted through the iterative process of refining the project design. As a regional organisation, the Project Steering Committee is comprised of national representatives from Mauritius and Seychelles. Therefore, it is well-positioned to ensure that the proposed project design is tailored to local requirements, benefits vulnerable groups and includes gender considerations.

In the course of preparing the Concept Note, discussions and meetings were held with the project's Executing Entities, including a meeting of the Regional Steering Committee in

Seychelles, July 2016, to review the draft concept. Discussions were also held with the regional organisations COI and CORDIO, and the consultant for the Concept Note participated in the reef restoration sessions at the 13th International Coral Reef Symposium and was thus able to benefit from meetings with scientific experts on this topic to gain an understanding of the current global scientific perspective on coral restoration.

In addition to the Project Steering Committee, representatives from national ministries in each country were consulted on numerous occasions and at various stages of project preparation to ensure that the proposed project design meets the specific national circumstances of each country. These consultations included the National Designated Authority (NDA) and the National Executing Entity (NEE) in Mauritius and Seychelles. The details of these consultations are further described below.

National consultations were held in each Partner State. For these national consultations, workshops were convened with representatives from relevant national ministries and NGOs. Representatives from the steering committee and UNDP were also in attendance. These workshops were held on: 8 May 2017 (Stakeholder workshop in Mauritius) and 12 May 2017 (Stakeholder workshop in Seychelles). Moreover, several bilateral meetings were held between September and December 2017, with the implementing partners in each partner state to agree on the activities and result framework.

Two Regional Steering Committees were held, one in Mauritius (08 May 2017) and one in Seychelles (20-21 June 2017), where the results of these consultations were used to further revise and update the logical framework for the proposed project. In addition, national arrangements for the implementation of the project were agreed.

A full participant list and summary of the discussion of the three Regional Steering Committee meetings and stakeholder meetings are included in Annexes 3, 4, 5 and 6.

A full stakeholder analysis has been completed during preparation of the full Project Proposal to inform the project design and to ensure that the vulnerable groups are identified, and their needs addressed. The stakeholder analysis is included in the Community Development Plan for Mauritius and Seychelles (Annex 7 and 9 respectively). In Mauritius, the stakeholder analysis will be updated as per output 1.1.1. The full range of stakeholders will ultimately be involved, including in particular coastal communities, who in Mauritius have already expressed an interest in taking part in coral restoration activities¹²⁸, and the tourism sector. In Mauritius, the involvement of hotels is likely to be co-ordinated by the hotel association, AHRIM.

Stakeholders have been identified through desk review of past projects, giving consideration to women led projects and local private sector stakeholders. Several consultancy meetings and interviews were conducted with members of the communities in the villages along the target sites, including some hotel association, key governmental and non-governmental Organisation intervening in in coral reef conservation and rehabilitation.

Canvassing was carried out to ensure that vulnerable and underserved groups would not be left out of the equation. Through key informants, informal interviews were held with village inhabitants and information was gathered in order to include the maximum number of stakeholders as well as underserved and underrepresented groups and stakeholders.

¹²⁸ Nazurally, N. and Rinkevich, B. 2014. A Questionnaire-based Consideration of Coral Farming for Coastal Socio-economic Development in Mauritius. *Western Indian Ocean J. Mar. Sci.* 12 (1): 47-56.

Focus groups were carried out among community members in the coastal areas of targeted areas, where they have identified processes that already work well and common visions of success for the project and their communities in relation to climate change. They have carried out SWOT analysis, defined goals, objectives and action plan and defined roles and responsibilities that they wished to have during the project implementation.

The civil society and private sector stakeholders consulted were: coastal community groups, local non-governmental organizations operating in the vicinity of the proposed rehabilitation sites and more particularly conservation organizations, fishers - both registered and non-registered, boat operators and hotel associations. The consultations carried out revealed overall a favourable attitude towards the perspective of a coral rehabilitation project. In Mahébourg, the fishers and boat operators were wary of the diversity of corals to be rehabilitated, as there had been a recent resurgence of branching *Acropora* in boat passage areas. Fishers consulted on this site were also part of an ongoing project to rehabilitate a local *barachois* and mangrove swamp for which they were receiving daily allowances. They revealed that this supplemental income was very much appreciated due to their economic vulnerability and fishers in Mauritius and Rodrigues expressed that any income associated with rehabilitation work would be similarly appreciated as an alternative to complement to their fishing income. Hotel groups were also very favourable to the project and some hotels had already started small-scale coral rehabilitation projects, mainly with the aim to raise awareness among their clients. The hotel stakeholders consulted welcomed the future technical expertise brought about by the project. NGOs consulted were already either actively engaged in coral rehabilitation projects or in the development phase of such projects, using a community-based approach, with scientists and technical experts working with local fisher groups and boat operators to identify adequate sites and engage them in rehabilitation work through both paid and non-paid basis.

A full gender analysis has been completed during preparation of the full Project Proposal to inform the project design and to ensure that the gender specific needs are addressed to realize women empowerment and gender mainstreaming. the youth and gender analysis reports for Mauritius and Seychelles are at Annexes 8, and 10, respectively

Both countries are taking significant steps to improve gender equality; for example, in Mauritius the Local Government Act of 2011 stipulates that at least one third of candidates for the municipal council and village council elections must be of either gender. As a result, the share of women on municipal councils rose from 13.5% in 2001 to 36.7% in 2012, and on Village Council elections, from 2.8% in 1998 to 25.4% in 2012.

J. Funding justification

Component 1. Enhancement of food security and reduction of risks from natural disasters through the restoration of degraded reefs in Mauritius.

Baseline (without AF Resources)

In Mauritius, as in all SIDS, the main climate change threats, confirmed in many cases by meteorological observations, are changes in rainfall patterns leading to flooding and landslides, extended periods of drought, increases in sea surface temperature, changes in ocean acidity which weakens the carbonate structure of reefs, and increases in storms, storm surges and sea level rise. Escalating coastal erosion and flooding events are already being felt in Mauritius.

Between 1998 and 2007, mean sea level rose by 2.1mm per year in Mauritius and since then has been rising by around 3.8 mm/year; average temperature has risen by 0.74°C when compared to the 1961-90 average; flash floods in 2008 and 2013 resulted in loss of lives; and

there has been an increase in the frequency of extreme weather events, heavy rains and storms¹²⁹. It is predicted that half of the beaches on Mauritius could disappear by the middle of the century, which would be disastrous for the tourism industry¹³⁰.

Flooding in the coastal areas of Mauritius is already increasing, affecting many of the most populated locations given that these locations are concentrated on the low-elevation coastal areas; large relative increases in flooding are projected in the small island region of the Indian Ocean¹³¹. In Mauritius, the impacts of cyclones and tropical storms have intensified¹³² and this trend is projected to continue as Mauritius lies in the South Western Indian Ocean cyclone basin. There is also evidence that wave action in coastal areas has increased as a result of climate change, with sea level rise exacerbating coastal erosion as the waves reach further inland at high tide.

Mauritius is particularly vulnerable. It is ranked 13th in terms of overall disaster risk (measured according to the extent that natural hazards - *floods, droughts, storms, earthquakes and sea level rise* - coincide with a vulnerable society) on the World Risk Index¹³³ (on this set of parameters it is at highest risk of all the African nations) and 7th on the list of countries most exposed to natural hazards.

In 2011, insured losses from natural disasters, especially coastal (and riverine) hazards, reached globally USD105 billion, an all-time high. The Indian Ocean, one of the most disaster-prone regions, is particularly vulnerable to storms and wave surge, coastal flooding and sea-level rise.

Mauritius has developed comprehensive action plans and strategies to adapt to the negative environment and socio-economic impacts of climate change, and also to protect and sustainably manage ecosystems, such as coral reefs, that provide services that will provide concrete adaptation measures for climate change.

Mauritius has a Climate Change Action Plan in place and has invested significant resources in starting to develop appropriate adaptation and mitigation measures, and planning is in place for the introduction of a Climate Change Bill. A National Climate Change Adaptation Policy Framework and a Technology Needs Assessment (TNA) identifying and prioritizing relevant technologies for adaptation to and mitigation of climate change impacts has been prepared that highlights the importance of adaptation to Mauritius. A Climate Change Information Centre has been set up, with the support of UNDP, the Inter-Regional Technical Support Component of the Africa Adaptation Programme and Japan International Cooperation Agency (**JICA**) funded by the Government of Japan¹³⁴.

In Mauritius, work is underway to strengthen the management of and expand the network of MPAs, with the support of the forthcoming GEF project, and this will help protect coral reefs *in situ*.

¹²⁹ http://environment.govmu.org/English/Climate_Change/Pages/Climate-Change.aspx

¹³⁰ Mauritius TNA

¹³¹ Nicholls, R.J. & Hoozemans, F.M.J. 2002. *Global Vulnerability Analysis*. In Schwartz, M. (Ed). Encyclopedia of Coastal Science, Kluwer Academic Publishers.

¹³² Chang-Seng, D. 2007. Climate Variability and Climate Change assessment for the Seychelles, Second National Communication (SNC) under the United Nations Framework Convention on Climate Change (UNFCCC), National Climate Change Committee, Seychelles.

¹³³ 2015 World Risk Index, UNU-EHS and the [Alliance Development Works/Bündnis Entwicklung Hilft \(BEH\)](#)
<http://www.worldriskreport.org/>

¹³⁴ http://environment.govmu.org/English/Climate_Change/Pages/CCIC.aspx

However, the costs of implementing all the adaptation measures are extremely high and for Mauritius, further active measures and financial and technical support are required to ensure that life and property are protected from disaster and that food security and livelihoods are assured.

Coastal erosion is being addressed in Mauritius through the continual upgrading of infrastructure (e.g. rock armouring, sea-walls, break-water/piers, groynes) and through reclamation. This strategy results in a fragmented approach, with the tourist industry covering costs to protect beaches, government financing the protection of public infrastructure, and private owners safeguarding their own investments. In extreme cases, infrastructure such as roads has to be moved away from the shoreline. Under the business as usual scenario, coastal erosion is thus likely to continue, affecting public and private/hotel beaches and impacting on the recreational enjoyment of the public and the willingness of tourists to both countries. The potential impact of coastal erosion on tourism in Mauritius is already of concern to the government and efforts are underway to reduce this but these are costly and not necessarily effective.

As coral reefs decline, fewer tourists will come for the purpose of diving and snorkelling, and already the government is promoting a strategy of greater diversification of tourist attractions.

Flooding of coastal communities will continue to increase; artisanal fish catches will continue to decline, and food security will be jeopardized. Coral reefs will be protected within the MPAs for their biodiversity values and for tourism and fisheries purposes, but MPAs are not always in locations where the coral reefs can provide buffering services to protect coastal infrastructure and communities, and the management of the MPAs rarely takes adaptation to climate change and food security into account.

Mauritius has undertaken pilot activities in coral reef restoration, but these have been uncoordinated and have often lacked sustainability and adequate resources for maintenance and monitoring. Existing adaptation efforts have not adequately incorporated Ecosystem based Approaches (EbA) to adaptation.

Additionality (with AF Resources)

Up to now coral reef restoration efforts have not been up to scale in Mauritius, despite the fact that Climate Change and El Nino regularly affect the existing coral reefs. Hence there is need to upscale coral reef restoration efforts significantly. Also, there is need to learn from other coral reef restoration efforts in the Indian Ocean so as to obtain the most climate resilient methods available and improve on them.

With AF financing, activities under the proposed project will result in the restoration of degraded coral reefs in key locations in Mauritius that ultimately will have the outcomes of:

- More effective shore protection and a buffering service against erosion and floods on the long term
- Enhanced economic activities, leading to improved livelihoods and greater food security as a result of increased fish catches for coastal communities, and increased enjoyment of reefs for tourists, leading to greater employment for local people through the tourism industry
- Have trained workforce available for future partnership in coral restoration activities, nationally.

The additional resourcing will provide an opportunity to upscale initiatives significantly to restore degraded coral reefs, and to ensure that they provide improved livelihoods for local communities and in the long-term benefit the national economy. The sites where coral reefs would be restored may well become visitor destinations in their own right, attracting scientists, tourists and the general public.

Component 2. Enhancement of food security and reduction of risks from natural disasters through the restoration of degraded reefs in Seychelles

Baseline (without AF Resources)

In Seychelles, as in all SIDS, the main climate change threats, confirmed in many cases by meteorological observations, are changes in rainfall patterns leading to flooding and landslides, extended periods of drought, increases in sea temperature, changes in ocean acidity which weakens the carbonate structure of coral reefs, and increases in storms, storm surges and sea level rise. Escalating coastal erosion and flooding events are already being felt in Seychelles.

Rates of sea level rise around Mahe in Seychelles have been measured at 1.46 mm a year¹³⁵. It has been estimated¹³⁶ that globally, without adaptation, a 1 m rise in sea level will produce a 14-fold increase in flooding compared to the situation without sea-level rise. Even under a lower sea-level rise scenario of 38 cm by the 2080s, the global increase in flooding will be seven-fold compared with the situation without sea-level rise. Shore wave heights are limited by water depths, so with the increase in sea level, the height of waves will also increase.

Flooding in the coastal areas of Seychelles is already increasing, affecting many of the most populated locations because these are concentrated on the low-elevation coastal areas, and there are predicted to be large relative increases in flooding in the small island region of the Indian Ocean¹³⁷. In Seychelles, the impacts of cyclones and tropical storms have intensified¹³⁸ and this trend is projected to continue. Although Seychelles is situated just north of the South Western Indian Ocean cyclone basin, the granitic islands are affected by the associated extreme rainfall and wave swells¹³⁹. There is also evidence that wave action in coastal areas has increased as a result of climate change, with sea level rise exacerbating coastal erosion as the waves reach further inland at high tide.

Seychelles is considered less at risk than Mauritius due to its favourable socio-economic status (it ranks 153rd) but lacks the ability to reduce overall risk: since the beginning of the 1990's, Official Development Assistance (ODA) flows have fallen by over 90% and this has placed a financial burden on the Government's budget. Furthermore, of the 86% of the Seychelles population living on Mahe, around 60% of people live in coastal areas; the remaining 14% of the population live mostly on Praslin and La Digue and almost all people live in the narrow coastal

¹³⁵ Chang-Seng, D. 2007. Climate Change Scenario Assessment for the Seychelles, Second National Communication (SNC) under the United Nations Framework Convention on Climate Change (UNFCCC), National Climate Change Committee, Seychelles.

¹³⁶ Nicholls, R.J. & Hoozemans, F.M.J. 2002. *Global Vulnerability Analysis*. In Schwartz, M. (Ed). Encyclopedia of Coastal Science, Kluwer Academic Publishers.

¹³⁷ Nicholls, R.J. & Hoozemans, F.M.J. 2002. *Global Vulnerability Analysis*. In Schwartz, M. (Ed). Encyclopedia of Coastal Science, Kluwer Academic Publishers.

¹³⁸ Chang-Seng, D. 2007. Climate Variability and Climate Change assessment for the Seychelles, Second National Communication (SNC) under the United Nations Framework Convention on Climate Change (UNFCCC), National Climate Change Committee, Seychelles.

¹³⁹ The Seychelles National Climate Change Committee, 2009. Seychelles National Climate Change Strategy.

plains. Thus around 75% of the population may be considered vulnerable to climate change risks and in need of adaptation measures.

In 2011, insured losses from natural disasters, especially coastal (and riverine) hazards, reached globally USD105 billion, an all-time high. The Indian Ocean, one of the most disaster-prone regions, is particularly vulnerable to storms and wave surge, coastal flooding and sea-level rise.

Seychelles has developed comprehensive action plans and strategies to adapt to the negative environment and socio-economic impacts of climate change, and also to protect and sustainably manage ecosystems, such as coral reefs, that provide services that will provide concrete adaptation measures for climate change.

In both countries, work is underway to strengthen the management of and expand the network of MPAs, with the support of the forthcoming GEF project, and this will help protect coral reefs *in situ*. The recently completed GOS-UNDP-GEF project 'Strengthening Seychelles' Protected Area System through NGO management modalities'.

In Seychelles, progress will be made toward adaption as a result of the Seychelles MSP Initiative which will produce a national multi-use marine spatial plan that guide the strategies and interventions to be undertaken through the Seychelles Conservation & Climate Adaptation Trust (SeyCCAT). SeyCCAT will ultimately lead to designation for some 30% of the EEZ as protected areas, half of which is planned to be strict no take zones.

However, the costs of implementing all the adaptation measures are extremely high and for both countries, further active measures and financial and technical support are required to ensure that life and property are protected from disaster and that food security and livelihoods are assured.

Coastal erosion is being addressed in Seychelles through the continual upgrading of infrastructure (e.g. rock armouring, sea-walls, break-water/piers, groynes) and through a strong focus on land reclamation. This strategy results in a fragmented approach, with the tourist industry covering costs to protect beaches, government financing the protection of public infrastructure, and private owners safeguarding their own investments. In extreme cases, infrastructure such as roads has to be moved away from the shoreline. Under the business as usual scenario, coastal erosion is thus likely to continue, affecting public and private/hotel beaches and impacting on the recreational enjoyment of the public and the willingness of tourists visit Seychelles.

As coral reefs decline, fewer tourists will come for the purpose of diving and snorkelling, and already the government is promoting a strategy of greater diversification of attractions.

Flooding of coastal communities will continue to increase; artisanal fish catches will continue to decline, and food security will be jeopardized. Reefs will be protected within the MPAs for their biodiversity values and for tourism and fisheries purposes, but MPAs are not always in locations where the reefs can provide buffering services to protect coastal infrastructure and communities, and the management of the MPAs rarely takes adaptation to climate change and food security into account.

Seychelles has undertaken pilot and large-scale activities in coral reef restoration, but these have been uncoordinated and have often lacked sustainability and adequate resources for maintenance and monitoring. In Seychelles, the Government has recognized as a shortcoming that existing adaptation efforts have not adequately incorporated EbA. Therefore, it has

identified EbA as its priority for adaptation fund financing—seeking to put in place the requisite management systems.

Additionality (with AF Resources)

With AF financing, activities under the proposed project will result in the restoration of degraded coral reefs in key locations in Seychelles that ultimately will have the outcomes of: (1) More effective shore protection and a buffering service against erosion and floods, and (2) Enhanced economic activities, leading to improved livelihoods and greater food security as a result of increased fish catches for coastal communities, and increased enjoyment of reefs for tourists, leading to greater employment for local people through the tourism industry

The additional resourcing will provide an opportunity to upscale initiatives significantly to restore degraded reefs, and to ensure that they provide improved livelihoods for local communities and in the long-term benefit the national economies of both countries.

The sites where coral reefs have been restored may well become visitor destinations in their own right, attracting scientists, tourists and the general public. These efforts are expected to increase public awareness of the coastal adaptation issues in Seychelles and an understanding of cost-effective solutions to climate change impacts.

Component 3. Knowledge management, training and sensitization to build regional capacity for sustainable reef restoration

Baseline (without AF Resources)

Institutional capacity for coral reef restoration will remain insufficient, with limited technical knowledge. Coral reef restoration efforts will remain small scale, wasting financial and human resources on initiatives that are not sustainable in the long term and efforts will remain fragmented and uncoordinated. No systematic knowledge management system with adequate ecosystem-based adaptation elements will be developed and instituted. Up-scaling of best practices will therefore be unlikely to happen.

Currently, there is no regional exchange of knowledge in coral reef restoration techniques and efforts. Neither is there a standardized approach in coral restoration efforts.

Additionality (with AF Resources)

With the financing rendered through the Adaptation Fund, decision makers, local communities and the general public will have a good understanding of coral reef restoration and how it will contribute to comprehensive adaptation measures. This approach will increase the likelihood that both countries will succeed in their adaptation efforts. Institutions will be strengthened in skills and capacity for active reef restoration, and knowledge generated and shared.

Moreover, the project will enable the implementation of regional capacity in coral reef restoration, with the promotion of a more standardized science-based approach and cumulative knowledge through sharing experiences. All people engaged in the coral reef restoration project will benefit from the latest scientific knowledge and techniques.

Currently results in coral reef restoration have been publicized for some projects in Seychelles but not all projects in Mauritius and Seychelles. As such AF support will provide regional and international visibility on actions initiated and results obtained in both countries. The AF

financing will also enable for improved livelihood opportunities, e.g. creation business opportunities as a result of coral reef restoration activities at the community level.

With AF financing, Mauritius and Seychelles will enable the compilation of spatio-temporal data on current wave pattern, which will be used as a planning tool for future restoration to maximize coastal protection and minimize potential negative impacts on the coasts. Additionally, the AF financing will enable the review of the legislative and institutional framework of both countries to develop a regional coral reef restoration plan.

K. Project Sustainability

Marine Protected Areas (MPAs) with effective enforcement have been targeted for restoration (at selected sites within MPAs) in both Mauritius and Seychelles because: 1) they provide a protected environment so the effects of the coral reef restoration activity can be scientifically quantified without interference from confounding factors (i.e. fishing, anchor damage from boats, runoff pollution, etc), and the coral reefs restored there will also be protected as per MPA regulations, 2) they have an existing ecotourism infrastructure so any increase in job opportunities and benefits to locals can be incorporated quickly within the MPA system, 3) they are an ideal location to showcase the coral reef restoration work for educational, capacity building and ecotourism purposes because there's already a communication infrastructure in place for them.

The development of a business plan or a coral reef economic and financial strategies or business plan for each coral reef restoration initiative is a key element in ensuring sustainability. A summary business plan is shown in Part II "Project Justification". In particular, the project will evaluate the use of Corporate Social Responsibility (CSR) funding. In Mauritius, under the Finance Act 2015, all companies must put 2% of their chargeable income of the preceding year towards a CSR Programme, which must have objectives of benefiting Mauritian communities. Similarly, in Seychelles, there is a CSR contribution of 0.5% of the monthly turnover, of which half can go to approved NGOs. Such regulatory set-up in both countries provides opportunities for private sector finance (especially the tourism industry) to actively and directly support small scale coral reef restoration activities through the CSR funding. The involvement of other industry partnerships in active coral reef restoration activities will be streamlined once the active coral reef restoration activities are more standardized, their effectiveness and results monitored regularly and disseminated widely. Moreover, coral reef restoration is in line with the Mauritian Government's budgetary measure in 2017¹⁴⁰ to promote development of alternative livelihood opportunities for coastal communities through coral farming by fishermen

Although some reluctance was observed in the past from hotels to contribute to conservation initiatives, recently, the number of hotels involved in marine and coastal conservation work is growing. Disappointments expressed by tourists in their diving and snorkelling experiences in these countries in recent years might be helping the hotels to recognize the importance of marine and coastal ecosystem conservation and restoration work.

Development of linkages with related projects will help to further develop and ensure sustainability. For example, the COI Islands project, currently in its second phase but due to complete in 2017, contains a number of activities related to coral reef monitoring including the establishment of a regional coral reef facility and development of the Coral Reef Information System (CRIS).

¹⁴⁰ Government of Mauritius, Budget Speech 2017-2018

The long-term sustainability of active coral reef restoration efforts can only be ensured if coral recruitment is enhanced, either by the coral transplants becoming an additional source of recruits or by the attraction of recruits from elsewhere due to the settlement cues associated with the presence of corals¹⁴¹. This indicates the importance of establishing a permanent monitoring programme at each coral reef restoration site to develop a full understanding of the evolution of the restored coral reefs.

To ensure long-term sustainability of active coral reef restoration effort and scale up of restoration activities a regional coral reef restoration plan will be developed. This will consider the management of coral reefs, enforcement plan, DRR aspect, the strategic restoration plan, knowledge sharing, capacity building, regional studies and long term collaboration of the countries in the region.

Feasibility and experience built on the project will appeal to other funding donors for future coral restoration projects. A collaboration with private sector on coral reef restoration activities is also viable. During consultative process, it was noted that the private sector was also interested in the coral restoration works, however, they were not aware of the coral reef restoration in a changing climate context. As such, securing funds from potential funding donors and collaboration with private sector will further ensure the sustainability of the coral reef restoration efforts.

L. Environmental and social impacts and risks

To avoid or reduce potentially negative impacts of the project activities, the potential risks have been identified and analysed in line with the AF's Environmental and Social Policy, as well as the UNDP Social and Environmental Screening Principles (SESP), see Annex 2. The project proposal is categorised within **Category B**, considering that some risks are being observed but are considered low.

Social principles to identify potential negative impacts: Despite the positive impacts that can enhance the project results, some environmental and social principles of the AF could be triggered by the project in terms of environmental and social impact and risks. An evaluation of the project against each of the AF Environmental and social principles is described below and summarised in Table 9.

Table 9 Checklist for environmental and social principles

Checklist of environmental and social principles	No further assessment required for compliance	Potential impacts and risks – further assessment and management required for compliance
<i>Compliance with the Law</i>		X
<i>Access and Equity</i>		X
<i>Marginalized and Vulnerable Groups</i>		X
<i>Human Rights</i>	X	
<i>Gender Equity and Women's Empowerment</i>	X	
<i>Core Labour Rights</i>		X
<i>Indigenous Peoples</i>	X	
<i>Involuntary Resettlement</i>		X
<i>Protection of Natural Habitats</i>		X

¹⁴¹ Montoya-Maya PH, Smit KP, Burt AJ, Frias-Torres S. (2016). Large-scale coral reef restoration could assist natural recovery: a case study in Seychelles, Indian Ocean. *Nature Conservation*

<i>Conservation of Biological Diversity</i>		X
<i>Climate Change</i>	X	
<i>Pollution Prevention and Resource Efficiency</i>	X	
<i>Public Health</i>	X	
<i>Physical and Cultural Heritage</i>	X	
<i>Lands and Soil Conservation</i>	X	

Principle 1: Compliance with the Law.

The project will be undertaken in compliance with domestic law of Mauritius and Seychelles and with all relevant international laws. The consultative process during the concept note and full project proposal allowed all stakeholders to review the relevant legal requirements for both countries and ensure that the proposed project is aligned with regional and national laws as well as policies and plans for coral reef restoration and climate change adaptation. Further specifications are expected to arise as a result of the new budget measure proposed by the Government of Mauritius, namely measure 104¹⁴² which aims to promote coral farming by fishermen and small and medium enterprises (SMEs) for developing ornamental corals for the tourism sector, aquarium market and high-end jewellery manufacturing.

According to the laws of Mauritius and Seychelles, it is prohibited to remove corals from the sea and trade of corals are illegal. The project will be implemented within MPAs, Fisheries Reserves and Special Reserves. These areas already have enforcement procedures put in place.

At present, the regulatory framework for coral reef restoration in Mauritius falls under the Marine Resources and Fisheries Act of 2007. It also provides for the management, conservation, protection of fisheries and marine resources and protection of marine ecosystems, and covers the establishment of aquaculture enterprises and MPAs. In Seychelles, the Environmental Protection Act 2016 provides for the protection, preservation and improvement of the environment and for the control of hazards to human beings, other living creatures, plants and property. List of legislations, guidelines and policies that regulate coral farming and the means to meet the requirements have been described in Part II Section E of the proposal.

Both Mauritius and Seychelles require Environment Impact Assessment (EIA) studies for some listed undertaking under the Environment Protection Act 2002 (Mauritius) and the Environmental Protection (Impact Assessment) Regulations 1999 (Seychelles). It is to be noted that works related to coral reef restoration are not one of the listed undertakings for both countries requiring an EIA.

There is a slight risk that the restoration activities through coral nurseries, might result in poaching or illegal/uncontrolled traffic of corals.

The regulatory framework provides for the control of the coral nurseries in both countries. The relevant authorities will provide enhanced enforcement measures so as to ensure that private sector involvement in coral reef restoration follows required standards and chain of custody for corals grown in nurseries. It is to be noted that MOEMRFS and MECC are the Ministries responsible to enforce the protection of MPAs and marine ecosystems in Mauritius and Seychelles, respectively. They are the Executing Entities for this project. In the event poaching has been observed, the responsible Ministry will take all necessary legal actions against the offenders.

¹⁴² Government of Mauritius (2017), Budget Speech 2017-2018, pg. 16

Presently in Mauritius, the Fisheries Protection Service of the MOEMRFS and the National Coast Guard are working together for patrolling the MPAs and enforcing the laws at sea. Several patrols are being carried out. The management of the nurseries and restoration sites will be through increased enforcement, in both countries. Measures would be taken to enhance community policing around the coastal areas and with the boat operators to sensitize the latter on the importance of corals.

Measures to enhance enforcement have already been initiated. In Mauritius, under a GEF project on Mainstreaming Biodiversity, staff from SEMPA have already received a boat, vehicle and equipment to strengthen the enforcement in the SEMPA. Same will be done for the enforcement of the Blue Bay Marine Park this year.

Workers and communities will be informed that they will be responsible for any offences that they may commit and as such will be accountable. In this way AF, UNDP and the project cannot be accused for any illegal action that may occur. Moreover, under the project there will be a lot of public sensitization on the importance of corals, their protection and offences for illegal action towards corals.

Additionally, in Mauritius, another means to control on any programmes, activities involving coral culture is through registration at the MOEMRFS. For instance, the on-going “Coral Culture Training Programme” currently being run by the MOI and AFRC, coastal communities participating in the project are being registered under a training programme under which they will be eligible to “work with corals” under the supervision of MOI/AFRC/FPS/NCG. NGOs who will be participating in this project will also need to register under the said training programme.

It is to be noted that in Mauritius there will be no trade of corals. Aquaculture corals from this project will serve for restoration purposes only. Rehabilitation of degraded reefs will allow for restoration of reef ecosystem services. Moreover, measure to control traffic of protected species are already put in place in Mauritius. The Competent Authority (Fisheries) of the MOEMRFS, is also responsible for all export and import of marine organisms. They make regular intervention at the airport to detect illegal import and export of any illegal marine organisms.

Principle 2: Access and Equity.

The project will provide fair and equitable access to benefits in a manner that is inclusive and does not impede access to basic health services, clean water and sanitation, energy, education, housing, safe and decent working conditions, and land rights.

During the implementation of the project under Component 1 for Mauritius, the two executing entities – the Albion Fisheries Research Centre (AFRC) and the Mauritius Oceanography Institute (MOI) in collaboration with non-governmental organizations selected through a Call for Proposals, at each of the selected sites, will work to ensure that members of vulnerable groups – particularly individuals who depend on the coastal zone for their livelihood – become direct beneficiaries of the project. The same approach will be taken in Seychelles by the three Responsible parties in all the 4 restoration sites.

Adequate safety measures will be taken for all those involved in the practical restoration work, particularly with regards to SCUBA diving. The lessons learned from the project will then allow private sector stakeholders such as hotels to continue supporting the inclusion of vulnerable groups in coral reef restoration efforts during and after the project. The development of coral reef economic and fiscal strategies and business plans for restoration work in each country will ensure a full understanding of the costs involved.

Although the labour requirements are intensive, the project will not involve a large number of local community participants at each site due to the specialized nature of the skills involved. As such, there is a risk that this limits access to a larger number of community members to participate directly in the project.

Project proponents will work with fishermen and other coastal stakeholders to ensure that the locations of the nursery and restoration sites do not limit access to traditional fishing grounds or impede boat passage for tourist operators. The project will not exacerbate existing inequities, particularly with respect to marginalized or vulnerable groups. All but one of the restoration sites are selected in MPAs and fisheries reserves, where boat access are already regulated and any fishing activities prohibited (for both registered and unregistered fishers). Regular patrols from coast guards and other government officials are carried out regularly to ensure compliance to the laws (as described in Part II Section F). As such, coral restoration activities taking place inside MPAs and fisheries reserves will not affect anyone's fishing activities.

One coral restoration site in Seychelles (Anse Forbans) is deliberately selected outside of a protected area with an aim to pilot community-based coral restoration activities in Seychelles for potential future replication, to expand community-based ecosystem restoration activities to reduce their climate change vulnerabilities and to prove that coral restoration activities can be successful even outside of protected areas as long as strong community engagement is ensured. (refer to the Proposal on page 19)

This coastal region has a local community that is quite dependent on artisanal fisheries. Degradation of coral reefs in this locality has made the local community more vulnerable. The coastline at Anse Forbans has suffered severe erosion over the last few years, due mainly to the loss of the coral reef and its change from a coral dominated community to a macro-algae dominated community. This has led to a reduction in reef-crest rugosity and increased long-shore currents causing sand loss and erosion. This has also led to the reduction of their fish catch. In other words, the loss of coral reefs has left them with less natural protection from coastal storms and with less income and food security due to reduced catch. Given the situation and resulting from awareness activities by MCSS, the community has expressed strong willingness to engage in the coral restoration activities for the expected long-term DRR and food security benefits.

During the coral restoration activities under implementation, there will most likely be a change in their fishing practices (either on the areas they fish, or the route they get to their fishing ground, etc.) in order to ensure the effectiveness of the coral restoration activities; however, those changes in their fishing practices will NOT be involuntary. Rather, they will be willingly and voluntarily implemented by the communities to ensure the effectiveness of coral restoration activities, because they are the ones implementing coral restoration activities. There will be sufficient sensitization and training activities supported by the project to ensure that the communities appreciate the various linkages between their activities and their impacts on marine ecosystems, as well as the linkages between the healthy marine ecosystems (including restored corals and fisheries) and ecosystem goods and services that they provide to the communities in a long term.

As from the start of the implementation of the project, all the community members neighbouring the project site (including the vulnerable and marginalised groups) will be informed of the grievance mechanism put in place by the proposed project. They will be informed that they could voice out their comments and complaints. The grievance mechanism has been explained in Part III Section C of the proposal.

In the event the community-based approach is found successful in the coral reef restoration activities, the restoration plan could be expanded, and as such, involve a larger number of community members. In Mauritius, there is political commitment, since the Government promotes SMEs for coral restoration under the direction of MOEMRFS.

Other possible risks identified include limited access to published papers and data on regional studies that may impact on the regional studies. Also, if communication plan not well prepared there was a risk that some of the communities will not be aware of the works carried out and the results of the restoration works.

Principle 3: Marginalized and Vulnerable Groups.

In Mauritius 8.5% of the population live below the national poverty line, and 39.3% of the population of Seychelles live under the Basic Needs Poverty Line.

According to social register of Mauritius, there are some communities around the target site in Mauritius (e.g. Cite La Chaux,) that have been designed as pockets of poverty. These communities are the most vulnerable to coastal flooding either because they live on the shoreline or in reclaimed areas of wetlands at risk of flooding or because the structures they live in are not robust enough to withstand flooding. Income sources in these areas are not very varied, and the majority of its residents (54 % of men and 61% of women) earn between USD 115 and USD 233 per month, being at or below the national poverty line.

Also, these people normally heavily dependent on marine environment adjacent to Blue Bay Marine Park and Grand Port Fishing Reserves for their livelihood. There are approximately 194 registered Fishermen and much more that are not registered. And in Rodrigues, the coastal community are even more dependent on the ocean for their livelihood. Furthermore, there are many more registered fishermen who are women

As such their vulnerability to coastal flooding, storms, hurricanes, coastal erosions or any other potential negative impacts associated with climate change is worsened due to their limited livelihood means and high dependency on the healthy and abundant marine and coastal ecosystem.

However, it is to be noted that since the coral restoration activities will be implemented in MPAs and Fisheries Reserve, where fishing is already prohibited by laws and the laws strictly enforced; thus, we expect no changes in fishing activities by fishers (either registered or unregistered) by the project interventions. The project will, on the contrary, positively benefit these vulnerable and marginalised groups in both short-term and long-term. On the short term, some of these communities would have employment opportunities due to community-based approach of coral reef restoration activity in Mauritius and Rodrigues. These new types of employment associated with coral restoration activities are expected to be promoted beyond the project implementation period in Mauritius with the Government's policy to promote coral restoration efforts involving SMEs. On the long term, fishers who are fishing in the areas adjacent to MPAs and fisheries reserves will benefit from the spill off effect (increase of fish population in region neighbouring the project sites) as a result of coral reef restoration in the region.

In Seychelles some 40,000 people live in coastal areas and are vulnerable to coastal flooding, storms and coastal erosion. Moreover, around 10% of the households are to some extent dependent on small-scale artisanal fisheries. Tourism in Seychelles contributed 46.1% of the country's GDP, providing 56.4% of national employment and generating 33.2 % of the country's

foreign exchange earnings. As such coral reef protection is of national interest and we consider all the coastal population is considered vulnerable.

It is to be noted that much of the coastline at Anse Forbans has suffered severe erosion over the last few years, due mainly to the loss of the coral reef and its change from a coral dominated community to a macro-algae dominated community. This has led to a reduction in reef-crest rugosity and increased long-shore currents causing sand loss and erosion. The projected restoration should also help to reduce such events and as such provide direct benefits to those currently affected.

The project will avoid imposing any disproportionate adverse impacts on marginalized and vulnerable groups including children, women and girls, the elderly, displaced people, refugees, people living with disabilities, and people living with HIV/AIDS. Vulnerable groups including community members and particularly women and youth living in proximity to the proposed sites of interventions, living in deprived socio-economic conditions and who are heavily dependent on the marine environment for their livelihoods were consulted during the project development phase to identify needs and define roles and responsibilities. The inclusion of these targeted communities is a core part of the implementation of the project and its financial, environmental and social sustainability. Although the number of direct beneficiaries remains small, the project is expected to build capacity within the larger community for alternative livelihoods. Sensitization and awareness campaigns undertaken locally will further avoid the exclusion of marginalized groups and ensure their participation in the decision-making processes at a local level.

At Anse Forbans the project will be implemented by the community for the community. Any restriction will not be involuntary and only temporary. Rather they will be voluntary to ensure that their hard work (coral reef restoration) is not impacted. There will be no economic deprivation, rather the proposed restorative activities will improve the local reef and thereby increase marine life generally on these reefs to the benefice of both visitors (tourists) and fishers.

Principle 4: Human Rights.

The project will respect international human rights. The project integrates overarching human rights principles in order to strengthen social and environmental sustainability by including measures to assist the republics of Mauritius and Seychelles to implement human rights. UNDP consistently applies the Human Rights Based Approach (HRBA) in all programming, taking into account the responsibilities of the duty-bearers and the obligations of the right-holders. The project design includes the identification of the government authorities as the primary enforcer in ensuring effective management of the nursery grown corals and the transplanted corals in the lagoons as they provide essential ecosystem services to an island nation.

The Mauritius and Seychelles governments recognize the importance of partnerships across various sectors, and the integral engagement and involvement of the rights-holders themselves in this agenda. These rights-holders include fishermen, NGOs and other community members participating in the project efforts, integrating community views, limiting negative impacts and improving livelihoods for coastal stakeholders. As an adaptation project with an ecosystem approach, the project promotes the right to food, the right to life and health, and the right to an adequate standard of living. The project will also take special care in respecting the right to non-discrimination, particularly in connection with the integration of vulnerable groups.

Moreover, Mauritius and Seychelles are not among countries cited in any Human Rights Council Special Procedures. Therefore, there is no relevant human rights issue to consider.

Principle 5: Gender Equality and Women's Empowerment.

Gender equity and women's empowerment has been considered from the early project development phases, with the development of the Gender and Youth Assessment for each country outlining the baseline context, challenges, potential climate change implications, and the Gender and Youth Action Plan (Annexes 8 and 10).

In Mauritius, men and women enjoy the same legal status and rights under the constitution and law. The courts uphold these rights. Nonetheless, cultural and societal barriers prevented women from fully exercising their legal rights. The Ministry of Gender Equality, Child Development, and Family Welfare has a mandate to promote the rights of women. The National Women Entrepreneur Council, operating under the ministry, is a semiautonomous government body established to promote the economic empowerment of women. Women have equal access to credit and can own or manage businesses¹⁴³.

In Seychelles, the law provides for the same legal status and rights for women as for men, and the society is largely matriarchal.¹⁴⁴ There was no officially sanctioned discrimination in employment, and women were well represented in both the public and private sectors. There is no economic discrimination against women in employment, access to credit, equal pay for equal work, or owning or managing a business. Inheritance laws do not discriminate against women.

In both countries, boys and girls have access to free primary and secondary level education. Literacy rates and school enrolment rates are high for both boys and girls. While boys and girls are subject to equal education opportunities, some stereotypical divides are observed in the subjects they major at the tertiary education level.

Employment opportunities are still better for men than for women, especially at the managerial level jobs and jobs with higher wages. It is observed in both countries that members of female-headed households yearn less with less opportunities for various factors.

Both female and youth representation in the decision-making are limited, and voice of women and/or youth are not organized well enough to be heard at the political arena. With support from women organization and youth organization, positions of women and youth should be further strengthened and their voice be heard.

The proposed project interventions will not pose any risks related to gender equity and gender (and youth) empowerment. Rather, the project is designed so that its implementation will contribute to the empowerment of women and youth in economic activities, through improved livelihoods, and active participation in technical activities and scientific researches related to coral restoration efforts, contributing to the reduction of the gender stereotyping in professions. A number of indicators included in the Results Framework are designed specifically to realize these benefits related to women and youth empowerment.

Equal participation of men and women in decision-making forums as well as capacity building activities will be sought. In Mauritius, women from coastal communities have expressed an interest in supporting awareness raising activities and want to be a part of local decision-making forums. In addition, fisherwomen as well as women who have strong swimming and underwater skills in Rodrigues and the South of Mauritius will have an opportunity to participate in coral reef restoration training and implementation. The project will also give particular attention to capacity building of female scientists.

¹⁴³ Mauritius (2016) Human Right Report

¹⁴⁴ Seychelles (2016) Human Right Report

Project Gender Officer(s) will be recruited to monitor progress in implementation of the project Gender Action Plans and to ensure the intended gender and youth empowerment results will be achieved through the project implementation.

Principle 6: Core Labour Rights.

Mauritius and Seychelles have both ratified to the eight fundamental labour rights conventions. The project will meet the core labour standards as identified by the International Labour Organization. Components 1 and 2 will involve intensive labour for a limited number of individuals for the installation of coral reef nurseries, maintenance and transplantation to restoration sites. In Mauritius, community members will be recruited to provide assistance to scientific SCUBA divers. The budget developed has earmarked daily wages for community members based on the prevailing practices for minimum wages, and a clear record of works carried out. Safety measures for all underwater activities will follow internationally recognized standards.

The direct beneficiaries may be exposed to the risk of accidents, through the mishandling of materials and equipment, while implementing the proposed coral reef restoration work. As such, during the project's implementation, the PMT and National Project Teams will ensure compliance with national and international labour laws and will provide adequate protection equipment for workers, training (advanced training for SCUBA diving activities), insurance and access to medical decompression chambers.

Principle 7: Indigenous Peoples.

Not applicable: there are no indigenous peoples in both the Republic of Mauritius and the Republic of Seychelles.

Principle 8: Involuntary Resettlement.

In Mauritius, all the project sites are selected within MPAs and Fishing Reserve. Since fishing is already prohibited (for both registered and non-registered fishers) in these protected areas, coral reef restoration works will not cause any loss of access to fishing grounds and thus there will not be any economic displacement.

Anse Forbans (in Seychelles) is the only restoration site that is not within a MPA or a Reserve. This site is a fishing ground for the neighbouring activities. One coral restoration site was deliberately selected outside of a protected area with an aim to pilot community-based coral restoration activities in Seychelles for potential future replication, to expand community-based ecosystem restoration activities to reduce their climate change vulnerabilities and to prove that coral restoration activities can be successful even outside of protected areas as long as strong community engagement is ensured. (refer to the Proposal on page 19). Anse Forbans was selected due to the high interests by the communities. Restoration at Anse Forbans will be implemented by the community for the community. Any restriction will be voluntarily set by the community themselves to ensure that their hard work (coral reef restoration) is not impacted. The possibility of involuntary resettlement is considered to be remote owing to the fact that 1) the high level of commitment and interests by the community themselves are confirmed during the proposal development stage and 2) there are other fishing areas in the neighbouring region.

The risk of economic deprivation is very low, rather the proposed restorative activities will improve the local reef and thereby increase marine life generally on these reefs to the benefit of both visitors (tourists) and fishers. Strong communication efforts will be sustained through the project implementation to ensure the buy-ins and cooperation of the fishers.

Nonetheless, there is a remote possibility that any community members may feel they have to involuntarily alter their fishing activities, leading to involuntary resettlement, due to voluntary measures set by the community. As from the start of the implementation of the project, all the community members neighbouring the project site (including the vulnerable and marginalised groups) will be informed of the grievance mechanism put in place by the proposed project. They will be informed that they could voice out any restriction that they may be victim. The grievance mechanism has been explained in Part III Section C of the proposal. In an extreme case that a grievance received cannot be resolved without a change in the project location, then the project would consider selecting another coral restoration site within a protected area, where no fishing activities are allowed, to ensure that the project will cause no impacts on the existing fishing activities of any fishers.

Further, the Environment Unit of UNDP will collaborate with the Socio-Economic Development Unit to monitor the Marshall Plan on poverty to ensure that these vulnerable community are not negatively impacted and are benefiting from the project through participation.

Principle 9: Protection of Natural Habitats.

The project proposal aims to restore 2 reef sites in the Marine Protected Areas in Mauritius (Blue Bay Marine Park and South East Marine Protected Area) and 3 sites in the MPAs of Seychelles (Cousin Island, Curieuse Island and Ste Anne) and one non MPA site in Seychelles (Anse Forbans-pilot site). The project will impact positively these marine habitats, since it aims to restore the damaged coral reefs and increase the biodiversity of the ecosystem.

The main legislations for Marine Protected Areas in Mauritius are: The Fisheries and Marine Resources Act (2007), The Environment Protection Act (2002); and the Marine Protected Areas Regulations (2001). In Seychelles, the MPAs are regulated through: the National Parks and Nature Conservancy Act (1969); the Protected Areas Act (1967); the Environment Protection Act (2016); the Wild Animals and Birds Protection Act (and associated regulations) (1966); and the Fisheries Act (1987).

The project will not involve unjustified conversion or degradation of critical natural habitats, including those that are: (a) legally protected; (b) officially proposed for protection; (c) recognized by authoritative sources for their high conservation value, including as critical habitat. The ecosystem-based approach to adaptation will support the protection of natural habitats and help critical habitats within Marine Protected Areas recover from climate-change related bleaching and other impacts. By engaging with local stakeholders and involving them directly in project implementation, it is expected that management of these protected areas will improve.

Although it is not possible to completely eliminate risks that some small areas of natural habitat may be disturbed in the construction of nursery sites, due to mishandling of material or equipment, science-based coral reef restoration work, proposed by this project, will avoid the risk of impacting natural habitats when installing ocean nurseries and intervention in restoration sites as much as possible. A detailed science-based evaluation of nursery and restoration sites, which is included in the proposed activities, will help minimize such risks. The similar approach has already been tested in previous work done in Seychelles, which successfully minimized the impacts on the existing habitats from the installation of the nurseries and the restoration sites.

Being MPAs and Fishing Reserves, all access and activities are regulated and controlled, and fishing is strictly prohibited. All precautions will be taken to ensure that the natural habitat remains undisturbed, as far as possible. Training will be provided to Responsible parties, workers and community members that will be directly involved in the project to ensure the protection of natural habitat. Moreover, in the event that there is need to displace some living species, same will be done in the presence of the authority (e.g. Fisheries officers of the MOEMRFS in Mauritius). Additionally, a complete survey (e.g. current pattern, coastal water quality, biodiversity survey) will be undertaken during the first year of the project implementation to establish the baseline information of the natural habitats for future monitoring purposes. In the long run, the project activity will restore the damaged coral reefs.

Principle 10: Conservation of Biological Diversity

The project will be implemented in MPAs as described in Principle 9. Being MPAs, the project sites have high level of biodiversity. However, with the past coral bleaching events that occurred in both countries due to increase in sea surface temperature amplified by Climate Change, the biodiversity of these MPAs has been greatly affected. The project therefore aims to restore the damaged coral reefs in the MPAs and ultimately, will improve the biodiversity of these ecosystems.

The project is designed and will be implemented in a way that avoids any significant or unjustified reduction or loss of biological diversity. There will be no introduction of known invasive species into the MPAs.

The science-based coral reef restoration will not harm the donor colonies where the coral nubbins are extracted. This was tested already in the previous efforts in Seychelles. As long as the maximum amount to be extracted from a donor coral is limited to 10 % per colony volume, damage to donor colonies can be avoided.

Both Mauritius and Seychelles are dominated by patch reefs harbouring significant coral biodiversity. Over 6 years, the target is to farm 140,000 corals in Mauritius and 103,500 in Seychelles. Coral nubbins will be collected from donor colonies.

Coral reef restoration work will be carried out mainly with identified based on a set of criteria which include climate change resilient species, resilient strains, colony state and health, colony size, amongst others .

Depending on species, colony size, colony type, colony state and health, coral nubbins will be taken from the wild for culture in nurseries. Based on studies undertaken by the MOI, 10% nubbins taken from a *Pocillopora verrucosa* colony of approximate size diameter 25cm may amount to a total of 10-12 fragments. However, 10% nubbins taken from a *P. eydouxi* colony of approximate size diameter 35cm may amount to a total of 5-8 fragments. For *Acropora selago*, 10% nubbins taken from a colony of approximate size diameter 40cm may amount to a total of 18-20 fragments. On the other hand, for *A. muricata*, which usually covers whole patches of reefs (but with patches comprising several colonies, which are usually hard to demarcate among each other), 10% nubbins taken from a patch of approximate size diameter 2000cm may amount to a total of 200-220 fragments. Based on these findings, it is estimated that 140,000 fragments will be acquired from a total area of 7.7ha of healthy reef.

It is possible that the focus on climate-resilient species will lead to a loss of genetic diversity in the marine ecosystems. Asexual reproduction (fragmenting) of climate resilient species in coral reef restoration aims to stabilize and stop the degradation of the restoration sites. Previous work shows that once a site has been restored with nursery grown corals using asexual reproduction,

the newly transplanted corals perform normal sexual reproduction and the restored sites recruit new juveniles of the coral species used in the restoration action but also coral species coming from elsewhere through larval drift in ocean currents. Therefore, the larval attraction effect generated by the restored site ensures the increase of biodiversity over time.

Principle 11: Climate Change.

The proposed project will not result in any significant or unjustified increase in greenhouse gas emissions or other drivers of climate change.

Principle 12: Pollution Prevention and Resource Efficiency

The project will be implemented in a way that meets applicable international standards for maximizing energy efficiency and minimizing material resource use, the production of waste, and the release of pollutants. The project will not require significant amounts of water, energy, materials or other natural resources. The project is not likely to result in the production of significant quantities of wastes, especially of hazardous or toxic wastes. Efforts will be made to use materials that are not hazardous (i.e. using marine cement instead of epoxy). Wherever possible, recycled materials will be used for the establishment of nurseries. The project will not produce significant volumes of effluents or air pollutants, including greenhouse gases. The project will not affect important water bodies or significantly affect water regimes, as it will use seawater. The project will not generate significant nuisances such as air pollution, noise, vibration and odours.

Principle 13: Public Health

The project is designed and will be implemented in a way that avoids potentially significant negative impacts on public health. Healthier, more resilient coral reef ecosystems in each country will have positive impacts on health, supporting livelihoods and local economies. Two of the five project sites are characterised by having low-income population with low education levels. The impacts of climate change on the marine resources have reduced the availability and access to food. The proposed project is expected to have a positive impact in food security in the long term.

Principle 14: Physical and Cultural Heritage

The project does not entail any risk for physical and cultural heritage. The land nurseries will be constructed in sites where no physical and cultural heritage has been identified. The other nurseries will be ocean based. The project is designed and will be implemented in a way that avoids the alteration, damage, or removal of any physical structures.

Principle 15: Lands and Soil Conservation

The project does not involve productive lands or land that provides valuable ecosystem services. As the sites are located within MPAs, all efforts will be made for an integrated approach to coastal zone management in the context of climate change adaptation, and linkages with sustainable land and coastal management efforts will be made. In Mauritius, the integrated coastal zone management (ICZM) committee on coral reefs will have an important role to play to support in the follow-up of the project. Moreover, the project is expected to have a positive impact on coastal preservation. The restoration of coral reefs will potentially protect some 2.5 Km of coast line in Mauritius and some 600m in Seychelles.

Table 10 Environmental and social impacts and risks

Check List of environmental and social principles	Potential impacts and risks
<i>Compliance with the Law</i>	There is a slight risk that the restoration activities using coral nurseries, might result in poaching or illegal/uncontrolled traffic of corals. Probability (P)=1 Impact (I)=2
<i>Access and Equity</i>	Although the labour requirements are intensive, the project will not involve a large number of local community participants at each site due to the specialized nature of the skills involved. There is a risk that this limits direct participation to a larger number of community members. In Seychelles, access to fishing ground at one coral restoration site (Anse Forbans) will be temporarily limited. Although such restriction will be imposed by the community themselves voluntarily, in case there is any grievance emerging from any individual fisher(s) who feel their access to their fishing ground is involuntarily removed from them, it will be dealt with properly through the grievance mechanism set for the project and through a social response mechanism by UNDP Mauritius/Seychelles. P=2 I=2
<i>Marginalized and Vulnerable Groups</i>	At the coral restoration site in Anse Forbans, community members will have to alter their fishing activities temporarily to protect the coral restoration site. A communication plan will be in place to sensitize each member of the community how such temporary fishing restriction will contribute to the restoration of corals and its ecosystems, leading to the better fishing experiences in a long run. As all other coral restoration sites are within MPAs or Fisheries Reserves, the project implementation will not affect anyone's fishing activities, including those by marginalized and vulnerable groups (e.g. unregulated fishers). A communication plan will sensitize community members, fishers (both registered and unregistered) and others whose livelihood depend on the healthy coral ecosystems, that the coral restoration activities within MPAs and Fisheries Reserves will bring spill-over positive impacts to those who fish areas adjacent to those MPAs and Fisheries Reserves in a long run. P=1 I=1
<i>Human Rights</i>	Not applicable
<i>Gender Equity and Women's Empowerment</i>	Not applicable
<i>Core Labour Rights</i>	There is a risk of accidents due to mishandling of equipment or material P=2 I=2
<i>Indigenous Peoples</i>	Not applicable
<i>Involuntary Resettlement</i>	Only one coral restoration site, which is selected outside of MPA or Fisheries Reserves, might potentially cause an involuntary alternation of fishing activities of local community member(s) due to the project intervention. Communities at Anse Forbans are planning to set voluntary measures to restrict fishing activities at their coral restoration site to protect the site. Although the measures are proposed, set, and enforced by the community themselves, there is a remote risk that this may lead to a situation where a community fisher(s) feel that their fishing activities are involuntarily altered, resulting in involuntary economic resettlement. P=1 I=4
<i>Protection of Natural</i>	Small areas of natural habitat may be disturbed in the construction of nursery

Check List of environmental and social principles	Potential impacts and risks
<i>Habitats</i>	sites – however the nurseries also act as habitats providing shelter and food to marine species in the lagoon. P=4 I=1
<i>Conservation of Biological Diversity</i>	As a climate change adaptation project, coral reef restoration work will be carried out mainly with identified climate resilient species. While land-based nurseries will also include rare species of coral, it is possible that the focus on climate-resilient species will lead to a loss of genetic diversity in the restored sites P=4 I=1
<i>Climate Change</i>	Not applicable
<i>Pollution Prevention and Resource Efficiency</i>	Not applicable
<i>Public Health</i>	Not applicable
<i>Physical and Cultural Heritage</i>	Not applicable
<i>Lands and Soil Conservation</i>	Not applicable

PART III: IMPLEMENTATION ARRANGEMENTS

A. Project arrangements

Implementing Entity

The project will be implemented over a period of six years (72 months). Since there are no accredited National Implementing Entities (NIEs) to the Adaptation Fund (AF) in the target countries, the project will be implemented by the **United Nations Development Programme (UNDP)**, which is accredited as AF Multilateral Implementing Entity (MIE). UNDP will assure the administrative and financial management of the project. The following implementation services under the Direct Implementation Modality (DIM) will be provided by UNDP for the proposed project:

- coordinating and managing the overall implementation of project outcomes and activities;
- facilitating of interactions with the AF Board and related stakeholders;
- accountability of the project implementation and reporting on budget performance;
- quality assurance and accountability for outputs and deliverables at the project development phase, during implementation and on completion;
- information and communication management, including maintaining Information Management Systems and specific project databases to track and monitor progress – financial and substantive – of project implementation;
- regional knowledge management, communications and awareness raising;
- disbursing funds to the Responsible Parties for the implementation of on-the-ground activities within those countries;

- providing technical oversight to all activities carried out by the Responsible Parties; and
- managing centralised procurement of goods and services for the project.

The UNDP will be collaborating with the Executing Entities in Mauritius and Seychelles, who will act as Responsible Parties to carry out activities within the DIM Project. They will have to report progress to the Project Manager and the Project Steering Committee.

In terms of project management, there will be three levels of implementation, i.e. Regional, National and local. The project organogram is shown in fig 16.

Executing Entities

The Executing Partner for the Republic of Mauritius will be the **Ministry of Ocean Economy, Marine Resources, Fisheries, and Shipping (MOEMRFS)**, which has the mandate to provide an enabling environment for the promotion of sustainable development of the fisheries sector and is responsible for the management of coastal waters and any related activities being carried out within these, and specifically the following bodies under this Ministry:

- **Albion Fisheries Research Centre (AFRC)** was established in 1982 under the MOEMRFS, and responsible for stock assessment of marine resources, MPA management, ocean-based coral farming/restoration and long-term coral reef monitoring, will lead on the development of ocean-based coral nurseries, with support from Mauritius Oceanography Institute.
- **Mauritius Oceanography Institute (MOI)** was established in 2000 to develop and strengthen oceanographic research, within the maritime zone of the Republic of Mauritius, with technical expertise and institutional capacity for both coral farming, species identification and coral genetics. MOI will lead on research activities in the project, and the development of a land-based coral nursery.

To assist the Executing Partner in the implementation of the project at the community/local level, UNDP will recruit one NGO in Mauritius and one in Rodrigues.

The Executing Partner for the Republic of Seychelles will be the **Ministry of Environment, Climate Change and Energy (MEECC)**, which has the mandate for environmental, climate change and energy policy and management.

In Republic of Seychelles, the following organisation will act as the Responsible Parties:

- **Seychelles National Parks Authority (SNPA)**, which is a government organisation under the aegis of MEECC, is responsible for the management of all state owned terrestrial and marine protected areas. SNPA will build on its existing coral reef restoration work and benefit from opportunities for further training for its staff and permit staff retention (from EBA project) as well as integration in the organisation at the end of the FB project.
- **Nature Seychelles (NSey)**, an NGO that has pioneered terrestrial restoration of islands, and has been the recipient of GEF-funds and other large donor funded projects. NSey manages the Cousin Island Special Reserve, the site of a 5,500 m² restored reef, and will build on its previous large-scale coral reef restoration experience (up to 25,000 nursery-grown corals transplanted). NSey is registered as a Private Educational and Training Institute (under the Education Act);

- **Marine Conservation Society of Seychelles (MCSS)** is an NGO, which promotes the conservation of the marine environment through education, research and the implementation of a number of programmes. MCSS has participated in several marine ecosystem management programmes and supported projects on coral predators.

Project Management Team (PMT)

UNDP, as MIE for this project, will recruit and establish a Project Management Team (PMT) to be led by a Regional Project Manager (RPM). He will be supported by a Project Assistant (PA) and a Financial Assistant (FA) and technically supported by a Chief Technical Advisor (CTA). The PMT will be accountable to UNDP and the PSC for the quality, timeliness and effectiveness of the activities carried out, as well as for the use of funds. Moreover, the PMT will have the following responsibilities:

- Facilitate the coordination of the overall project implementation at the different (regional, national and local/city) levels, including supervision, oversight and backstopping of the various Executing Entities;
- Act as Secretariat of the Project Steering Committee (PSC), to which it will submit annual work plans for review and approval, as well as annual narrative reports (see also Section D, Part III, on reporting requirements);
- Produce progress reports and financial reports every 3 months
- Produce Annual Project Progress Reports every 12 months to be submitted to the donor (Adaptation Fund);
- Ensure budgeting and financial management, with the support of UNDP administration;
- Prepare and manage all contractual agreements with the national/international consultants, including terms of reference, work plans, budgets and payment schedules, and perform payments upon progress, as per UNDP procedures;
- Carry out regular project monitoring at all levels (regional, national and local/project site level), ensuring compliance and quality control in accordance with UNDP and AF standards and requirements;
- Organise the mid-term review and the independent terminal project evaluation;
- Organise duty travel, seminars, public outreach activities and other project events
- Carry out Environmental and Social Impact Monitoring as per Environmental and Social Management Plan (Section C, Part III)
- Coordinate overall knowledge management and project communication.
- Handle any grievance received and respond accordingly, as per the stakeholder Response Mechanism of UNDP described Section C, Part III.

The terms of reference of the RPM, PA, FA and CTA have been described in Annex 11.

Project Steering Committee (PSC)

A **Project Steering Committee (PSC)** is the overall and highest decision-making body for the project and provides strategic guidance on project implementation issues. It will meet at least once a year at the regional level and will have the following responsibilities:

- Review, discuss and provide substantive comments and main recommendations to the annual progress reports prepared and presented by the PMT during the annual PSC meetings;
- Review, discuss and approve the annual work plans, procurement plans and budget submitted by the PMT;

- iii. Define the main strategies and provide overall policy guidance, recommendations and orientations for project implementation and coordination throughout the implementation period.
- iv. Ensure policy conformity of the project activities in each country and policy mainstreaming, as required, of project activities to ensure the sustainability of the project results beyond the project implementation period.
- v. Ensure that co-financing will be realized through effective consultation and partnership;
- vi. Ensure that the project will make positive impacts on gender mainstreaming as much as possible.

The PSC will be composed of senior representatives of the Project National Coordination Committee of each country and UNDP. A representative of the Regional Scientific Advisory Committee (RSAC) will be co-opted. The Chairperson will be elected at each seating. The RPM will act as Secretariat to the PSC.

Project National Coordination Committee (PNCC)

In each target country, a Project National Coordination Committee (PNCC) will be set up, which will meet at least quarterly to discuss the status of the project implementation at the national level and provide guidance and recommendations for the next 3 months. It will also act as an immediate grievance mechanism and provide response and direction accordingly. The RPM will act as the Secretariat of the PNCC. The PNCC will report to the PSC. The PNCC may be able to make decisions on matters delegated by the PSC as and when appropriate.

The highest authority of the Executing Partners (i.e. MOEMRFS for Mauritius and MEECC for Seychelles) will chair their respective PNCCs. The PNCC will be gender-balanced and will be composed of the principal stakeholders for each country, and will include representatives from Executing Partner, the Responsible Parties, other relevant Ministries, UNDP, NGOs, Private Sector, Civil Societies, Accademia and other relevant stakeholders. The PNCC representation and terms of reference will be finalized in the Project Inception Workshop (IW). The TOR of the PNCC is at Annex 11.

Regional Scientific Advisory Committee (RSAC)

A Regional Scientific Advisory Committee will be established composed of relevant scientists from each target country and including recognised international and regional coral reef restoration experts (i.e. Australia, Madagascar, Maldives, South Africa, Sri Lanka and Thailand). As mentioned in Section II-A "Project Component- Component 3", the project will look into the possibility for the Coral Specialist Group, hosted by the Coastal Oceans Research and Development in Indian Ocean (CORDIO), to act as the Regional Scientific Advisory Committee. As such a member of the Coral Specialist Group will be co-opted as member of the Project Steering Committee.

Existing regional bodies and platforms will be used where appropriate to ensure that activities undertaken through the project are appropriately co-ordinated and communicated at the regional level. These will include the Indian Ocean Commission, WIOMSA, the proposed WIO coral reef network, CORDIO and the various committees and co-ordinating bodies under the Nairobi Convention. The RSAC will meet virtually every year. However, the RSAC will meet at least once during the course of the project, as back to back meeting with the PSC. The terms of reference of the RSAC is at Annex 11.

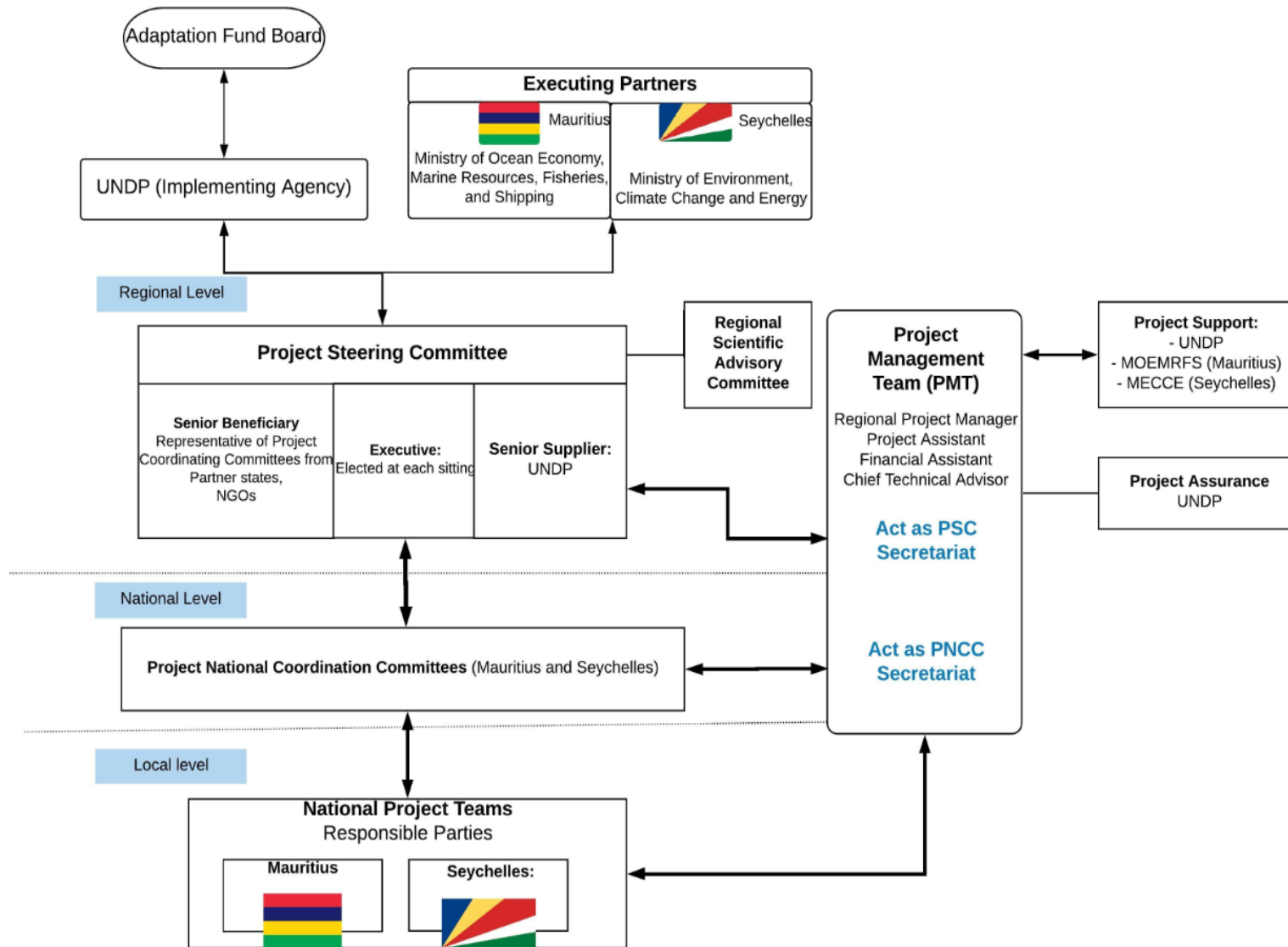


Figure 16: Project Organogram

B. Financial and project risk management

Financial and project risk management measures will be assessed throughout project design and implementation. Potential risks related to project implementation and response measures are described in Table 11.

Table 11 Potential risks related to project implementation and response measures

#	Description	Type	Risk rating	Countermeasures/ Management Response
1.	<p>Loss of government support may result in lack of prioritization of proposed project activities.</p> <p>It may become more difficult to get the full engagement of higher level Government staff and politicians, if coral reef restoration activities appear to constrain development, or has an apparent high cost that is not understood to bring benefits</p>	Political	<p><i>Low</i></p> <p>P=1 I=3</p>	Regular stakeholder consultation and involvement will be undertaken to ensure that government maintains its commitment and considers the proposed project as a support to its coastal protection and coral restoration programmes.
2.	<p>Disagreement amongst stakeholders with regards to demonstration of site selection in Mauritius and Seychelles</p> <p>Discussion about demonstration site among the stakeholders may become a distraction from the coral reef restoration activities and may cause delay in the implementation.</p>	Operational	<p><i>Low</i></p> <p>P=1 I=2</p>	<ul style="list-style-type: none"> Intervention sites have been selected at the preparation stage. There will be a participatory approach to the proposed project, particularly with regard to intervention site selection. The Selected sites need to be reconfirmed at the LPAC¹⁴⁵ stage.
3.	<p>Capacity constraints of local institutions may limit the ability to undertake the research and interventions in Seychelles.</p> <p>It may be difficult to obtain full engagement of local institution if they feel they do not have the capacity to undertake in research in the domain of coral reef restoration.</p>	Institutional	<p><i>Low to medium</i></p> <p>P=2 I=2</p>	<ul style="list-style-type: none"> Collaboration and exchange between local institutions and Regional research institutes will be initiated and capacity building will be provided by Mauritius to the Seychellois counterparts.
4.	<p>Lack of commitment/buy-in from local communities may result in failure of intervention sites</p> <p>It may be difficult to obtain the full engagement of the community if they do not find the change in livelihood beneficial in the long term</p>	Operational	<p><i>Medium</i></p> <p>P=3 I=1</p>	<ul style="list-style-type: none"> Community stakeholders were consulted through a bottom-up approach integrating the community into the proposed project's implementation phases will be followed.

¹⁴⁵ Local Project Appraisal Committee

#	Description	Type	Risk rating	Countermeasures/ Management Response
5.	<p>Disagreement among stakeholders in respect of roles in the proposed project.</p> <p>Discussion on the roles and responsibilities about the areas of action of each stakeholder may become a distraction for the implementation of the coral reef restoration activities.</p>	Institutional	<p><i>Low</i></p> <p>P=2 I=1</p>	<ul style="list-style-type: none"> Stakeholder roles are detailed clearly in the stakeholder involvement plan, which was developed at project development stage during the consultative processes (2 Regional Steering Committees) in Mauritius and Seychelles (Project Formulation Grant II). This plan will be presented and confirmed during the Inception Workshop.
6.	<p>Current climate and seasonal variability and/or hazard events result in poor results for the coral restoration.</p> <p>Severe bleaching may occur for long periods thus decreasing the success rate of coral survival in the restoration sites.</p>	Environmental	<p><i>Medium</i></p> <p>P=2 I=4</p>	<ul style="list-style-type: none"> Thermal-resistant corals (more resilient to bleaching) will be used as much as possible. Nursery-grown corals of appropriate size will be transplanted at the restoration sites to reduce risks of hazard impact from predators. Diversity in transplanted coral species will reduce this risk. In Seychelles, where it is not frequently affected by cyclones and storms (compared to Mauritius), rope nurseries will be used in nurseries In Mauritius adapted multi-layered rope nurseries and table nurseries will be used.
7.	<p>Delays in fund transfers and procurement of technical services and equipment.</p> <p>Late funding (slow transfer of funds) or limited absorptive capacity for the Programme (UNDP/ MOEMRFS/ MEECC) may delay some activities, and have a knock-on effect, as outputs from one component are required for the initiation of other component.</p>	Financial	<p><i>Medium</i></p> <p>P=3 I=1</p>	<ul style="list-style-type: none"> Project activities have been designed and paced to ensure a reasonable chance of completion over six years (a timeframe less than this would be too ambitious); the PMT will provide required oversight for management of project inputs. Bridging arrangement could be considered between the project and National Institutions in case there are delays.

C. Environmental and social risk management measures

Environmental and social impacts and risks have been identified for the proposed project (see Part II Section L). According to Mauritian and Seychelles legislation, works pertaining to coral reef restoration does not require submission of an Environment Impact assessment (EIA) study. However, since the project is a Category B as per AF requirement, an Environment and Social Risk Management Plan (ESMP) has been prepared. The Matrix below (Table 12) shows the identified risks/negative impacts and the measures for environmental and social risk management. It is to be noted that management measures have been provided only to principles where potential impacts and/or risks have been identified. Annex 15 presents the detailed ESMP, linking Project Activities with identified risks; the role of stakeholders in the implementation of the ESMP; the institutional arrangement; and the frequency of monitoring and reporting of the identified environmental and social impacts and risks.

Table 12 Environmental and social risk management plan

Principles	Identified Risks and impacts	Mitigating measures	Indicator	Responsible for Monitoring ¹⁴⁶
<i>Compliance with the Law</i>	If monitoring and control not maintained, there is risk that the restoration activities using coral nurseries, might result in an illegal or uncontrolled traffic of corals	<ul style="list-style-type: none"> – The relevant authorities would implement enhanced enforcement measures so as to ensure that private sector involvement in coral reef restoration follows the required standards and chain of custody for corals grown in nurseries. – Regular and enhanced monitoring at nursery grounds and restoration sites – Enhanced monitoring in ports/airport areas for illegal transport of corals 	<ul style="list-style-type: none"> – Number of monitoring patrols to enforce existing National Laws. – Number of interventions – Number of intervention of unauthorised transport/trafficking of corals at ports and airports 	National Project Team (NPT) With assistance from: <ul style="list-style-type: none"> – MOEMRFS – MEECC – SFA¹⁴⁷ – NCG¹⁴⁸ – Customs

¹⁴⁶ NOTE: at project inception stage, all stakeholders mentioned in ESMP will have to sign an ESMP implementation agreement with UNDP.

¹⁴⁷ Seychelles Fisheries Authority

¹⁴⁸ National Coast Guard (in Mauritius and Seychelles)

Principles	Identified Risks and impacts	Mitigating measures	Indicator	Responsible for Monitoring ¹⁴⁶
<i>Access and Equity</i>	<p>Due to the specialized nature of the skills needed, the project will not involve a large number of local community participants. As such, there is a risk that this limits direct participation in on-site restoration activities (i.e. activities requiring SCUBA diving certificates) to a larger number of community members.</p> <p>Fishers at Anse Forbans may temporarily have limited boat access in this pilot site.</p> <p>There is a slight risk that not all the communities will be aware of the works carried out and results of studies</p> <p>Limited access to published papers and data may impact on the regional studies</p>	<ul style="list-style-type: none"> – Clear and transparent criteria for eligibility of the project beneficiaries will be applied, including the selection of participants in the training sessions to be organised. – Creation of other, not so specialised jobs associated with coral nursing and restoration efforts. – Communication on grievance mechanism. – Public communication and sensitization campaign will be developed to (i) raise public awareness and engagement; (ii) facilitate communication and collaboration among stakeholders and project partners; and (iii) enable dissemination of information and lessons through tailor-made communication products, such as: <ul style="list-style-type: none"> o Creation and maintenance of project website o Use of social media o Short clips and documentary films – Ensure access to publish papers to all project team and have agreement with Accademia to have access to published data generated with support of the project fund. 	<ul style="list-style-type: none"> – Number of complaints received – Level of application of clear and transparent criteria for eligibility of the projects beneficiaries. – Level of application of the fair criteria for selection of participants in the training sessions organised. – Number and quality of the project communication system. – Project website updated regularly – Communication plan approved by PSC 	<p>National Project Team (NPT) UNDP MOI MOEMRFS PMT</p>
<i>Marginalized</i>	At some community-based	Ensure the participation of women and other	<ul style="list-style-type: none"> – At least 30% of young people and women will be direct beneficiaries 	<p>NPT Project Gender</p>

Principles	Identified Risks and impacts	Mitigating measures	Indicator	Responsible for Monitoring ¹⁴⁶
<i>and Vulnerable Groups</i>	<p>coral nurseries, some of the marginalized and vulnerable group (including fishers and women) might:</p> <p>i) Not be able to participate in the project implementation directly due to specialised nature of the skills required or not well represented in the business plan</p> <p>ii) Temporarily be unable to carry out their normal economic activities due to the coral reef restoration activities (Anse Forbans).</p>	<p>marginalised and vulnerable groups participate in the implementation of the project and in sensitization campaign. (Some indicators in the Project Results Framework are made sensitive to the marginalized and the vulnerable.)</p> <p>The project includes activities to promote alternative income generating activities.</p> <p>Selection of the restoration sites and nurseries will occur through a participatory process where fishers can provide input on their fishing areas so that these can be avoided if possible.</p> <p>During the period that the fishing activities are curtailed, fishers will be encouraged and provided with authorization to fish in different areas.</p>	<p>of the project</p> <ul style="list-style-type: none"> – Number of alternate livelihoods (instead of fishing) undertaken by the local community (disaggregated data) – at least 30% of all trainings/workshops and learning events will be female – at least 35% of representatives in higher level authorities participating in the project will be female. – Number of marginalised/vulnerable groups benefiting from the project 	<p>Officers</p> <p>With assistance from: MOEMRFS MEECC and Economic Development Division of UNDP</p>
<i>Core Labour Rights</i>	<p>There is a risk of accidents due to mishandling of equipment or material</p> <ul style="list-style-type: none"> – Trained SCUBA Divers may be exposed to the risk of accidents while planting corals – Other risks to workers, 	<p>During implementation, the PMT and National Project Teams will ensure compliance with national and international labour laws and occupational and health safety laws.</p> <p>Adequate protection equipment for workers, training (advanced training for diving activities), insurance and access to medical decompression chamber will be</p>	<ul style="list-style-type: none"> – Proportion of workers who wear protective equipment – Level of compliance of the project with the labour laws in each country. – Number of incidence caused due to mishandling of equipment 	<p>Responsible parties.</p> <p>With the assistance from: – MOEMRFS</p>

Principles	Identified Risks and impacts	Mitigating measures	Indicator	Responsible for Monitoring ¹⁴⁶
	associated with mishandling of equipment at coral nurseries or at coral restoration sites.	provided.		<ul style="list-style-type: none"> – MEECC – MLIRET¹⁴⁹ – MEIC¹⁵⁰
<i>Involuntary Resettlement</i>	Some fishers actively fishing in Anse Forbans may feel the voluntary measures set by the Anse Forbans community to restrict fishing activities at their coral restoration site is set unfairly or set without their full consent.	<p>There will be full community engagement in the restoration activities, with a strong sustained communication effort throughout the project implementation to ensure the buy-ins and cooperation of the fishers. Fishers will also be encouraged to use the neighbouring fishing area during the project implementation.</p> <p>In case the project activity at Anse Forbans cause an economic issue to the local community, another restoration site (with legal protection) will be sought, since Anse Forbans is a pilot restoration site outside MPA or Reserve</p>	<ul style="list-style-type: none"> – Level of satisfaction of the community with the coral restoration works – No of persons redirected to neighbouring fishing ground – No. of complaints received for restriction of boat access. 	Responsible Parties
<i>Protection of Natural Habitats</i>	There is a low risk that some small areas of natural habitat in the project sites may be disturbed in the collection of the donor corals and construction of ocean-based nursery sites.	<p>Since the restoration works will be carried in MPAs and Fishing Reserves, all access and activities are regulated and controlled. In the long term, the project activity will restore the Natural Habitats.</p> <p>Science-based coral reef restoration work, proposed</p>	<ul style="list-style-type: none"> – Area of coral reef restored increased – Report on condition of the coral reef ecosystem – Coastal seawater quality, meeting the standards 	<p>NPT</p> <p>MOEMRFS (AFRC and MOI)</p> <p>MEECC</p>

¹⁴⁹ Ministry of Labour, Industrial Relations, Employment and Training

¹⁵⁰ Ministry of Employment, Immigration and Civil Status

Principles	Identified Risks and impacts	Mitigating measures	Indicator	Responsible for Monitoring ¹⁴⁶
		<p>by this project, will avoid the risk of impacting natural habitats when installing ocean nurseries and intervention in restoration sites as much as possible.</p> <p>All precautions will be taken to ensure that the natural habitat remains undisturbed, as far as possible. Training will be provided to Responsible parties, workers and community members that will be directly involved in the project to ensure the protection of natural habitat. Moreover, in the event that there is need to displace some living species, same will be done in the presence of the authority (e.g. Fisheries officers of the MOEMRFS in Mauritius)</p> <p>Continuous monitoring of the water quality, biodiversity and other key environmental parameters of the donor and nursery sites.</p>	<ul style="list-style-type: none"> – Improved level of biodiversity of the restored coral reef compared to natural sites – Number of community members trained in handling living organisms – Number of translocated living organism 	<p>With the assistance of SFA</p>
<i>Conservation of Biological Diversity</i>	<p>Coral reef restoration work will be carried out mainly with identified climate resilient species. It is possible that the focus on climate-resilient species will lead to a reduction of genetic diversity in the restored sites</p>	<p>In the short term, asexual reproduction (fragmenting) of climate resilient species will be implemented to stabilize and stop the degradation of the restoration sites. Thereafter, the genetic diversity would be increased through sexual reproduction of the transplanted corals.</p>	<ul style="list-style-type: none"> – Number of asexually farmed corals successfully transplanted. – Number of sexually farmed corals successfully transplanted – Fish diversity (abundance and number of species) 	<p>MOEMRFS MEECC NPT</p>

Grievance mechanism

The proposed project will utilize the existing UNDP grievance mechanism (known as Stakeholder Response Mechanism) to allow the affected to raise concerns that the proposed project is not complying with its social or environmental policies or commitments. It will be the responsibility of the PMT and National Project Teams to ensure that all relevant stakeholders are adequately informed of the grievance mechanism. The Grievance mechanism will be housed in UNDP. The focal point of the grievance mechanism would be Mr. Satyajeet Ramchurn, Head of Environment Unit in Mauritius and Mr Roland Alcindor, Program Manager in Seychelles.

The Regional Project Manager, Project Assistant and Financial Assistant or the executing partners (in Mauritius and Seychelles) are usually the first point of contact for any project-related complaints from stakeholders. The PMT and project team should respond promptly and appropriately to a complaint. The different steps involved in the Stakeholders Response Mechanism (RSM) is described in the flow chart in figure 17

Anyone could raise concern on the project. This mechanism considers the special needs of different groups as well as gender consideration and potential environmental and social risks. A combination of mailboxes (at project site), confidential persons in the community and telephoning options offer an immediate way for employee, community and public affected by the project to safely express their concerns. It will also be possible to raise their concerns through Facebook, twitter, or email.

The address and e-mail address of the Adaptation Fund will also be made public (i.e. on project website, Facebook and mailbox) for anyone to raise concerns regarding the project:

Adaptation Fund Board secretariat
Mail stop: MSN P-4-400
1818 H Street NW Washington DC
20433 USA
Tel: 001-202-478-7347
Email: afbsec@adaptation-fund.org

The Adaptation Fund Board Secretariat will receive a copy of any complaint received and a report describing how the grievance has been addressed.

Project staff will be trained in procedures for receiving messages and on the reporting of any grievances. In addition, monitoring activities allow project participants to voice their opinion or complaints as they may see fit.

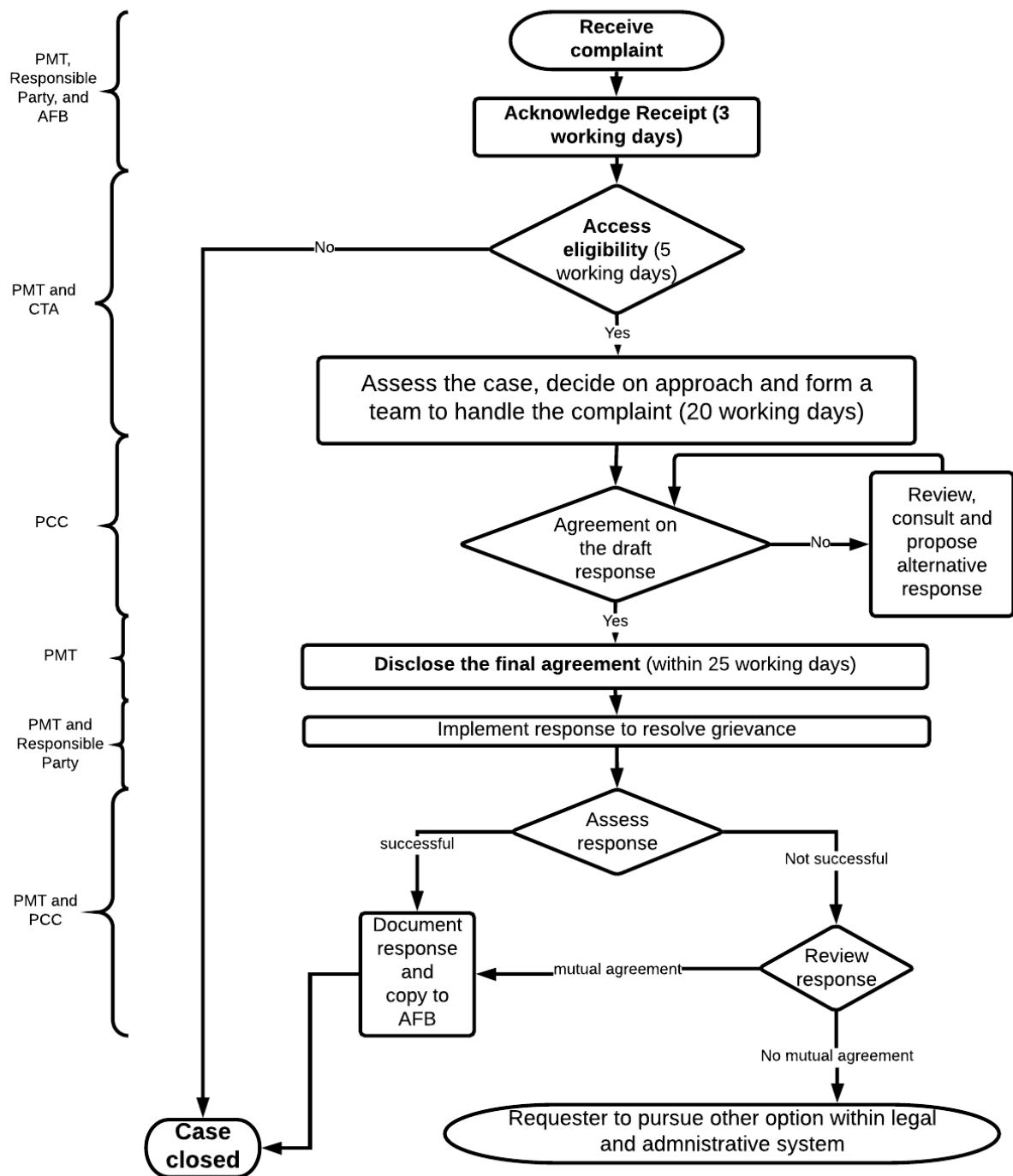


Figure 17: Work flow for the RSM mechanism following a complaint

D. Monitoring and evaluation

The monitoring and evaluation (M&E) scheme will be applied in accordance with the established UNDP procedures throughout the project lifetime. The executing partners, together with the UNDP Mauritius/Seychelles will ensure the timeliness and quality of the project implementation. The M&E plan will be implemented as proposed in the table below. Technical guidance and oversight will be also provided from the UNDP's Regional Service Centre in Addis Ababa as well as the PSC.

The audits on the project will follow UNDP finance regulations and rules and applicable audit policies on UNDP projects.

The Results Framework noted in Section E below (Table 14) provides performance and impact indicators for project implementation along with their corresponding means of verification. These will form the basis on which the project's Monitoring and Evaluation system will be built throughout the 6-year implementation period.

The principle components of the Monitoring and Evaluation Plan will include: (1) establishing monitoring responsibilities and events, (2) project reporting and (3) independent evaluations. The project's Monitoring and Evaluation Plan will be presented and finalized at the Project's Inception Phase following a collective fine-tuning of indicators, means of verification, and the full definition of project staff M&E responsibilities

Milestones

Project start

A *Project Inception Workshop (IW)* will be held within the first 3 months of project start with those with assigned roles in the project management, UNDP CO and where appropriate/feasible, regional technical advisors as well as other stakeholders. The IW is crucial to building ownership for the project results and to plan the first-year annual work plan.

The **Inception Workshop** should address a number of key issues including:

- Assist all partners to fully understand and take ownership of the project. Detail the roles, support services and complementary responsibilities of UNDP CO and Regional Coordinating Unit (RCU) staff (i.e. UNDP Mauritius/Seychelles and CTA) vis-à-vis the project team. Discuss the roles, functions, and responsibilities within the project's decision-making structures, including reporting and communication lines, and conflict resolution mechanisms. The Terms of Reference for project staff will be discussed again as needed.
- Based on the project results framework, to finalize the first annual work plan. Review and agree on the indicators, targets and their means of verification, and recheck assumptions and risks.
- Provide a detailed overview of reporting, monitoring and evaluation requirements. The Monitoring and Evaluation work plan and budget should be agreed and scheduled.
- Discuss financial reporting procedures and obligations, and arrangements for annual audit. Audits on the project will follow UNDP finance regulations and rules and applicable audit policies.
- Plan and schedule Project Steering Committee and Project National Coordination Committee meetings. Roles and responsibilities of all project organization structures should be clarified, and meetings planned. The first Project Steering Committee meeting should be held within the 12 months following the inception workshop.

An Inception Workshop Report is a key reference document and must be prepared and shared with participants to formalize various agreements and plans decided during the meeting.

Quarterly

- Progress made shall be monitored in the UNDP Enhanced Results Based Management Platform.
- Based on the initial risk analysis submitted, the risk log shall be regularly updated in ATLAS.
- Based on the information recorded in ATLAS, an Annual Project Progress Report (PPR) can be generated in the Executive Snapshot;
- Other ATLAS logs will be used to monitor issues, lessons learned etc. The use of these functions is a key indicator in the UNDP Executive Balanced Scorecard.
- Evaluation of the Environment and Social Impact Assessment monitoring.

Annually

An **Annual Project Progress Report (PPR)** will be prepared by the Regional Project Manager, shared with the PSC. The PPR will evaluate yearly project progress, using identified M&E indicators. The PPR will identify yearly objectives and targets, lessons learned and risk mitigation measures, as well as relevant financial information. The data for monitoring will consist of financial, procurement and physical progress reports as well as compliance with the requirements of the environmental and social assessment and management frameworks, along with financial audit reports. It will also include measures considered in the risk management plans proposed in Section B of Part III.

Project Reporting

Periodic monitoring through site visits: UNDP Mauritius/Seychelles and PMT and Chief Technical Advisor will conduct visits to project sites based on the agreed schedule in the project's Inception Report/Annual Work Plan to assess first hand project progress. Other members of the PSC and PNCC may also join these visits. A Field Visit Report/BTOR will be prepared by the PMT and will be circulated no less than one month after the visit of the project team to and PSC and PNCC members.

Mid-term of the project cycle: The project will undergo an independent Mid-Term Evaluation (MTE) at the mid-point of project implementation (beginning-year 4). The MTE will determine progress being made toward the achievement of outcomes, assess financial, social and environmental risks and pinpoint corrective actions as required. It will focus on the effectiveness, efficiency and timeliness of project implementation; will highlight issues requiring decisions and actions; and will present initial lessons learned about project design, implementation and management. The findings of this evaluation will be incorporated as recommendations for enhanced implementation during the final half of the project's term.

Project Closure: An independent Final Evaluation will be undertaken 3 months prior to the final RSC meeting (prior to project closure) and will be undertaken in accordance with UNDP guidance. The Final Evaluation will focus on the delivery of the project's results as initially planned (and as corrected after the mid-term evaluation, if any such correction took place). The final evaluation will look at impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental benefits/goals. The Terms of Reference for this evaluation will be prepared by the UNDP CO. The Final Evaluation should

also provide recommendations for follow-up activities and will require a management response, which will be uploaded to PIMS and to the UNDP Evaluation Office Evaluation Resource Centre (ERC).

Learning and knowledge sharing

Results from the project will be disseminated within and beyond the project intervention zone through existing information sharing networks and forums.

The project will identify and participate, as relevant and appropriate, in scientific, policy-based and/or any other networks, which may be of benefit to project implementation through lessons learned. The project will identify, analyse, and share lessons learned that might be beneficial in the design and implementation of similar future projects.

There will be a two-way flow of information between this project and other projects of a similar focus.

Monitoring and Evaluation Budget

Table 13 Indicative Project Monitoring and Evaluation Workplan and budget

Type of M&E activity	Responsible Parties	Budget USD	Time frame
Inception Workshop and Report	<ul style="list-style-type: none"> ▪ PMT ▪ UNDP CO 	10,000	Within first three months of project start up
Measurement of Means of Verification of project results	UNDP RTA/Programme Manager will oversee the hiring (specific studies and institutions), and delegate responsibilities to relevant team members.	N.A	Start, mid- and end of programme (during evaluation cycle) and annually when required.
Measurement of Means of Verification for Project Progress on output and implementation	Oversight by Regional Project Manager PMT National Project team	N. A	Annually prior to PPR and to the definition of annual work plans
ARR/PIR	<ul style="list-style-type: none"> ▪ PMT ▪ UNDP CO ▪ UNDP RTA 	None	Annually
Periodic status/ progress reports	<ul style="list-style-type: none"> ▪ PMT 	None	Quarterly/ Annually
Mid-term Evaluation	<ul style="list-style-type: none"> ▪ PMT ▪ UNDP CO ▪ UNDP RTA ▪ External Consultants (i.e. evaluation team) 	45,000	Year 4, At the mid-point of the project implementation.
Final Evaluation	<ul style="list-style-type: none"> ▪ PMT, ▪ UNDP CO ▪ External Consultants (i.e. 	45,000	Year 6, at least three months before the end of project

Type of M&E activity	Responsible Parties	Budget USD	Time frame
	evaluation team)		implementation
NEX Audit	<ul style="list-style-type: none"> ▪ UNDP CO ▪ PMT 	30,000	As per UNDP regulations
Visits to field sites	<ul style="list-style-type: none"> ▪ UNDP CO ▪ Government representatives ▪ PMT ▪ PSC ▪ CTA 	20,000	Yearly
TOTAL indicative COST		150,000	

Note:

1. The costs indicated here do not include the costs associated with UNDP staff. Those UNDP related costs are covered by the MIE fee.
2. The budget for M&E activities are included in the project budget component found in Section G of Part III.

E. Results framework

Table 14: Project Result Framework

Expected Outcomes/Outputs	Outcome/Output Indicator	Baseline (2016-2017)	Target by end of project	Means of Verification	Assumptions
<p>Objective 1: To improve food security and livelihoods and mitigate disaster risk through active restoration of coral reefs degraded by coral bleaching as a result of climate change in Mauritius and Seychelles, at a larger scale than ever tested in the past</p>	Targeted degraded sites restored to scale using farmed corals, with good survivorship and growth rates of the colonies	<p><u>Mauritius :</u> 0.075ha (750 m²) in Mauritius (non-project sites) 0 Ha at BBMP and SEMPA (project sites) <u>Seychelles:</u> 0.5 ha (5.225 m²)</p>	At least 3.2 Ha in Mauritius and 2.5 Ha in Seychelles	Survey, evaluation report, Annual Progress Report	No major adverse extreme weather or climate events (significant sea temperature rise, tsunami, cyclones) occur during the project period, allowing the timely transplantation of nursery grown coral colonies.
	Number of stakeholders with improved livelihoods due to new and sustained employment & business opportunities related to coral restoration activities and/or due to the improved coastal and marine ecosystems supported by the restored corals	0	At least 800 persons	Livelihood Survey	Coastal communities and stakeholders have successfully completed the training provided and are interested in undertaking new business approach for coral-based business. Still room left for growth for economic activities (e.g. tourism) without compromising the health of the coastal and marine ecosystems supported by the restored corals.
	Number of people trained and involved in the establishment, maintenance and monitoring	0	In Mauritius, at least 20 community members involved	Monitoring and evaluation reports for land-	Low turnover for community members and staff involved until the end of the project

Expected Outcomes/Outputs	Outcome/Output Indicators	Baseline (2016-2017)	Target by end of project	Means of Verification	Assumptions
	of successful ocean nurseries for corals		In Seychelles: Cousin: 6 staffs, volunteers and 10 community members. Ste Anne/Anse Forbans: 4 staff, Communities and 10 Community members Curieuse: 4 staff and 12 rotating volunteers	based and ocean-based nurseries; staff contracts; volunteer contracts	Scientific diver volunteers change every 3 months Community member, staff and volunteers learn to work together through the project lifetime Sufficient number of qualified local population interested in the training and engagement in coral restoration work.
Objective 2: To generate knowledge about effective restoration techniques for dissemination to other SIDS and countries within the wider region.	Number research papers on coral reef restoration submitted for presentation at various scientific forums in the WIO and globally, with female scientists' participation in publication efforts actively supported.	0	At least 3 papers published At least 5 female scientists contributed in the production of scientific publication	Report published in peer-reviewed journals & Project Progress Report	Studies, Reports and Research papers on coral reef restoration initiatives in the region and globally available and accessible Capacity of key stakeholders on coral reef restoration techniques and coral genetics analysis including clade analysis built Sufficient number of qualified female scientists interested in the coral restoration science field.
	Number of "lessons learned" generated and disseminated through various communication channels and knowledge exchange fora on the practical topics relevant to the coral restoration efforts at scale, including 1) coral restoration financing, 2) climate change resilience of the applied techniques, 3) upscaling efforts, 4) financial and technical sustainability, 5) stakeholder and private sector	zero	At least 1 brief on coral restoration financing At least 1 brief on climate change resilience At least 1 brief on coastal restoration at scale At least 1 brief on financial and technical sustainability At least 1 brief on stakeholder and/or private sector engagement	"Lessons learned" communication materials (in any appropriate format)	

Expected Outcomes/Outputs	Outcome/Output Indicators	Baseline (2016-2017)	Target by end of project	Means of Verification	Assumptions
	engagement and buy-ins, 6) women and youth empowerment;		At least 1 brief on women and youth empowerment		
Component 1: Enhancement of food security and reduction of risks from natural disasters through the restoration of degraded reefs in Mauritius					
Outcome 1.1: Improved livelihood for a sustainable partnership and community-based approach to reef restoration	Number of members from coastal communities that are deriving an income from new coral restoration and related economic activities, with a particular attention given to providing opportunities to support female-headed household members	0	At least 200 persons (disaggregated by sex, age and household status) by end of project	Survey, Evaluation reports, annual reports from NGOs	Coastal communities have successfully completed the training provided and are participating fully throughout the duration of the project
Output 1.1.1 Coastal communities benefit from improved livelihoods through employment establishing and maintaining coral nurseries and transplantation sites.	Number of community members (as identified in Community Action Plan and any other complementary analysis) trained in establishing and maintaining proposed coral nurseries (Data disaggregated by community groups, gender and age group), with a particular attention given to increasing female and youth participants/trainees	0	At least 20 for Mauritius 11 for Rodrigues Data collected aggregated by sex, age and household status	Training report	Community members have successfully completed the training provided

Expected Outcomes/Outputs	Outcome/Output Indicator	Baseline (2016-2017)	Target by end of project	Means of Verification	Assumptions
Output 1.1.2 Coastal communities benefit from improved livelihoods through increased revenue from alternative work including tourism (glass bottom boat tours, snorkelling and diving trips)	Number of coral restoration economic and financial strategies developed for sustainable financing mechanism	0	1 coral restoration economic and financial strategy developed for Mauritius and Rodrigues	coral restoration economic and financial strategy document	Mauritius economy remains stable, tourism remains at same level or higher, so that the business plan is implemented as written.
	Number of partnership agreement signed for job opportunities	0	at least 2 agreements signed, and new employment opportunities created	Signed Agreement document	Mauritius economy remains stable, tourism remains at same level or higher, so that the business plan is implemented as written.
	Number of people benefiting from improved income as result of the project, with particular attention given to increasing beneficiaries from female-headed households.	0	At least 100 persons (disaggregated by sex, age and household status) by end of project	Livelihood surveys, annual reports from NGOs	Coastal communities have successfully completed the training provided and are participating fully throughout the duration of the project
Outcome 1.2: Coral farming and nursery facilities established at a sufficient scale for more climate change resilient corals	Land and ocean-based nurseries operational and producing sufficient coral stock for transplantation	0	<ul style="list-style-type: none"> <u>Mid-term</u>: 1 Nursery established and operational <u>End of project</u>: 3 nurseries (land & sea based) operational and producing coral stock at sufficient scale 	Technical reports, survey reports, established nurseries, coral stock available for transplantation	Favourable weather conditions (incl. no extreme El Nino events experience) Timely delivery and availability of necessary equipment for set up of nurseries
Output 1.2.1 Donor coral colonies of appropriate species (resilience, maintaining genetic diversity) available at	Number of coral species for propagation based on resilience and genetic diversity identified.	none	Coral species identified and validated by the Project Steering Committee	Technical Assessment Report on coral species identified, Minutes of Steering Committees	Preliminary findings on list of coral species that are suitable for culture in Mauritius readily available. Personnel of the MOI has been effectively trained for clade analysis and genetic connectivity.

Expected Outcomes/Outputs	Outcome/Output Indicators	Baseline (2016-2017)	Target by end of project	Means of Verification	Assumptions
sufficient scale (quantity, time, intervals etc.) for propagation in nurseries	Number of donor sites with locally threatened species (Mauritius & Rodrigues) identified	None	at least 2 donor sites identified	Survey Reports	Preliminary findings on list of locally threatened coral species readily available. Favourable weather conditions allow the timely completion of surveys
	percentage of high-thermal tolerance corals collected from donor sites for propagation in nurseries.	0%	not more than 10 % of each donor coral colony will be collected to avoid death of donor corals at donor site	Technical assessment report, Report on genetic analysis, survey report of donor site	Favourable weather conditions, including no extreme El Niño events causing bleaching of aquacultured resilient coral species
Output 1.2.2 Reports on coral reef status, water quality, and other key environmental and social parameters for potential nursery sites	Survey for identification of nursery sites (Mauritius and Rodrigues)	Not yet undertaken	Reports on coral reef status, water quality, current patterns/flushing and other key environmental and social parameters for potential nursery sites produced	Survey reports	List of Nursery site locations based in MPAs/Marine Parks available, Favourable weather conditions allow the timely completion of surveys
	Number of Environmental and Social Monitoring surveys carried out	0	one survey per year, as per ES Risk Assessment (Part II-L)	Environment and Social Monitoring Reports	implementation of the project does not lead to social issues.
Output 1.2.3 A land-based nursery and 2 or more ocean nurseries established and maintained on a regular basis	Number of Land based nursery established and operational	0	One land-based nursery established and operational	Monitoring and evaluation report for nursery site, Physical verification (site visits), Operational reports, List of assets	Timely delivery and availability of necessary equipment for set up of nurseries

Expected Outcomes/Outputs	Outcome/Output Indicator	Baseline (2016-2017)	Target by end of project	Means of Verification	Assumptions
	Number of infrastructure for nursery seeding from sexual reproduction (Mauritius) established	Infrastructure non-existing	1 Infrastructure established	Monitoring and evaluation report for nursery site, Physical verification (site visits), Operational reports, List of assets	Favourable weather conditions allow the timely collection of spawns/larvae from the wild during spawning seasons
	Number of ocean-based nurseries established and operational in Mauritius	1 ocean-based nursery is currently operational	1 new ocean-based nursery established and operational with 100 basal tables, 100 multi-layered ropes nursery units	Monitoring and evaluation report for nursery site, Physical verification (site visits), Operational reports, List of assets	Timely delivery and availability of necessary equipment
	Number of community members involved in the maintenance and monitoring of new ocean-based nurseries in Mauritius	0	At least 20 community members involved	Monitoring and evaluation report for nursery site	Community members involved till the end of the project - low turnover
	Number of ocean-based nurseries established and operational in Rodrigues	No ocean-based nursery is currently operational	1 ocean-based nursery established and operational with 40 multi-layered ropes nursery unit	Monitoring and evaluation report for nursery site, Physical verification (site visits), Operational reports, List of assets	Timely delivery and availability of necessary equipment

Expected Outcomes/Outputs	Outcome/Output Indicator	Baseline (2016-2017)	Target by end of project	Means of Verification	Assumptions
	Number of community members involved in the maintenance and monitoring of ocean-based nurseries in Rodrigues	0	At least 11 community members fully involved	Trained work force in field of coral farm management Monitoring and evaluation report (from monitoring)	Community members involved till the end of the project
Output 1.2.4 Stock of farmed corals available for transplantation	Number of coral fragments under culture in land-based nursery (Mauritius)	0	15,000 coral fragments (including resilient species and locally threatened coral species)	Monitoring and evaluation report for nursery site	The actual survival rate of coral fragments is as per estimated survival rates based on past studies and research undertaken by MOI (75%)
	Percentage of coral polyps successfully settled in situ	0%	1.5% of polyps settled from each spawning. (approximately 1500 recruits per year)	Technical and monitoring reports	Surveys of dates of spawning have been identified correctly and that all conditions are favourable for settling of coral polyps.
	Number of coral fragments under culture in new ocean-based nurseries in Mauritius	0	120,000 fragments	Monitoring and evaluation report for nursery site	The actual survival rate of coral fragments is as per estimated survival rates based on past studies and research undertaken by MOI (75%)
	Number of coral fragments under culture in ocean-based nurseries in Rodrigues	0	40,000 fragments for multi-layered rope nursery unit	Monitoring and evaluation report	Timely delivery and availability of necessary equipment Favourable weather conditions allow the timely completion of surveys

Expected Outcomes/Outputs	Outcome/Output Indicator	Baseline (2016-2017)	Target by end of project	Means of Verification	Assumptions
Outcome 1.3: The health of degraded reefs restored, through active restoration work, maintenance and monitoring efforts, leading ultimately to greater protection of shore from flooding and storm damage	Number of sites restored with nursery grown corals in Mauritius and Rodrigues	0	2 Sites restored with nursery-grown coral colonies contributing to coral and fish recovery.	Monitoring reports	Favourable weather conditions allow the timely completion of surveys, transplantation of corals, maintenance and monitoring of restored sites
Output 1.3.1: Rugosity and structure of reefs restored, leading ultimately to greater protection of shore from erosion.	Areas of site successfully restored using farmed corals of resilient species in Mauritius and Rodrigues	Total of 750 m ² restored at Trou aux Biches (150m ²), Flic en Flac (250m ²), Albion (350 m ²) No restored site in BBMP	2.5 Ha in Mauritius and 0.7 Ha in Rodrigues	Monitoring reports GIS Mapping	Favourable weather conditions allow the timely completion of surveys, transplantation of corals, maintenance and monitoring of restored sites

Expected Outcomes/Outputs	Outcome/Output Indicator	Baseline (2016-2017)	Target by end of project	Means of Verification	Assumptions
Output 1.3.2 Recovery of fish population and other reef associated fauna and flora, leading ultimately to improved food security in Mauritius and Rodrigues.	percentage of live coral cover and quality of restoration sites (including, restored coral health status, coral recruitment, fish biomass, fish diversity and fish catch amongst others)	% live coral: NA Fish population and fish catch: NA	at least 10 % increase in live coral cover, fish density and diversity.	Annual monitoring report to assess the temporal progress of the project.	Favourable weather conditions (incl. no El Nino events experience). There is high survival rate of transplanted corals.
Component 2: Enhancement of food security and reduction of risks from natural disasters through the restoration of degraded reefs in Seychelles					
Outcome 2.1 Improved livelihood for a sustainable partnership to coral reef restoration	Number of members from coastal communities that are deriving an income from new coral restoration and related economic activities, with a particular attention given to providing opportunities to support female-headed household members	0	At least 60 persons (disaggregated by sex, age and household status) by end of project	Survey, Evaluation reports, annual reports from NGOs	Stakeholders are interested in undertaking new business approach & enabling national environment for coral based and mariculture based businesses
Output 2.1.1 Coastal communities benefit from improved livelihoods through employment establishing and maintaining coral nurseries and transplantation	Number of people trained in establishment and maintenance of coral nurseries (Data disaggregated by community groups, gender and age group), with a particular attention given to increasing female and youth participants/trainees	0	At least 60 people by end of project (Data disaggregated by community groups, gender and age group)	Surveys, Training certificates, annual reports from NGOs	Participants are willing to be trained in coral reef restoration and have successfully completed the training provided

Expected Outcomes/Outputs	Outcome/Output Indicators	Baseline (2016-2017)	Target by end of project	Means of Verification	Assumptions
sites.					
Output 2.1.2 Coastal communities benefit from improved livelihoods through increased revenue from alternative work including tourism (glass bottom boat tours, snorkelling and diving trips)	Number of sustainable financing mechanisms for the maintenance and monitoring of coral restoration activities with recommendations	Draft business plan	1 Business plan produced including marketing & development of 2 products, at least 2 MOUs and new employment opportunities created	Statistics from Government of Seychelles Signed MOUs Business plan document Products marketed & sold	Seychelles economy remains stable, tourism remains at same level or higher, so the business plan is implemented as written
	Number of stakeholders with improved livelihoods due to new employment & business opportunities, with particular attention given to increasing beneficiaries from female-headed households.	0	At least 60 people by end of project (Data disaggregated by community groups, household status, gender and age group)	Surveys, annual reports from NGOs	Participants are willing to be trained in coral reef restoration and have successfully completed the training provided Sufficient entrepreneurs motivated to develop associated business opportunities
Outcome 2.2 Coral farming and nursery facilities established at a sufficient scale for more climate change resilient corals	Land and ocean-based nurseries operational and producing sufficient coral stock for transplantation	Editing ocean-based nurseries: >Curieuse (~2000 fragments) >Ste Anne/Ile aux Cerfs (450 fragments) Beau Vallon (400 fragments) >Cousin (32500)	Mid-term: Existing and Nursery established and operational End of Project: At least 10 ocean nurseries of different capacity, 1 land-based nursery operational and producing coral stock at sufficient scale	Technical reports, coral survey reports, established nurseries, coral stock available for transplantation	Timely delivery and availability of necessary equipment for set up of nurseries Nursery corals will have a similar survival as previous Reef Rescuers project (75 %) No major mass bleaching events, or crown-of-thorns & Drupella snail invasions during project period

Expected Outcomes/Outputs	Outcome/Output Indicator	Baseline (2016-2017)	Target by end of project	Means of Verification	Assumptions
		fragments) Existing Land Based Nurseries: >Beau Vallon (200 fragments) >Anse Forbans (100 fragments)			
Output 2.2.1 Donor coral colonies of appropriate species (resilience, maintaining genetic diversity) available at sufficient scale (quantity, time, intervals etc.) for propagation in nurseries	Number of coral species for propagation based on resilience and genetic diversity identified	Coral species selected during previous Reef Rescuers Project (Nature Seychelles) based on survival from 1998 El Nino	Coral species identified and validated by the Project Steering Committee	Technical Report on coral species identified, Minutes of Steering Committee	New coral species selected will perform equally or better than coral species of the Reef Rescuers project
	Number of donor sites with resilient and resistant coral species identified	2 Donor sites identified and used for previous Reef Rescuers project (Nature Seychelles)	At least an additional donor site identified in Cousin island, Ste Anne, Cerf Islands and Curieuse/Praslin area.	Donor site survey reports	List of local thermal tolerant coral species available Favourable weather conditions allow the timely completion of surveys

Expected Outcomes/Outputs	Outcome/Output Indicator	Baseline (2016-2017)	Target by end of project	Means of Verification	Assumptions
	percentage of climate resilient coral collected from donor sites for propagation in nurseries	0%	not more than 10 % of each donor coral colony will be collected to avoid death of donor corals at donor sites	Technical assessment report, report on genetic analysis, survey report of donor site	Favourable weather conditions, including no extreme El Nino events causing bleaching of aquacultured resilient coral species.
Output 2.2.2 Reports on coral reef status, water quality, and other key environmental and social parameters for potential nursery sites	Surveys for identification of nursery sites including parameters suitable for maximized coral growth	1 nursery site at Cousin Island; 1 nursery site at Curieuse Island; 1 nursery site at-Ste Anne/Ile aux Cerf	3 Nursery sites of different size operational	Reports on nursery sites	Species selection is science-based and performs as in previous projects. Adequate environmental conditions remain for ideal coral growth in nurseries
	Number of Environmental and Social Risk Assessment Reports	0	6	Annual Environment and Social Risk Assessment Reports	Implementation of the project does not lead to environmental and social issues

Expected Outcomes/Outputs	Outcome/Output Indicators	Baseline (2016-2017)	Target by end of project	Means of Verification	Assumptions
Output 2.2.3 A land-based nursery established, and 2 or more ocean nurseries are established and maintained on a regular basis	Number of land-based nursery established and operational	2 small scale land nurseries at Beau Vallon and Anse Forbans	One additional land-based nursery established and operational at Cousin Island	Monitoring and evaluation report for land-based nursery	Land based nursery will work for production of coral sexual recruits; availability of necessary workers, equipment and materials to build land-based nursery
	Number of ocean-based nurseries established and operational	Previous experience installing & maintaining ocean nurseries; midwater rope nurseries still operational from Reef Rescuers project	Cousin: At least 10 ocean nurseries; Curieuse: 20 Nurseries; St Anne: 8 Nurseries.	Monitoring and evaluation report for ocean nursery sites, physical verification (site visits), operational reports, list of assets	Timely delivery and availability of necessary equipment and materials to build ocean nurseries
	Number of people involved in the maintenance and monitoring of new land and ocean-based nurseries	Reef Rescuers project: Prior team of 3 permanent staff and 35 rotating volunteer scientific divers. Current team of 2 MCSS: 3 project staff	Cousin: 6 staffs, volunteers and 10 community members. Ste Anne/Anse Forbans: 4 staff, Communities and 10 Community members Curieuse: 4 staff and 12 rotating volunteers	Monitoring and evaluation reports for land-based and ocean-based nurseries; staff contracts; volunteer contracts	Low turnover for community members and staff involved until the end of the project Scientific diver volunteers change every 3 months Community member, staff and volunteers learn to work together through the project lifetime

Expected Outcomes/Outputs	Outcome/Output Indicator	Baseline (2016-2017)	Target by end of project	Means of Verification	Assumptions
		and volunteers			
Output 2.2.4 Stock of farmed corals available for transplantation	Number of coral fragments under culture in land-based nursery	0	At least 1,000 corals growing in the land-based nursery derived from sexual and/or sexual reproduction	Monitoring and evaluation reports for land nursery site	The survival rate of coral fragments in the land nursery is similar or better than the survival rate in past ocean nurseries (75 %) implemented by Nature Seychelles
	Number of coral fragments under culture in new ocean nurseries	Past Reef Rescuers Project by Nature Seychelles grew 40,000 corals in ocean-based nurseries; Present bleaching resistant corals (super corals) at Cousin Island	Cousin: At least 50,000 corals Curieuse: at least 40000 Ste Anne at least 12500 Total: 102,500.	Monitoring and evaluation reports for ocean nursery site	The survival rate of coral fragments in ocean nurseries is similar (75%) or better than in previous Reef Rescuers project; No major mass bleaching events, or crown-of-thorns & Drupella snail invasions during project period

Expected Outcomes/Outputs	Outcome/Output Indicators	Baseline (2016-2017)	Target by end of project	Means of Verification	Assumptions
		nursery site			
<p>Outcome 2.3 The health of degraded reefs restored, through active restoration work, maintenance and monitoring efforts, leading ultimately to greater protection of shore from flooding and storm damage</p>	Number of sites restored with nursery grown corals	1 site (0.5 hectare) of degraded reef were restored in Cousin Island by Nature Seychelles, Reef Rescuers project	At least 3 degraded reef sites of different sizes restored with nursery-grown corals, sea bed stabilisation and control of macro algae, thus contributing to coral and fish recovery	Underwater surveys & monitoring reports	Favourable weather conditions allow the timely completion of surveys, transplantation of corals, maintenance and monitoring of restored sites No major events (climate, tsunami) occur during project period
<p>Output 2.3.1 Rugosity and structure of reefs restored, leading ultimately to greater protection of shore from erosion</p>	Area of site successfully restored with nursery grown corals	Previous experience restoring a degraded reef with 25,000 nursery grown corals in the Reef Rescuers project covering 0.5 Ha	Cousin: At least 1 Ha of degraded reef Curieuse: 1 Ha over project life cycle Ste Anne: 0.25 Ha over project life cycle Anse Forbans: 0.25 Ha over project life cycle Total: 2.5 Ha	Monitoring reports, GIS Mapping	Favourable weather conditions allow the timely completion of surveys, transplantation of corals, maintenance and monitoring of restored sites The survival rate of transplanted corals is similar or better than in previous Reef Rescuers project; No major

Expected Outcomes/Outputs	Outcome/Output Indicator	Baseline (2016-2017)	Target by end of project	Means of Verification	Assumptions
					mass bleaching events, or crown-of-thorns & Drupella snail invasions during project period
	Number of people involved in cementing corals to the degraded reefs and monitoring restoration effects	Prior experience applying cementing techniques during the Reef Rescuers project: Cousin: 3 staff, 2 divers and 35 rotating volunteers SNPA: 4 staff and volunteers; MCSS: 3 staffs and volunteers	Cousin: 4 staff + volunteers rotating every 3 months or as needed SNPA: 4 staff and rotating volunteers MCSS: 4 staffs and volunteers	Monitoring reports for restored reefs; staff contracts; volunteer contracts	The survival rate of transplanted corals is similar or better than in previous Reef Rescuers project; No major mass bleaching events, or crown-of-thorns & Drupella snail invasions during project period
Output 2.3.2 Recovery of fish population and other reef associated fauna and flora, leading ultimately to improved food security in Seychelles	percentage of live coral cover and quality of restoration sites (including, restored coral health status, coral recruitment, fish biomass, fish diversity and fish catch amongst others)	Percentage cover of live coral: --Curieuse 19% cover --Anse Forbans < 5% -- Ste Anne/Cerf 49% Average fish population per	at least 10 % increase in live coral cover, fish density and diversity.	3 reports (coral reef ecosystem including, restored coral health status, coral recruitment, fish biomass, fish diversity and fish catch amongst others) to assess the temporal progress of the	Favourable weather conditions allow the timely completion of surveys, transplantation of corals, maintenance and monitoring of restored sites

Expected Outcomes/Outputs	Outcome/Output Indicators	Baseline (2016-2017)	Target by end of project	Means of Verification	Assumptions
		m ² at Ste Anne is 0.307. no data available for other sites		project - beginning, midterm and end of project	
Component 3: Knowledge management and sharing, training and sensitization to build regional capacity for sustainable reef restoration					
Outcome 3.1 Improved understanding and knowledge management of use of reef restoration as an adaptation measure	Number of result dissemination reports produced for sharing of acquired experience/knowledge, lessons learned etc.	0	At least 7	Reports and other tangible means of result dissemination	Sensitisation materials successfully disseminated to the right target audience/population
Output 3.1.1 Comparative review and analysis of coral restoration initiatives in the region and globally, with gaps in knowledge identified	Comprehensive review of coral reef restoration in the region and globally undertaken	None	Report/Paper on comprehensive review of coral reef restoration in the region and globally finalised and validated by the Project Steering Committee	Report on comprehensive review of coral reef restoration & Project Progress Report	Studies, Reports and Research papers on coral reef restoration initiatives in the region and globally available and accessible
Output 3.1.2 Based on past and ongoing coral restorations efforts undertaken by the project and others, science-based best practice and methodologies	Methodologies for coral restoration in Mauritius and Seychelles developed, based on best available science and practices	none	Coral restoration methodology and good practices guide developed and validated by the project steering committee	Methodologies developed and adopted for coral reef restoration activities. Project Progress Report Guideline document &	Studies and Research papers on coral reef restoration methodology accessible Reports on past and current coral reef restoration projects locally and in the region readily available

Expected Outcomes/Outputs	Outcome/Output Indicator	Baseline (2016-2017)	Target by end of project	Means of Verification	Assumptions
(e.g. factors determining success in coral restoration are known; cost-effective approaches, etc.) developed, constraints and challenges identified, and lessons learned documented.				survey Report (currents/wave pattern, GIS/habitat mapping, physico-chemical surveys of sites, inventory of coral species, genetic identification of resilient species, water quality amongst others)	
Output 3.1.3 Research undertaken to provide information to guide restoration and enhance reef resilience where required (e.g. genetic connectivity of coral species, spawning seasons and coral recruitment patterns, resistant/resilient species and clades)	Research and surveys on key information for reef restoration undertaken	Preliminary surveys and analysis of past coral reef restoration projects undertaken	Regional research and analysis on key information coral reef resilience, and genetic diversity and connectivity undertaken	Report on research and analysis Published papers.	Capacity of key stakeholders on coral reef restoration techniques and coral genetics analysis including clade analysis built

Expected Outcomes/Outputs	Outcome/Output Indicators	Baseline (2016-2017)	Target by end of project	Means of Verification	Assumptions
Outcome 3.2 Improved understanding within the WIO and globally of successful approaches to reef restoration, the constraints and challenges, with lessons learned incorporated into new initiatives	Number of abstracts of research papers on coral reef restoration submitted for presentation at various scientific forums in the WIO and globally	0	Abstracts: Midterm: At least 2 End of project: At least 4	Project Progress Report Research papers published	Capacity of stakeholders built on preparation of research papers Commitment of stakeholders to produce research papers documenting the findings of the coral restoration initiative
Output 3.2.1 Lessons learned in reef restoration documented and shared	Knowledge sharing platform on reef restoration for sharing lessons learned developed	0	Knowledge sharing platform developed and operational	Project Progress report website	Active participation and collaboration of the key stakeholders of coral reef restoration Systematic monitoring and documentation of the coral reef restoration process at each stage
Output 3.2.2 Reef Restoration tool kit and manual for use in the WIO published and disseminated	Reef Restoration Manual developed	1	Reef Restoration Manual updated, revised and published online	Coral Reef Manual and website where it is made accessible	Active participation and collaboration of the key stakeholders of coral reef restoration for the timely drafting of the manual

Expected Outcomes/Outputs	Outcome/Output Indicator	Baseline (2016-2017)	Target by end of project	Means of Verification	Assumptions
Outcome 3.3 Regional capacity developed for sustainable and climate resilient coral restoration.	Number of members from Mauritius and Seychelles trained in coral reef restoration techniques and analysis (incl. identification of resilient corals, long-term monitoring programmes, sexual reproduction of corals, micro-fragmentation, GIS, genetic connectivity, etc.), with particular attention given to increasing female participants/beneficiaries from the capacity building activities	0	Mid-term: At least 20 End of year: At least 45 Gender disaggregated data will be collected. Beneficiaries: MOEMRFS, MOI, SNPA, Nature Seychelles, MCSS and some participants from the WIO region who are doing active in coral restoration work in the region.	Project Progress report Training report	Members have successfully completed the training provided Sufficient number of qualified female staff/scientists interested in the coral reef restoration work.
Output 3.3.1 Regional training programme on reef restoration in place, possibly with an associated Certificate of Competence	Number of members from Mauritius and Seychelles trained in coral reef restoration methods, with particular attention given to increasing female participants/beneficiaries from the capacity building activities	0	Mid-term: At least 7 End of project: At least 20 Gender disaggregated data will be collected. Beneficiaries: representative of the WIO region countries involved in coral reef restoration	Project Progress report + Training report	Members have successfully completed the training provided
Output 3.3.2 Regional training workshops undertaken on monitoring, DNA-based approach for the identification of resilient corals, genetic	Number of members from Mauritius and Seychelles trained in advanced coral genetics including clade analysis, with particular attention given to increasing female participants/beneficiaries from the capacity building	0	End of project: At least 20 participants Gender disaggregated data will be collected. Beneficiaries: MOEMRFS, SNPA, Nature Seychelles, MCSS and some	Training report + Lab-book records	Recruitment of a consultant or sponsored training to an international genetic facility (with advanced knowledge in coral genetics) Timely delivery and availability of additional lab equipment

Expected Outcomes/Outputs	Outcome/Output Indicator	Baseline (2016-2017)	Target by end of project	Means of Verification	Assumptions
connectivity and other topics as appropriate	activities		participants from the WIO region who are doing active in coral restoration work in the region.		
Output 3.3.3. Sustainable long-term monitoring programme developed and underway for restored reefs, based on international/regional protocols and best practice	Regional Coral Restoration Plan including national components and long-term monitoring programme	0	Regional Coral restoration plan developed and validated by the Project Steering Committee and adopted by both countries	Regional Coral Reef Restoration Plan Project Progress Report	Literature on coral reef restoration selection criteria accessible Reports on past and current coral reef restoration projects locally readily available
	Participation in regional and international fora	0	participation to at least 2 relevant regional/international forum	Feedback report minutes of Regional/international forum	Commitment of stakeholders to produce research papers documenting the findings of the coral restoration initiative
	Regional Studies on wave pattern, beach erosion and mapping	0	At least 5 surveys (one in each site) by mid project and 10 by the end of the project.	Survey reports Research paper	There is full cooperation between Mauritius and Seychelles. Commitment of stakeholders to produce research papers documenting the findings

F. Project Alignment with AF framework

Table 15 Project Alignment with AF framework

Project Objective(s) ¹⁵¹	Project Objective Indicator(s)	Fund Outcome	Fund Outcome Indicator	Grant Amount (USD)
Objective 1: To improve food security and livelihoods and mitigate disaster risk through active restoration of coral reefs degraded by coral bleaching as a result of climate change in Mauritius and Seychelles, in order to restore their essential ecosystem services.	Degraded sites restored to scale using farmed corals, with good survivorship and growth rates of the colonies	Outcome 5: Increased ecosystem resilience in response to climate change and variability-induced stress	5. Ecosystem services and natural resource assets maintained or improved under climate change and variability-induced stress	5,423,007
	Number of stakeholders with improved livelihoods due to new employment & business opportunities	Outcome 6: Diversified and strengthened livelihoods and sources of income for vulnerable people in targeted areas	6.1 Percentage of households and communities having more secure access to livelihood assets	1,557,706
	Number of people involved in the building, maintenance and monitoring of ocean nurseries			
Objective 2: To generate knowledge about effective restoration techniques for dissemination to other SIDS and countries within the wider region.	No of trained community members that have changed occupation to coral restoration activities	Outcome 3: Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level	3.2 Modification in behaviour of targeted population	1,283,921
	Number research papers on coral reef restoration submitted for presentation at various scientific forums in the WIO and globally			
Total at Objective level				8,264,634
Project Outcome(s)	Project Outcome Indicator(s)	Fund Output	Fund Output Indicator	Grant Amount (USD)
Improved understanding and knowledge management of use of reef restoration as an adaptation measure	No of training on effective restoration technique and sensitisation campaign on coral reef restoration as an adaptation measure to Climate Change.	Output 3: Targeted population groups participating in adaptation and risk reduction awareness activities	3.1.2 No of news outlets in the local press and media that have covered the topic.	1,283,921
Ecosystem services and	Number of ocean nurseries	Output 5: Vulnerable	5.1. No. of natural resource	5,423,007

¹⁵¹ The AF utilized OECD/DAC terminology for its results framework. Project proponents may use different terminology, but the overall principle should still apply

Project Objective(s) ¹⁵¹	Project Objective Indicator(s)	Fund Outcome	Fund Outcome Indicator	Grant Amount (USD)
assets provided by reefs in the form of shoreline protection, fisheries and tourism strengthened	established and operational with donor coral species that were survivors of previous bleaching events	ecosystem services and natural resource assets strengthened in response to climate change impacts, including variability	assets created, maintained or improved to withstand conditions resulting from climate variability and change (by type and scale)	
Stakeholders benefiting from improved livelihoods and greater food security as a result of employment in coral restoration initiatives, improved fish catches as reefs recover; potential sale and/or export of corals from nurseries for souvenir and the aquarium trade; greater revenue from tourism	Number of members from coastal communities that are deriving an income from new coral restoration and related economic activities	Output 6: Targeted individual and community livelihood strategies strengthened in relation to climate change impacts, including variability	6.1.2. Type of income sources for households generated under climate change scenario	1,557,706
Total at Outcome level				8,264,634

The following two of the Adaptation Fund core indicator are suggested to be monitored during the project implementation, namely: Number of Beneficiaries; and Natural Assets Protected or Rehabilitated. The targets for AF's Core Indicators of the project are indicated in Table 16. The reporting format of the AF core indicators are at Annex 12. The expected targets will be adjusted during the first year of implementation and the actual value will be reported at the completion of the project.

Table 16 *Expected target of AF Core Indicators*

Core Indicators	Expected target and information on the core indicators
Number of Beneficiaries	<p>Direct beneficiaries: 1001</p> <ul style="list-style-type: none"> • Mauritius: 660 (300 female, 150 youth) <ul style="list-style-type: none"> ○ 20 (taking part in training and restoration work) ○ 40 (NGO workers, University Students, researchers and conservationists) ○ 500 fishers ○ 100 boat operators • Seychelles: 223 (100 female and 70 youths) <ul style="list-style-type: none"> ○ 53 vulnerable group (35 female, 10 youth) ○ 45 boat operators ○ 85 (taking part in training and restoration works) (45 female, 40 youth) ○ 40 NGO workers, University Students, Researchers and conservationist (20 female,20 youth) <p>Indirect beneficiaries: 80,325</p> <ul style="list-style-type: none"> • Mauritius: 29500 (14,900 female and 4,500 youth) • Seychelles 59,725 (29,710 female and 9,820 youth) <ul style="list-style-type: none"> ○ 48,000 tourists (24000 female and 7400 youths) ○ 2825¹⁵² population of Takamaka (1000 female, 400 youths) ○ 8900 Population of Praslin (4710 female, 2020 youths)
Restoration of coral reefs	<p>3.2 Ha of coral reefs in Mauritius 2.5 Ha of coral reefs in Seychelles</p>

¹⁵² (2010) National Statistics Bureau, Seychelles

G. Budget

Award ID:	TBD	Project ID(s):	TBD
Award Title:	TBD		
Business Unit:	MUS 10		
Project Title:	Restoring marine ecosystem services by restoring coral reefs to meet a changing climate future		
PIMS no.	5736		
Implementing Partner /Executing Agency	UNDP		

Component 1: Enhancement of food security and reduction of risks from natural disasters through the restoration of degraded reefs in Mauritius

Table 17: Budget Component 1

Project Outcomes	Description	Account code	Yr1	Yr2	Yr3	Yr4	Yr5	Yr6	Budget (USD)	Budget Note
Outcome 1.1: Improved livelihood for a sustainable partnership and community-based approach to reef restoration.	Contractual Services Companies	72100	10,555	-	2,920	-	-	2,920	16,395	1
	Equipment and furniture	72200	63,150	-	-	-	-	-	63,150	2
	Audio Visual & Print Prod Costs	74200	13,000	15,000	-	-	-	-	28,000	3
	Training Workshops and Conference	75700	49,300	-	-	-	-	-	49,300	4
	Travel	71600	1,316	-	-	-	-	-	1,316	5
Subtotal Outcome 1.1			137,321	15,000	2,920	-	-	2,920	158,161	
Outcome 1.2: Coral farming and nursery facilities established at a sufficient scale for	Contractual services Companies	72100	33,544	183,080	123,472	123,472	66,972	34,416	564,956	6
	Equipment and furniture	72200	100,000	-	-	-	-	-	100,000	7

Project Outcomes	Description	Account code	Yr1	Yr2	Yr3	Yr4	Yr5	Yr6	Budget (USD)	Budget Note
more climate change resilient corals.	Materials and goods	72300	452,349	408,775	27,725	27,725	27,200	27,200	970,974	8
	Travel	71600	4,920	19,300	-	-	-	-	24,220	9
Subtotal Outcome 1.2			590,813	611,155	151,197	151,197	94,172	61,616	1,660,150	
Outcome 1.3: The health of degraded reefs restored, through active restoration work, maintenance and monitoring efforts, leading ultimately to greater protection of shore from flooding and storm damage.	Miscellaneous Expenses	74500	6,985	1,355	944	1,081	670	1,494	12,529	10
	Audio Visual & Print Prod Costs	74200	-	-	-	-	-	15,000	15,000	11
	Contractual Services Companies	72100	-	-	21,600	53,760	32,160	18,920	126,440	12
	Equipment and furniture	72200	230,000	-	-	-	-	-	230,000	13
	Materials & Goods	72300	202,000	-	-	6,000	6,000	38,000	252,000	14
	Transport, Shipping and handle	74700	-	-	-	1,500	1,500	1,500	4,500	15
	Travel	71600	13,260	-	3,800	5,700	-	18,460	41,220	16
Subtotal Outcome 1.3			452,245	1,355	26,344	68,041	40,330	93,374	681,689	
Total Component 1			1,180,379	627,510	180,461	219,238	134,502	157,910	2,500,000	

Component 2: Enhancement of food security and reduction of risks from natural disasters through the restoration of degraded reefs in Seychelles

Table 18: Budget Component 2

Project Outcomes	Description	Account code	Yr1	Yr2	Yr3	Yr4	Yr5	Yr6	Budget (USD)	Budget Note
Outcome 2.1: Improved livelihood for	contractual services Companies	72100	4,380	15,000	-	4,380	-	4,380	28,140	17

Project Outcomes	Description	Account code	Yr1	Yr2	Yr3	Yr4	Yr5	Yr6	Budget (USD)	Budget Note
a sustainable partnership to coral reef restoration.	Training Workshops and Conference	75700	-	10,400	28,400	10,400	10,400	5,600	65,200	18
Subtotal Outcome 2.1			4,380	25,400	28,400	14,780	10,400	9,980	93,340	
Outcome 2.2: Coral farming and nursery facilities established at a sufficient scale for more climate change resilient corals.	contractual services Companies	72100	138,389	251,399	255,583	259,867	264,253	123,139	1,292,630	19
	Equipment and furniture	72200	57,000	6,120	8,742	18,867	8,995	5,500	105,224	20
	Materials & Goods	72300	187,529	49,271	49,969	50,699	51,460	19,203	408,131	21
	Travel	71600	6,000	-	-	-	-	-	6,000	22
Subtotal Outcome 2.2			388,918	306,790	314,294	329,433	324,708	147,842	1,811,985	
Outcome 2.3: The health of degraded reefs restored, through active restoration work, maintenance and monitoring efforts, leading ultimately to greater protection of shore from flooding and storm damage.	Miscellaneous Expenses	74500	343	685	685	685	685	342	3,425	23
	contractual services Companies	72100	20,326	82,210	84,418	86,721	89,124	64,051	426,850	24
	Equipment and furniture	72200	20,000	8,000	8,000	8,000	8,000	8,000	60,000	25
	Materials & Goods	72300	2,400	7,400	7,400	7,400	7,400	7,400	39,400	26
	Travel	71600	7,000	13,000	13,000	13,000	13,000	6,000	65,000	27
Subtotal Outcome 2.3			50,069	111,295	113,503	115,806	118,209	85,793	594,675	
Total Component 2			443,367	443,485	456,197	460,019	453,317	243,615	2,500,000	

Component 3: Training to build capacity for sustainable coral reef restoration

Table 19: Budget Component 3

Project Outcomes	Description	Account code	Yr1	Yr2	Yr3	Yr4	Yr5	Yr6	Budget (USD)	Budget Note
Outcome 3.1: Improved understanding and knowledge management of use of reef restoration as an adaptation measure	Audio Visual & Print Prod Costs	74200	2,000	2,000	2,000	2,000	5,000	8,000	21,000	28
	Contractual Services Companies	72100	-	5,000	-	-	-	-	5,000	29
	Equipment and furniture	72200	14,000	-	-	-	-	-	14,000	30
	International Consultant	71200	8,000	83,590	24,000	24,000	72,000	24,000	235,590	31
	Materials and goods	72300	-	27,600	27,600	12,600	3,000	-	70,800	32
	Training Workshops and Conference	75700	-	4,000	-	-	-	-	4,000	33
	Transport, Shipping and handle	74700	-	20,000	20,000	15,000	5,000	-	60,000	34
	Travel	71600	-	1,615	-	-	-	-	1,615	35
Subtotal Outcome 3.1			24,000	143,805	73,600	53,600	85,000	32,000	412,005	
Outcome 3.2: Improved understanding within the WIO and globally of successful approaches to reef restoration, the constraints and challenges, with lessons learned incorporated into new initiatives	Contractual Services Companies	72100	49,270	47,271	42,272	42,272	42,272	42,272	265,629	36
	Contractual Services Individual	71400	80,315	120,472	120,472	120,472	120,472	120,471	682,673	37
	International Consultant	71200	-	24,000	-	-	-	-	24,000	38
	Training Workshops and Conference	75700	-	1,000	-	-	1,000	-	2,000	39
	Travel	71600	-	3,580	-	-	59,940	-	63,520	40
Subtotal Outcome 3.2			129,585	196,323	162,744	162,744	223,684	162,743	1,037,823	
Outcome 3.3: Regional capacity developed for sustainable and climate resilient coral restoration	Contractual Services Companies	72100	24,000	20,000	20,000	20,000	20,000	24,000	128,000	41
	Information Technology Equipment	72800	720,000	-	-	-	-	-	720,000	42
	International Consultant	71200	-	4,000	66,860	44,000	44,000	50,000	208,860	43

Project Outcomes	Description	Account code	Yr1	Yr2	Yr3	Yr4	Yr5	Yr6	Budget (USD)	Budget Note
	Local Consultants	71300	-	-	25,400	24,000	24,000	25,400	98,800	44
	Materials and goods	72300	22,000	16,000	19,000	14,000	14,000	22,000	107,000	45
	Training Workshops and Conference	75700	-	5,600	11,200	-	1,400	3,000	21,200	46
	Travel	71600	600	20,040	35,245	9,150	16,125	22,475	103,635	47
Subtotal Outcome 3.3			766,600	65,640	177,705	111,150	119,525	146,875	1,387,495	
Outcome 3.4: Project Monitoring and Auditing	Miscellaneous Expenses	74500	12,385	6,650	9,560	6,355	860	6,130	41,940	48
	International Consultant	71200	13,730	13,730	38,730	13,730	13,730	38,730	132,380	49
	Local Consultants	71300	6,666	6,666	26,667	6,667	6,667	26,667	80,000	50
	Professional Services	74100	5,000	5,000	5,000	5,000	5,000	5,000	30,000	51
	Training Workshops and Conference	75700	18,000	4,000	4,000	4,000	4,000	12,000	46,000	52
	Travel	71600	27,690	9,730	17,480	9,730	17,480	14,880	96,990	53
Subtotal Outcome 3.4			83,471	45,776	101,437	45,482	47,737	103,407	427,310	
Total Component 3			1,003,656	451,544	515,486	372,976	475,946	445,025	3,264,633	

Project Execution cost

Table 190: Budget Project Execution Cost

Project Outcomes	Description	Account code	Yr1	Yr2	Yr3	Yr4	Yr5	Yr6	Budget (USD)	Budget Note
Project Execution cost	Miscellaneous Expenses	74500	6,410	2,530	2,530	2,530	2,530	3,170	19,700	54
	Contractual Services Individual	71400	64,962	83,765	85,361	87,037	88,796	90,644	500,565	55
	equipment and furniture	72200	6,000	290	290	290	290	290	7,450	56
	Information Technology Equipment	72800	5,400	292	275	275	275	275	6,792	57
	Travel	71600	114,880	43,680	43,680	43,680	43,680	43,680	333,280	58
Project Execution cost*			197,652	130,557	132,136	133,812	135,571	138,059	867,787	

*Project Execution Cost is the same or equivalent to Project Management Cost with UNDP's terminology

Budget of implementing entity Management Fee

Table 201: Budget Implementing Entity Management Fee

UNDP Fees for Support to Adaptation Fund Project

“Restoring marine ecosystem services by restoring coral reefs to meet a changing climate future”

Category	Services Provided by UNDP	UNDP Fee (9.5%)
Identification, Sourcing and Screening of Ideas	<p>Provide information on substantive issues in adaptation associated with the purpose of the Adaptation Fund (AF).</p> <p>Engage in upstream policy dialogue related to a potential application to the AF.</p> <p>Verify soundness & potential eligibility of identified idea for AF.</p>	\$43,379
Feasibility Assessment / Due Diligence Review	<p>Provide up-front guidance on converting general idea into a feasible project/programme.</p> <p>Source technical expertise in line with the scope of the project/programme.</p> <p>Verify technical reports and project conceptualization.</p> <p>Provide detailed screening against technical, financial, social and risk criteria and provide statement of likely eligibility against AF requirements.</p> <p>Determination of execution modality and local capacity assessment of the national executing entity.</p> <p>Assist in identifying technical partners. Validate partner technical abilities. Obtain clearances from AF.</p>	\$130,137
Development & Preparation	<p>Provide technical support, backstopping and troubleshooting to convert the idea into a technically feasible and operationally viable project/programme.</p> <p>Source technical expertise in line with the scope of the project/programme needs.</p> <p>Verify technical reports and project conceptualization.</p> <p>Verify technical soundness, quality of preparation, and match with AF expectations.</p> <p>Negotiate and obtain clearances by AF. Respond to information requests, arrange revisions etc.</p>	\$173,516
Implementation	<p>Technical support in preparing TORs and verifying expertise for technical positions.</p>	\$390,411

	<p>Provide technical and operational guidance project teams.</p> <p>Verification of technical validity / match with AF expectations of inception report.</p> <p>Provide technical information as needed to facilitate implementation of the project activities.</p> <p>Provide advisory services as required.</p> <p>Provide technical support, participation as necessary during project activities.</p> <p>Provide troubleshooting support if needed. Provide support and oversight missions as necessary.</p> <p>Provide technical monitoring, progress monitoring, validation and quality assurance throughout.</p> <p>Allocate and monitor Annual Spending Limits based on agreed work plans.</p> <p>Receipt, allocation and reporting to the AFB of financial resources.</p> <p>Oversight and monitoring of AF funds. Return unspent funds to AF.</p>	
Evaluation and Reporting	<p>Provide technical support in preparing TOR and verify expertise for technical positions involving evaluation and reporting.</p> <p>Participate in briefing / debriefing.</p> <p>Verify technical validity / match with AF expectations of all evaluation and other reports</p> <p>Undertake technical analysis, validate results, and compile lessons.</p> <p>Disseminate technical findings</p>	\$130,137
Total		\$867,580

Budget Notes:

1. Contractual Service of NGOs (one in Mauritius and one in Rodrigues) for:
 - Carrying out stakeholder analysis in Mauritius and Rodrigues
 - Developing a strategic plan for self-sustaining of nurseries
 - Training of communities
 - Partnership agreement
 - Carrying out livelihood survey reports
 2. Acquisition of information Technology equipment for responsible parties for training of communities (laptops, software licenses, external hard drive, project, etc); diving equipment (17 sets); and snorkelling equipment (13 sets)
 3. Publication and printing costs for communication resources and media (newsletters, brochure, fact sheets, etc)
 4. Costs associated with organisation of community/beneficiary training workshops and incentives to participants, training in advance PADI and snorkelling
 5. Cost for trip to Rodrigues for resource persons from (1) AFRC and (1) MOI for community training in Rodrigues (3 days). (cost of trip= USD 250/person; DSA= USD 136/day):
 6. Contractual Services of NGOs (Mauritius and Rodrigues) which include:
 - Boat rental (~ 20 days/year at a rate of USD 100/day)
 - Petrol for boat (~200 days trip/year at rate of USD 28/day trip) for Yrs. 2-4 in Mauritius and Rodrigues
 - Carrying out Environmental and Social Impact Assessment at each site on a yearly basis (USD 560/year).
 - Recruitment of 2 Site project coordinator (USD 970/month/person). (Marine Biologist or equivalent, minimum MSc Level, Rescue or Dive Master) for 60 months
 - Recruitment of 2 Site project assistant (USD 690/month/person) (Marine Biologist or equivalent, minimum BSc Level, Rescue or Dive Master) for 60 months
 - Incentive (USD24/person day) to Communities for
 - Manufacture (400-person days in Mauritius and 154-person days in Rodrigues) (year 2)
 - Deployment (600-person days in Mauritius and 84-person day sin in Rodrigues) (year 2)
 - Population of nurseries (800-person days in Mauritius and 154-person days in Rodrigues) (year 2)
 - Maintenance of nurseries (1500-person days/year in Mauritius and 600-person days/year in Rodrigues) from year 2 – 4.
- Recruitment of land-based nursery personnel:
- 2 Nursery men (USD 648/months/person) for 5.5 years
 - 1 Plant operator (USD 648/months) for 5.5 years
 - Population of land-based nurseries and ocean-based nurseries with donor coral fragments.
7. Cost associated with acquisition of 2 transport vehicles (including running costs) (USD 50,000 each)
 8. Cost associated with:

- acquisition of material for genetic analysis of resilient donors (USD 150,000)
 - air tank refill for diving (USD 5 /dive; on an average of 43 dives/year)
 - tank air refill for collection of coral larvae for sexual propagation of corals (5 dives / year) for 3 years
 - Materials and goods for collection of coral larvae (year 2-4) (USD 500 /year)
 - Chemicals, consumable and reagents for monitoring of sea water quality and other environmental parameters in donor and ocean-based nurseries of Mauritius and Rodrigues (USD 26,000/year)
 - Materials for survey and monitoring in Mauritius and Rodrigues (USD 10,000 for year 1 then USD 1,000/year)
 - Materials for setting up of land-based nursery at MOI (USD 210,000)
 - Material for setting up of land-based nursery (experimental) for sexual propagation of corals (USD 56,099).
 - Materials for setting up multi rope nurseries (200 in Mauritius and 40 in Rodrigues) (USD 900/nursery)
 - Materials for setting up of table nurseries (100 in Mauritius and 50 in Rodrigues) (USD 1100/ nursery)
9. Cost for trip in Rodrigues (cost of trip= USD 250/person; DSA= USD 140/day):
- Year 1: 4 persons (2 MOI and 2 AFRC) for 7 days to carry out survey to identify donor sites in Rodrigues
 - Year 2: 4 persons (2 MOI and 2 AFRC) for 9 days for the collection of donor species from donor sites for asexual propagation in ocean-based nurseries and to carry out monitoring of donor and ocean-based nurseries (sea water quality and other key environmental parameters)
 - Year 2: 2 persons (1 MOI and 1 AFRC) for 14 days for identification of ocean-based nursery sites and restoration sites in Rodrigues.
 - Year 2: 4 persons (2 MOI and 2 AFRC) for 14 days to oversee the manufacture, deployment and population of nurseries in Rodrigues
 - Year 2: DSA for 2 persons (MOI and AFRC) for 4 days for training on monitoring in Rodrigues
10. Cost associated with services provided by UNDP CO Mauritius for activities such as procurement of goods, recruitment and organisation of travels and per diem for resource persons, any unforeseen expenses etc.
11. Cost associated with the updating and publication of the booklet on corals of Mauritius and Rodrigues
Note: the inventory of corals will be done by Government of Mauritius as in-kind contribution.
12. Contractual Services of NGOs (Mauritius and Rodrigues) which include:
- Petrol for boat (~58-day trip/year at rate of USD 28/day trip) for year 3-6 for Mauritius and Rodrigues
 - Incentive (USD24/person day) to Communities for
 - Transplantation of farmed corals (750-person days/year in Mauritius and 150-person days in Rodrigues) (year 3-4).
 - Maintenance of restoration sites (600-person days/year in Mauritius and

Rodrigues for year 3-6.

13. Cost associated with:
 - acquisition of multi spectral drone to carry out spatio-temporal study of beach profiles at restoration sites in Mauritius and Rodrigues. (USD 140,000)
 - Acquisition of equipment and software for current pattern analysis. (USD 90,000)
14. Cost associated with:
 - acquisition of 2 pneumatic drills (USD 10,000 each);
 - consumables for water analysis (USD 1,000 for year 4-6)
 - materials and logistics for monitoring survey in BBMP and SEMP (USD 5,000/ year for year 4-6)
 - materials and goods to carry out current temporal study (USD 150,000).
 - Logistics and consumables for current pattern survey and beach monitoring in Mauritius and Rodrigues (USD 32,000 / year in year 1 and year 6)
15. Cost associated with shipping of water samples from Rodrigues for analysis.
16. Cost for trip in Rodrigues (cost of trip= USD 250/person; DSA= USD 140/day):
 - Year 3: 4 persons (2 MOI and 2 AFRC) for 5 days to carry out survey to identify donor sites in Rodrigues
 - Year 4: 6 persons (3 MOI and 3 AFRC) for 5 days for monitoring of restored coral reef site in Rodrigues
 - Year 6: 4 persons (2 MOI and 2 AFRC) for 7 days for monitoring of restored coral reef site in Rodrigues
 - Year 1 and 6: 6 persons (5 MOI and 1 AFRC) for 14 days for spatio temporal study in Rodrigues
17. Cost associated with:
 - Development of Business Plan (Nsey) and Strategic/Financial Plan(SNPA)
 - Carrying out a livelihood survey.
18. Cost associated with:
 - Training of communities and NGO on establishing and maintaining coral nurseries
 - Awareness campaign on coral restoration in Seychelles
 - Scuba training of students (Nature Seychelles only)
19. 1) Cost associated with allowance of project staff for:
 - a) technical assessment and selection of coral species for transplantation
 - b) identification of donor sites
 - c) collection of donor corals
 - d) identification of ocean-based nursery sites
 - e) monitoring of water quality of donor and sea nurseries
 - f) maintenance of ocean-based nurseries

Note: Allowance of project staff for each responsible party in Seychelles are as follows:

- MCSS (USD 3000/month)
- Nsey – Project site coordinator (USD 3355/months), Science/Technical Officer

- (USD2706/month) and Dive officer (USD 1082/month)
 - SNPA – Project site coordinator (USD 12000/months) and 3 project staff (USD 780/person/month) and interisland ferry fare allowance (USD 60/trip; 72 trip /year)
 - 2) Cost associated with operation of ocean-based nurseries (staff house, PC house)
 - 3) Cost for maintenance of land nurseries
20. 1) Transport Vehicle for MCSS
- 2) Equipment for collection of donor corals for MCSS
- 3) Cost associated for purchasing of equipment by Nsey as follows:
- Dive equipment (USD 6000/year)
 - New Boat engine (USD 4,000)
 - Dissecting scope with lights (USD 2,500)
21. Costs associated with:
- Material for monitoring of donor coral reef and nurseries (USD 1000/year for SNPA) for year 2-6
 - Data top up for SNPA (~USD 264/year)
 - Materials for land-based nursery (USD 130,000) for Nsey
 - Materials for setting up and operation of ocean-based nurseries:
 - Ste Anne/le aux Cerfs – (USD 7000 /year)
 - Cousin Island (on average USD 3000 / year) and cost for petrol for 5 years (~USD 3600/year)
 - Curieuse Island (~USD 30,000/year)
 - Anse Forbans (~USD 7,000/year)
22. Return ticket for the 4 project staffs of Nature Seychelles (USD 1,500/ticket per project staff)
23. Cost associated with services provided by UNDP CO Mauritius for activities such as organisation of travels and per diem for resource persons, any unforeseen expenses etc.
24. Cost associated with:
- allowance of project staff of MCSS for transplantation of ocean-based nursery corals (3 months/year for year 1-6)
 - incentives for 2 volunteers (Mauritius exchange) (USD 500/months) for 6 months and housing of the volunteers (USD 2,000/year) for year 1-5
 - monitoring of health and diversity of corals, fish and other fauna and flora of the restored sites:
 - Anse Forbans for 5 years
 - Curieuse Island: Project Site Coordinator and 3 project staffs for 5 years
 - Cousin Island:4 divers (2 from Mauritius and 2 international) x 4 cycles of 3 months each = 8 divers/year at an estimated rate of USD 1541/person/month

- Monitoring and maintenance of restoration sites for 5 years:
 - Anse Forbans
 - Curieuse Island: Project Site Coordinator and 3 project staffs
 - Cousin Island: stipends for 4 student volunteers (USD 2346/year) and housing (USD 2,000/year) (year 2-5)
25. Cost associated with diving equipment, including maintenance (USD 8,000/year); and dive compressor (USD 12,000) for SNPA
 26. Cost associated with material for transplantation of ocean-based corals:
 - Anse Forbans (USD 5,000/year for year 2-6)
 - Curieuse: petrol for boat (USD 1,440/year) and consumables (USD 960/year)
 27. Cost associated with air ticket for:
 - 2 volunteers from Mauritius (USD 500/year/person) for Curieuse Island for 5 years
 - Air tickets for volunteer divers for Cousin Island (2 international divers x 4 cycles of 3 months each = 8 divers/year) (USD 1000/diver)
 - Air tickets for volunteer divers for Cousin Island (2 Mauritian divers x 4 cycles of 3 months each = 8 divers/year) (USD 500/diver)
 28. Cost associated with access to publications (scientific journals) and for the publication in journals of the following:
 - Comprehensive review of coral reef restoration techniques in the region and globally (USD 3,000)
 - Genetic connectivity study (USD 2,000/year)
 - Study on resistant/resilient species and clades analysis of thermos resistant species in Mauritius, Rodrigues and Seychelles. (USD 6,000)
 29. Contract out services for design and printing of guideline to coral restoration document
 30. Equipment for genetic connectivity study.
 31. Cost of contractual appointment of international consultants (including air tickets and DSA):
 - 1) Chief Technical Advisor (USD 800/person days) for:
 - Comprehensive review of coral reef restoration in the region and globally (40-person days)
 - Reef restoration methodologies, concept and best practices guidelines (40-person days)
 - Oversee implementation of Component 1, 2 and 3 (60-person days)
 - Air ticket and DSA for Mauritius, Rodrigues and Seychelles (USD 6,730)
 - 2) Expert in coral sexual reproduction and genetics (USD 800/person days)
 - Assist in the genetic connectivity study, sexual reproduction of corals and study on clade analysis of resistant/resilient coral species in Mauritius, Rodrigues and Seychelles (140-person days)
 - Air ticket and DSA for Mauritius (13 days) (USD 4,860)
 32. Cost associated with acquisition of materials and goods for:
 - Laboratory supplies for genetic connectivity analysis (USD 9600/year for yrs. 2-4)
 - Laboratory supplies for carrying out studies on identification of resilient coral

- species (USD 42,000)
33. Cost for the organisation of workshop/training in relation to reef restoration methodologies, concept and best practices guidelines
 34. Cost associated with shipping of sample material for:
 - genetic connectivity analysis from Rodrigues and Seychelles (USD 5000/shipping, once per year during year 2-4)
 - clade analysis from Seychelles (USD 5000/shipping, once per year during yrs. 2-5)
 - clade analysis from Rodrigues (USD 5,000 /shipping, once per year during yrs. 2 and 3)
 35. Cost for trip in Seychelles (cost of trip= USD 700/person; DSA= USD 305/day):
 - Year 2: 1 persons (MOI) for 3 days to take samples for genetic connectivity and build capacity of Seychelles to take sample and proper packaging for shipment to Mauritius.
 36. Cost of contractual appointment of:
 - Website manager for hosting and monthly maintenance of the website (USD 25,000)
 - Company for documentary film development (USD 235,629)
 - Design, printing and publishing of coral restoration. toolkit/manual (NOTE: same contractual appointment for designing, printing and publishing works for Components 1,2 and 3) (USD 5,000)
 37. Part of Cost of contractual appointment of regional project manager
 38. Part of cost of contractual appointment of CTA for the review/updating of the coral restoration toolkit/manual (30-person days at rate of USD 800/person days)
 39. Cost associated for the venue of RSAC meeting (USD 1000/meeting)
 40. Cost associated with travel (air ticket and DSA) for:
 - Participation in relevant international forum for 2 participants from Mauritius, 1 from Rodrigues and 3 from Seychelles
 - Coral experts from the region to attend RSAC meeting and exchange programme: 2 Rodrigues (USD 250); Australia (USD 2000); Madagascar (USD 600); Maldives (USD 600); South Africa (USD 850); Sri Lanka (USD 900); and Thailand (USD 1200), 4Mauritius (to Seychelles @USD700/person/trip). DSA for 2 days for meeting in Mauritius (USD 220) and in Seychelles (USD 305)
 41. cost for contractual appointment to carry out biannual beach profiling (USD 120000) and GIS mapping (USD 8000) for Seychelles
 42. Cost for the acquisition of:
 - Equipment (6 ADCP, 5WTR, 2 ECM) for collection of current pattern data (USD 600,000)
 - Equipment and Software for GIS (including workstation, GIS license (x3) map printing, MATLAB Licence (x3) (USD 90,000)
 - Software licences for spacio-temporal beach profiling (USD 30,000)
 43. Part of cost of contractual appointment of:
 - CTA for training in micro-fragmentation (USD4000)

- CTA for development of a Regional/National Coral Reef restoration plan (40-person days at rate USD 700/person days)
 - Expert in coral sexual reproduction and genetics for training in genetic analysis (15-person days at rate of USD 700/person days) including travel and DSA (USD 4860)
 - International expert in policy and legal, technical expert and financial expert for coral reef restoration plan (USD 700/person days for 72-person days/expert) and travel (USD 10,300)
44. Cost of contractual appointment of 2 local expert in policy/legal for development of a Regional/National coral reef restoration plan (USD 400/person days/expert for 120-person days/expert) including cost for air ticket to Mauritius and Seychelles (USD 700/trip/person) for 2 trips each.
45. Cost for acquisition of material for:
- Genetic connectivity/clade analysis training (USD 5000)
 - Micro-fragmentation training (USD 2000)
 - Logistics for field surveys (GIS) in Mauritius and Rodrigues for yrs. 1 and 6 (USD 4000/year for Mauritius and Rodrigues each)
 - Consumables and logistics for biannual beach profiling in Mauritius and Rodrigues (USD 84,000)
46. Cost associated with catering of 20 participants for:
- genetic connectivity, clade analysis regional training for 5 days (USD 6800)
 - micro-fragmentation for 4 days (USD 5,600)
 - Venue for training workshop, one for Mauritius and one for Seychelles (USD 3000/venue)
 - training of personnel of Seychelles (20) and Rodrigues (20) in current pattern study (USD 70/participant)
47. Cost associated with travel for regional training in:
- 1) genetic connectivity, clade analysis (5 days training, DSA- USD 220/day):
 - 3 participants from Seychelles (USD 700/trip/person)
 - 2 participants from Rodrigues (USD 250)
 - Coral experts from the region: Australia (USD 2000); Madagascar (USD 600); Maldives (USD 600); South Africa (USD 850); Sri Lanka (USD 900); and Thailand (USD 1200).
 - 2) Regional training on micro-fragmentation (6 days, DSA= USD 305/day)
 - 4 participants from Mauritius (2 MOI and 2 AFRC) (USD 700/trip/person)
 - 1 participant from Rodrigues (USD 950 USD/trip/person)
 - 3) Regional/National Coral Reef Restoration Plan (2 workshops)
 - 1 participant from Rodrigues (USD 250/trip/person to Mauritius, USD 950/trip/person to Seychelles)
 - 4 participants from Seychelles to Mauritius (USD 700/trip/person, DSA= USD 220/day/person for 3 days)
 - 4 participants from Mauritius to Seychelles (USD 700/trip /person, DSA= USD 305/day/person for 3 days)
 - 4) Current pattern (installation and removal of equipment):

- 3 technicians from Mauritius to Seychelles in year 5 and 6 (USD 700/trip/person, DSA=USD 305/person/day for 7 days/year)
 - 3 technicals from Mauritius to Rodrigues in year 3 and 4 (USD 250/trip/person, DSA= USD 140/day/person for 3 days)
 - Boat rental in Mauritius and Rodrigues (USD3,600)
 - Ferry allowance of USD 60/person/trip for 8 persons in year 5 and 6
- 5) Beach profiling twice per year in Rodrigues
- 3 technicians from Mauritius (2 MOI and 1 AFRC) (USD 250 / trip/person, DSA= USD 140/day/person for 6 days) for 5 years
48. Cost associated with services provided by UNDP CO Mauritius for activities such as procurement of goods, recruitment of experts/contractors/consultants and organisation of travels and per diem for resource persons, any unforeseen expenses etc.
49. Cost of contractual appointment of:
- Independent International M& E consultant (USD 50,000)
 - Travel cost of CTA to Mauritius, Rodrigues and Seychelles (USD 82,300)
50. Cost of contractual appointment of:
- 2 independent national M&E consultants (USD 40,000)
 - 2 National Gender Specialists (USD 40,000), one for Mauritius and one for Seychelles (3 weeks/year, including air ticket and DSA for Rodrigues and ferry fare for Praslin)
51. Cost for professional services for annual audit as per UNDP audit policies (USD 5,000/year)
52. Cost for the Organisation (venue and catering) of:
- Project Steering Committees (USD 4,000/per meeting, 2 in yr1 and 6, 1 meeting/year for yrs. 2-5, alternating Mauritius and Seychelles)
 - Inception and completion workshops (USD 14,000)
53. Cost associated with travel of 6 participants from Seychelles 6 participants from Mauritius (1 from Rodrigues) to travel for PSC meeting, outside their country. Air ticket(MUR-SEZ): USD 700/trip/participant, USD 250 for participant from Rodrigues, DSA in Mauritius = USD 220/day/participant, DSA in Seychelles = USD 305/day/participants
54. Cost associated with services provided by UNDP CO Mauritius for activities such as procurement of goods, recruitment of project personnel and organisation of travels and per diem for resource persons, any unforeseen expenses etc.
55. Cost of contractual appointment of Regional Project Manager (part)P2, Project Assistant(USD1900/month) and Financial Assistant (USD 1900).
56. Acquisition of 2 diving sets and maintenance
57. Acquisition of IT equipment (laptops, external hard drive, digital camera etc.) for Regional Project Manager, Project Assistant and Financial Assistant.
58. Cost for the travel of Regional Project Manager and Project or Financial Assistant in Seychelles (USD 700/trip/person, DSA: USD 305/day/person) and Rodrigues (USD 250/trip/person, DSA = USD 140/day/person), 4 trips per year. 1st trip in Yr 1 for a duration of 21 days, other trips duration = 10 days.

H. Disbursement Schedule

Table 212: Disbursement schedule

	Upon Agreement signature		Year 2	Year 3	Year 4	Year 5	Year 6	Total
	19-Jan	19-Jan	20-Jan	21-Jan	22-Jan	23-Jan	24-Jan	
Project Funds		2,627,401	1,522,539	1,152,146	1,052,233	1,063,765	846,549	8,264,633
Project Execution cost		197,652	130,557	132,136	133,812	135,571	138,059	867,787
Implementing Entity Fee	347,032	161,028	94,226	73,204	67,605	68,362	56,123	867,580
Total	347,032	2,986,081	1,747,322	1,357,486	1,253,650	1,267,698	1,040,731	10,000,000
	Tranche I		Tranche II	Tranche III	Tranche IV	Tranche V	Tranche VI	

PART IV: ENDORSEMENT BY GOVERNMENTS AND CERTIFICATION BY THE IMPLEMENTING ENTITY

A. Record of endorsement on behalf of the government¹⁵³

Copies of the endorsement letters are at Annex 13:

Mr D D Manraj, Financial Secretary, Alternate Designated Authority, Ministry of Finance and Economic Development	Date: January 12, 2018
Mr Didier Dogley, Minister, Designated Authority, Ministry of Environment, Energy and Climate Change	Date: January 9, 2018

⁶ Each Party shall designate and communicate to the secretariat the authority that will endorse on behalf of the national government the projects and programmes proposed by the implementing entities.

B. Implementing Entity certification

Provide the name and signature of the Implementing Entity Coordinator and the date of signature. Provide also the project/programme contact person's name, telephone number and email address

I certify that this proposal has been prepared in accordance with guidelines provided by the Adaptation Fund Board, and prevailing National Development and Adaptation Plans (Seychelles: National Climate Change Strategy, 2009 and Mauritius: Climate Change Information, Education and Communication Strategy and Action Plan 2014, National Climate Change Adaptation Framework 2013, INDC report 2015) and subject to the approval by the Adaptation Fund Board, commit to implementing the project/programme in compliance with the Environmental and Social Policy of the Adaptation Fund and on the understanding that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this project/programme.



Adriana Dinu,
Director, Sustainable Development (Environment) a.i.
Executive Coordinator, UNDP-GEF

Date: August 6th, 2018

Tel. and email: +1 (212) 906-5143
adriana.dinu@undp.org

Project Contact Person: Dr Akiko Yamamoto, Regional Technical Adviser
Tel. And Email: +251 91 250 3316, akiko.yamamoto@undp.org

ANNEXES

- Annex 1 Background information on coral reef restoration
- Annex 2 Social and Environment Screening Report
- Annex 3 Minutes of meeting of the first Regional Steering Committee
- Annex 4 Minutes of meeting of the Second Regional Steering Committee
- Annex 5 Minutes of meeting of the Third Regional Steering Committee
- Annex 6 Report on Stakeholder meetings
- Annex 7 Community Development Plan – Mauritius
- Annex 8 Youth and Gender Analysis Report – Mauritius
- Annex 9 Community Development Plan – Seychelles
- Annex 10 Youth and Gender Analysis Report – Seychelles
- Annex 11 Terms of Reference
- Annex 12 AFB Core Indicators
- Annex 13 Letters of Endorsement of Government of Mauritius and Government of Seychelles
- Annex 14 Conditions imposed by MOEMRFS for coral farming projects.
- Annex 15 Environment and Social Mitigation Plan

Background information on coral reef restoration

Current global understanding of coral reef restoration and terminology

Ecological restoration¹ is defined² as the process of assisting the recovery of an ecosystem that has been degraded, damaged or destroyed. Two types of restoration³ can be distinguished:

- **passive** restoration – management actions that remove the impact of environmental stressors that prevent the natural recovery of an ecosystem, such as establishing MPAs, reducing overfishing and pollution, etc
- **active** restoration which involves direct interventions such as (in the case of coral reefs) coral transplantation, removal of macroalgae (seaweeds), substrate consolidation and construction of artificial habitats.

Passive restoration, also known as conservation, is generally a less expensive option than active restoration. Even where active restoration is undertaken, passive methods are essential to remove threats and stressors that will otherwise prevent the growth and maintenance of the restored reefs, and create a high risk of failure and potential waste of resources.

Coral reef restoration is a well-established science^{4,5}, however, it is still at an earlier stage of research and development compared to other areas of restoration ecology such as terrestrial ecology (for example for forest restoration⁶). Even after 25 years of work, the “newer” status of coral reef restoration has been the subject to scepticism on the part of some scientists. However, coral reef restoration research and implementation are have rapidly increased in the last decade as demonstrated by the work presented at the 13th International Coral Reef Symposium, ICRS (with 3 coral reef restoration dedicated sessions, a total of 49 papers and 23 posters).

One of the obstacles for scaling-up of reef restoration is that there has been comparatively little critical evaluation of their success, with most projects evaluated over only a short time. A review of 74 scientific papers using coral transplantation for reef restoration, found that only 4% of reefs were monitored for more than the recommended five years’ post-transplantation, and over 50% were monitored for only one year or less. Furthermore, the most widely used indicators were growth and survival of the coral fragments (51% of studies used these only) and other ecological

¹ The terms “restoration” and “rehabilitation” are often used interchangeably. However, rehabilitation is normally used for the full replacement of structural or functional characteristics of an ecosystem that have been diminished or lost. The term restoration is used in preference in the concept, as there remains some question as to whether it will be feasible ultimately to fully rehabilitate coral reefs using active restoration techniques, although some scientists believe it may be possible

² Society for Ecological Restoration International Science & Policy Working Group. (2004) *The SER International*

Primer on Ecological Restoration. www.ser.org & Tucson: Society for Ecological Restoration International. 13 pp.

www.ser.org/content/ecological_restoration_primer.asp

³ Perrow, M. R., and A. J. Davy. 2002. Handbook of ecological restoration. Cambridge University Press, Cambridge, UK

⁴ Precht WF, ed.(2006) Coral reef restoration handbook. Boca Raton: CRC Press, 291–302.

⁵ Rinkevich B (2015) Climate change and active reef restoration: Ways of constructing the “Reefs of Tomorrow”. Journal of Marine Science and Engineering 3: 111-127

⁶ David Lamb and Don Gilmour. (2003). Rehabilitation and Restoration of Degraded Forests. IUCN, Gland, Switzerland and Cambridge, UK and WWF, Gland, Switzerland. x +110 pp.

factors are rarely addressed. Evaluation of the effectiveness of coral restoration programs should integrate ecological characteristics with socio-cultural, economic, and governance considerations to assess the efficacy of coral restoration as a tool to promote reef resilience and ensure the sustainable delivery of reef ecosystem services.⁷

Restoration of damaged reefs by transplantation of whole coral colonies or coral fragments is being increasingly shown to increase coral cover, species diversity, coral reproduction capacity and local recruitment⁸. Coral transplantation can be used to “spread” bleaching-resistant genotypes by using survivors of previous bleaching events as donor colonies⁹.

Several active reef restoration methods are now available and have been tested widely^{10, 11, 12}. The selection of which method, or combination of methods, is the most appropriate requires careful consideration as the appropriate choice is generally site-specific. Most efforts have been based on the use of asexually produced coral fragments, sourced from healthy coral colonies that are still present either on the disturbed reefs or on less damaged nearby reefs, or that represent “corals of opportunity”: i.e., colonies dislodged through natural processes or coral fragments produced through natural processes and collected from the substratum¹³. “Coral gardening” is a two-step protocol in which coral fragments are grown in *in situ* or *ex situ* nurseries, followed by planting the nursery-grown corals onto degraded sites. Coral gardening is one of the most successful coral restoration protocols in particular when floating midwater ocean (*in situ*) nurseries are used. Midwater floating nurseries have been used with nearly 90 coral species successfully propagated in nurseries around the world¹⁴. Nurseries using coated metal frames of various designs (e.g. tree frames, spider frames) on which the coral fragments are attached have also been successful in many locations.

The main purpose of the nurseries is to grow coral fragments to a size that reduces mortality after transplantation onto damaged or degraded reefs. Coral transplants

⁷ Hein, M. Y., Willis, B. L., Birtles, R. A., Beeden, R., 2016. Characterising coral restoration effectiveness: a review of current limitations and challenges at a socio-ecological scale. Paper presented at Int Coral Reef Symp, Hawaii.

⁸ Horoszowski-Fridman YB, Izhaki I, Rinkevich B (2011) Engineering of coral reef 572 larval supply through transplantation of nursery-farmed gravid colonies. *J. Exp. Mar. Biol. Ecol.* 399 (2): 162–166. doi:10.1016/j.jembe.2011.01.005.

⁹ Mascarelli A (2014) Climate-change adaptation: designer reefs. *Nature*: ... doi:10.1038/508444a.

¹⁰ Edwards, AJ, Gomez, ED (2007). Reef Restoration Concepts and Guidelines: making sensible management choices in the face of uncertainty. Coral Reef Targeted Research & Capacity Building for Management Programme: St Lucia, Australia. iv + 38 pp.

¹¹ Edwards, AJ (ed.) (2010). Reef Rehabilitation Manual. Coral Reef Targeted Research & Capacity Building for Management Program: St Lucia, Australia. ii + 166 pp.

¹² Young CN, Schopmeyer SA, Lirman D (2012) A review of reef restoration and coral propagation using the threatened genus *Acropora* in the Caribbean and Western Atlantic. *Bull Mar Sci* 88(4): 1075–1098

¹³ Ng CSL, Chou LM (2014) Rearing juvenile ‘corals of opportunity’ in *in situ* nurseries: A reef rehabilitation approach for sediment impacted environments. *Mar Biol Res* 10(8):833–838.

¹⁴ Rinkevich, B., 2014. Rebuilding coral reefs: does active reef restoration lead to sustainable reefs? *Curr. Opin. Environ. Sustain.* 7, 28e36.

Rinkevich, B., 2015. Climate change and active reef restoration - ways of constructing the ‘reefs of tomorrow’. *J. Mar. Sci. Eng.* 3, 111e127

have a greater chance of survival the larger they are¹⁵. The nurseries offer the advantage of decreased competition for resources (space, light), decreased predation, and suspension above sea-floor sediments. Coral nurseries can also be used to capture and harvest coral larvae, as genetic repositories¹⁶, or to grow mature breeding corals for larval production and seeding of surrounding reefs¹⁷. In the Caribbean, where there has been a massive reduction in live coral cover, such techniques are being widely used. Active restoration is especially important for reef-building corals that provide the bulk of the three-dimensional complexity on reefs and support critical ecological functions for many other reef-associated species¹⁸.

The following conclusions were reached and recommendations were made at a round-table on restoration, following the formal sessions, at 13th International Coral Reef Symposium (ICRS):

- Standard operating procedures (SOPs) are needed and best management practices must be collated and disseminated
- Individual initiatives should be tailored to local situations
- Use best available science
- Capacity building and training of local communities and others, is needed, making full use of local communities where appropriate, given the labour-intensiveness of the work
- A better understanding of successes and failures to date is needed
- Biosecurity issues must be addressed – including diseases of corals, introduction of alien species, potential future introduction of modified corals
- Funding is urgently needed, recognising the current high costs involvement although these are already decreasing.

Experience of coral reef restoration in Mauritius and Seychelles

Mauritius

In Mauritius, coral restoration work has been undertaken by MOI, AFRC, MOSSNSESD, and several NGOs in collaboration with hotels.

The MOI has undertaken research on coral farming projects since 2008, investigating the survival and growth of ten coral species in land- and ocean-based nurseries¹⁹. A pilot project was initiated to determine the feasibility of land-based coral culture using a variety of local coral taxa. A land-based nursery and an ocean-based nursery were established at Albion.

¹⁵ Guest JR, Baria MV, Gomez ED, Heyward AJ, Edwards AJ (2014). Closing the circle: Is it feasible to rehabilitate reefs with sexually propagated corals? *Coral Reefs* 33(1):45–55.

¹⁶ Schopmeyer SA, et al. (2012) In situ coral nurseries serve as genetic repositories for coral reef restoration after an extreme coldwater event. *Restor Ecol* 20(6):696–703.

¹⁷ Amar KO, Rinkevich B (2007) A floating mid-water coral nursery as larval dispersion hub: Testing an idea. *Mar Biol* 151(2):713–718.

¹⁸ Drury et al. 2016. Genomic variation among populations of threatened coral: *Acropora cervicornis*. *BMC Genomics*: 17:286

¹⁹ R. Moothien Pillay, S. Bacha Gian, V. Bhoyroo and S. Curpen 2012. Adapting Coral Culture to Climate Change: The Mauritian Experience. *Western Indian Ocean J. Mar. Sci. Vol. 10*, No. 2, pp. 155-167,

In 2012, with funding from the UNDP-GEF-SGP, MOI initiated a small scale reef restoration project with the NGO ELI Africa²⁰. During the implementation phase (2013-2014), the MOI jointly with ELI-Africa cultured up to 3000 selected coral fragments at Trou aux Biches, which were later transplanted to recipient reef sites. After providing suitable training in coral farming, MOI handed this over to ELI-Africa. The NGO Eco-Mode is also undertaking related activities.

Multi-layered rope nurseries were established at Albion and Flic en Flac in 2012 and at Trou aux Biches in 2013 using nine coral species. After 8-14 months, the nursery grown corals were transplanted to artificial reef restoration modules (ARRMs). Highest survivorship was recorded for the Pocilloporidae family. Growth rates did not differ significantly between nursery grown corals and transplanted corals. Predation by fish and *Drupella* snails and algal overgrowth were the main causes of coral mortality at the nurseries and ARRM; although volunteers and other partners were trained to inspect, clean and regularly remove parasites, at Trou aux Biches which was the main community site this was not undertaken regularly.

According to surveys carried out in 2014, the survival rates of planted corals were over 75% at Albion (3 years after plantation), over 65 % at Flic en Flac (2 years after plantation) and over 35% at Trou aux Biches (1 year after plantation)²¹.

A joint MOI and University of Mauritius (UoM) study looked at the effects of artificial feeding and environmental conditions on the *in situ* growth of cultured coral fragments in 2010 and involved the fish farm at Point-aux-Feuilles where nutrient levels are high. Notwithstanding their slow growth, corals may exhibit high calcification rates in such nutrient-rich environments (Shafir & Rinkevich, 2008, 2010) , which might be associated to the coral survival in the region closer to the fish farm (Nazurally, unpubl. data).

AFRC set up a pilot coral nursery at Albion in 2008, and following successful coral growth, colonies were attached to small basal tables made of PVC and placed on reefs at Albion, Pointe aux Sables and Trou aux Biches in 2011. According to an AFRC report, the survival rate of planted corals was ca. 50 % after 2 years⁷³ In 2013, AFRC placed large galvanised iron basal tables, holding up to 96 coral fragments each, at Balaclava Marine Park, Trou aux Biches and Blue Bay Marine Park (600 coral fragments). In future plans, the same type of large basal tables will be set at Ile aux Benitiers, Pointe aux Sables, Albion, Bel Ombre and Mon Choisy.

Under the *UNDP/AFB Climate Change Adaptation Programme in the Coastal Zone of Mauritius*, which is aimed at combating beach erosion and flood risk in three coastal sites, there is a pilot project on coral farming at Mon Choisy, underway through MOEMRFS.

The JICA supported project on *Capacity Development in Coastal Protection and Rehabilitation in the Republic of Mauritius (2012-2015)* developed coastal conservation plans for 14 sites where there is significant coastal erosion, and recommended reef restoration for five of these sites. In addition, a Reef Environment Conservation Plan was prepared which is being implemented by

²⁰ Moothien-Pillay, R., BachaGian S and Nicolas, A.2014. Community-based Rehabilitation Project, Trou-aux Biches. Final report to UNDP-SGP

²¹ JICA 2015. Reef Environment Conservation Plan. Chap. 6. Final Report. The Project for Capacity Development on Coastal Protection and Rehabilitation in the Republic of Mauritius

the Fisheries Division, coordinated by the MOSSNSESD with stakeholders including Fisheries Division, MOI, and NGO's.

Following the Study on Coastal erosion in the Republic of Mauritius (2003), 7 concrete block modules were placed in the Flic en Flac lagoon by the Beach Authority, MOSSNSESD, Fisheries Division, NCG and NGO on a pilot basis, to provide a substratum for coral larvae to settle and grow. Monitoring of the modules was undertaken by the Fisheries Division and successful coral larvae settlement was recorded. A full scale project was initiated by the MOSSNSESD in 2010, involving the placement of 60 concrete modules in the lagoon of Flic en Flac under the supervision of the Fisheries Division. Follow up monitoring showed that coral larvae successfully settled on the concrete blocks.

There are several NGO initiatives. WiseOceans is working with the Four Seasons Anahita Hotel to initiate a coral garden project that will use tree frames²². Under the Australian Aid Blue Economy Challenge, a potential project is being developed with the private sector to develop a coral farming facility in collaboration with the hotel sector. Reef Conservation is monitoring the trial sites that have been established at Balaclava as well as trial cement blocks with corals attached that have been put in at Albion by AFRC. Reef Conservation is also planning a reef restoration initiative in one of the Voluntary Marine Conservation Areas. Eco-Sud has submitted a proposal to the UNDP-SGP for coral farming in Blue Bay.

On Rodrigues, the NGO Shoals Rodrigues has undertaken some small scale restoration work on a reef that had suffered anchor damage Jean Tac in Anse Aux Anglais Marine Reserve. Some other initiatives were undertaken under a project led by Ministry of Fisheries with the support of the RRA for the planting of coral using metal tables whereby some coral settlement trials have been undertaken in SEMPA. The RRA has also undertaken some restoration work in the eastern lagoon at Anse Ally with the support of the fisher community.

Seychelles

Active reef restoration activities in the Seychelles are underway through Nature Seychelles, Seychelles National Parks Authority (SNPA), a community-based effort by the NGO Marine Conservation Society of Seychelles (MCSS) and an NGO-hotel collaboration.

With funding from the USAID Development Grant Program (DGP) and the GEF, Nature Seychelles established the four-year Reef Rescuers project, which started in 2011. The aim of the Reef Rescuers project was to test the feasibility of large-scale coral reef restoration, defined as more than 10,000 corals grown in nurseries and transplanted in a single project. The "coral gardening" method was used²³. First, coral fragments were raised in underwater nurseries. Second, after reaching a target size, the nursery corals were harvested and transplanted onto degraded reef areas. This project was

²² <http://fourseasonsreefaction.com/about/>

²³ Rinkevich B. 2006. The coral gardening concept and the use of underwater nurseries; lessons learned from silvics and silviculture. In: Precht WF, ed. Coral reef restoration handbook. Boca Raton: CRC Press, 291–302.

transformative in terms of number and species of corals transplanted and the size of the restored reef.

The restoration project included a nursery site and a reef transplantation site at the Cousin Island Special Reserve. Nurseries were filled with thumb-sized coral fragments (nubbins) obtained from corals of opportunity (corals dislodged due to anchor damage or storms) and donor corals that survived the 1998 mass coral bleaching event due to the coupling of the El Niño and the Indian Ocean Dipole^{24,25} as well as the 2004 Indian Ocean Tsunami²⁶ (Jackson et al., 2005). The nursery site, located on the north-west side of the island at approximately 1 km from the nearest coral reef, included 12 mid-water nurseries: 9 rope nurseries and 3 net nurseries. Rope nurseries²⁷ were used to grow branching and tabular corals. Net nurseries²⁸ were used to grow massive and encrusting corals. A total of 32 different coral species were used in this project. Each mid-water rope nursery consisted of 5 high-pressure PVC pipes (HP PVC), 600 × 64 mm in size, placed approximately 4 m apart, to which 20 m-long ropes were perpendicularly attached. Each rope held 80–150 corals, totaling approximately 5,000 corals in each rope nursery. Each mid-water net nursery consisted of a 6 m × 6 m frame constructed from PVC pipe, layered with a recycled 5.5-cm-mesh tuna net and contained approximately 480 coral fragments. All nurseries were attached to the 17 m-deep sandy seabed by anchor lines and maintained at a depth of 8 m below the sea surface by using recycled plastic jerrycans filled with air as buoys. After a 1-year growth period in the nurseries, branching and tabular corals reached a football size (roughly 22 cm wide) and were transplanted onto the degraded reef.

To ensure a resilient coral reef “the tortoise and the hare” fable strategy was used and two types of coral growing forms were seeded in the nurseries: slow growing massive and encrusting corals (the “tortoise”) and fast growing branching and tabular corals (the “hare”). Slow growing corals are more tolerant to variations in environmental conditions and provide structure over the long term. Fast growing corals are more sensitive to changing environmental conditions but recover quickly and build structure in the shorter term. A total of 32 different coral species were selected and grown in the midwater nurseries (Fig. 1).

The reef transplantation site, located on the south-west side of Cousin Island, consisted of a degraded coral reef affected by the 1998 mass coral bleaching event. At this site, a gentle slope (roughly 25°) extends to a depth of 13 m.

²⁴ Spencer T, Teleki KA, Bradshaw C, Spalding MD (2000) Coral bleaching in the southern Seychelles during the 1997–1998 Indian Ocean warm event. *Marine Pollution Bulletin* 40(7): 569–586.

²⁵ Spalding MD, Jarvis GE (2002) The impact of the 1998 coral mortality on reef fish communities in the Seychelles. *Marine Pollution Bulletin* 44: 309–321.

²⁶ Jackson LE, Barrie JV, Forbes DL, Shaw J, Manson GK, Schmidt M. 2005. Effects of the 26 December 2004 Indian Ocean tsunami in the Republic of Seychelles. Report of the Canada UNESCO Indian Ocean Tsunami Expedition, 19 January–5 February 2005. Geological Survey of Canada, Open File 4539, 73 p.

²⁷ Frias-Torres S, van de Geer C. 2015. Testing animal-assisted cleaning prior to transplantation in coral reef restoration. *PeerJ* 3:e1287.

²⁸ Frias-Torres S, Goehlich H, Reveret C, Montoya-Maya PH. 2015. Reef fishes recruited at midwater coral nurseries consume biofouling and reduce cleaning time in Seychelles, Indian Ocean. *African Journal of Marine Science* 37 (3): 421- 426

The seabed then flattens out and consists of a mixture of sand and coral rubble interspersed with granite outcroppings. The coral colonies grown in the midwater rope nurseries were transplanted to this degraded reef.

The corals grown in the net nurseries were used to restore a degraded reef at a hotel resort. Nature Seychelles secured funding from the GEF-Small Grants Program and collaborated with the Constance Lemuria 5 star resort in Praslin Island to restore a coral garden in Anse Kerlan. A team of 4 international scientific divers recruited for the project worked for 1.5 months intensively, to transplant 2,015 nursery-grown corals of branching, massive and encrusting species to a degraded path reef, 1-3 m deep.

In both cases, (Cousin Island and Praslin Island), the nursery grown corals were cemented to the natural substrate after the point of contact on the substrate was scrubbed clean of algae and sediment. From an initial nursery stock of 40,000 corals, 7,500 were lost in freak events: a hurricane (5,000 corals) and an invasive sponge (about 2,500 corals). From the final working stock of 32,500 corals, a total of 24,431 corals were transplanted between 2012 and 2014. Therefore, coral survival from insertion in the nursery as a nubbin to cementation in the coral reef was 75.2 %. A total of 5,225 km² (0.5 hectares) of degraded reef were restored at Cousin Island Special Reserve²⁹.

Figure 1. Coral species grown in midwater ocean nurseries during the Nature Seychelles Reef Rescuers project.



The labor force for the work was provided by a senior team of 3 experts hired for the project and international scientific divers joining as volunteers that rotated every 3 months. All participants were trained through a full-time six-week classroom and field based training program. A Toolkit in coral reef

²⁹ Montoya-Maya I PH, Smit KP, Burt AJ, Frias-Torres S. (2016). Large-scale coral reef restoration could assist natural recovery: a case study in Seychelles, Indian Ocean. *Nature Conservation*

restoration was produced and used for the training³⁰. Standardized protocols are being used to monitor the survival, reproduction, recruitment and bleaching response of donor and transplanted colonies, at the transplantation site and two control sites, one of which is a healthy and the other a degraded coral reef.

By 2014, there had been a 700% increase in coral cover, from about 2% in 2012 to 16%, and a five-fold increase in fish species richness, a three-fold increase in fish density, and a two-fold increase in coral settlement and recruitment at the transplanted site. The coral transplants also responded better to stressful conditions resulting from increased sea temperatures and a harmful algal bloom than corals that had remained in situ. The transplanted corals appear to recover faster and better than corals at other sites. However, the global bleaching event that started in 2014 and continued through to April 2016, has caused significant bleaching but is providing an invaluable opportunity to determine the effectiveness of the choice of coral reef species and the methods used.

The SNPA initiative, supported by the UNEP project *Building capacity for coastal ecosystem-based adaptation in SIDS*, has involved the establishment of a nursery with capacity to produce about 9,000 coral colonies every 6 months in Curieuse Marine National Park. Following the 2015-2016 bleaching event, over 8% of corals in the nursery bleached and died, but this provides an opportunity to identify the more resilient corals and to use these for future propagation. A survey will be undertaken in to document the impact of the bleaching event and to identify pockets of resistant corals. Ultimately corals will be transplanted to 3 coral reef sites around Praslin Island (two within Curieuse Marine National Park and one outside, and through an extension to the project, the capacity of the nursery will be increased by about 50%.

The NGO Anba Lao and SNPA will use the Curieuse Marine National Parks, Ile Cocos Marine National Parks and Port Launay Marine National Parks as pilot sites to test 2 methods to promote survival of coral recruits once they have settled on rubble and macro-algae dominated reefs, classified as non-resilient reefs, by stabilising rubble and removing macro-algae. The partnership with SNPA ensures that the work is of benefit to socio-economically important reef sites upon which many people are dependent for their livelihoods; and boat charter operators will be involved.

Several hotels have initiated small projects to restore reef habitat for the benefit of tourists. A coral garden was created at the Hotel Lemuria on Praslin, with the technical support of Nature Seychelles. Nature Seychelles is developing a similar initiative with the resort on Cousine Island. The Marine Conservation Society of Seychelles (MCSS) is undertaking a coral restoration project with a PhD student, in partnership with the Cerf Island Resort and the Cerf Island community. Fragments and “corals of opportunity” are collected and attached to frames in a nursery and survival rates are being compared; as elsewhere, these have been affected by bleaching but the monitoring will continue.

At the Four Seasons Resort Seychelles, at Petite Anse on Mahe, a project to restore 10,000 m² of degraded reef is underway with the technical assistance of the NGO WiseOceans and support of MECCE. The aim is to grow 16,000 coral fragments

³⁰ Frias-Torres S, Montoya-Maya PH, Shah N.J (Eds.) 2015. Coral Reef Restoration Toolkit: A Field-Oriented Guide Developed in the Seychelles Islands. Nature Seychelles, Mahe, Republic of Seychelles.

(the majority coral of opportunity) in an in-situ nursery of rebar arches that has been constructed. Awareness raising is a central component of the project, and the reef restoration project is used in marine education programmes for guests and the wider community

Under the Adaptation Fund project, *Ecosystem Based Adaptation to Climate Change* the coastal protection ability of the degraded fringing coral reef at North East Point on Mahe is being enhanced by clearing rubble and building a submerged breakwater in the reef crest surf zone to protect the reef and to provide a substrate for coral colonization.

Current Coral reef restoration methods targeted for Mauritius and Seychelles under this project

Site Selection

Scoping studies and technical assessments will be undertaken to identify the specific nursery and restoration sites within the MPA sites selected, species for propagation and appropriate approaches and methodologies. In each country, these activities will be closely co-ordinated and dependent on the work undertaken in Component 3. Studies will be undertaken at potential restoration sites to determine their suitability in terms of water quality, health of existing reefs etc. Selection criteria for specific nursery, transplantation and control sites will be developed and implemented based on previous experiences, bearing in mind the key principle that the restoration efforts have the objective of helping to increase food security and/or shoreline protection. Coral reef status and water quality will be assessed at potential sites for nurseries and transplantation and GIS mapping will be used to help identify suitable sites, as well as locations for obtaining donor coral colonies. Some mapping of reefs has been initiated in Seychelles e.g. an atlas of shallow marine habitats around Praslin Island is being prepared by SNPA, and post-2016 bleaching assessments are underway around both Praslin and Mahe to identify areas of resilient reefs that could potentially provide coral fragments for restoration work. Previous work in Mauritius (e.g. at the Mahebourg Fish Farm and Blue Bay³¹) has started to provide an understanding of the critical factors for nurseries (e.g. bathymetry, distance from shore, currents, existence of predators, human threats etc). For transplantation sites, an important consideration is the extent to which the area is protected and free from human interference: best practice guidance is that transplant sites should be within an MPA and ideally within a no-take zone. However, the involvement of communities and NGOs, rather than relying solely on MPA staff who may have other duties, may be equally important.

Coral gardening: Nursery and transplantation phases

A resilient coral reef is often described as “the tortoise and the hare” fable, with two types of coral growing forms: slow growing massive and encrusting corals (the “tortoise”) coexisting with fast growing branching and tabular corals (the “hare”). Slow growing corals are more tolerant to variations in environmental conditions and provide structure over the long term. Fast growing corals are more sensitive to changing environmental conditions but recover quickly and build structure in the shorter term. The need for both growth forms is also reflected in the types of nurseries used. Further, the nubbins or coral fragments used in the nurseries can be produced through asexual or sexual reproduction. In asexual reproduction, nubbins

³¹ Nazurully, N. and Rinkevich, B. 2014. A Questionnaire-based Consideration of Coral Farming for Coastal Socio-economic Development in Mauritius. *Western Indian Ocean J. Mar. Sci.* 12 (1): 47-56,

are obtained by fragmenting donor corals, so each fragment, being a clone of the donor colony, becomes a new colony over time. In sexual reproduction, nubbins are obtained from the settlement of coral larvae resulting from broadcast spawning of eggs and sperm from the parent corals. Finally, the slow growth rates of massive and encrusting corals rule out the use of standard nurseries for fast production of transplants. To propagate these species, the technique of microfragmentation and fusion is needed. Here, donor colonies are cut into small strips (fingernail size), stimulating the fragments to grow quickly to reach their original size. Many fragments of the same coral, after peak growth phase, can be placed together and fuse, forming a larger coral colony 25 faster than if grown with the traditional nursery setup.

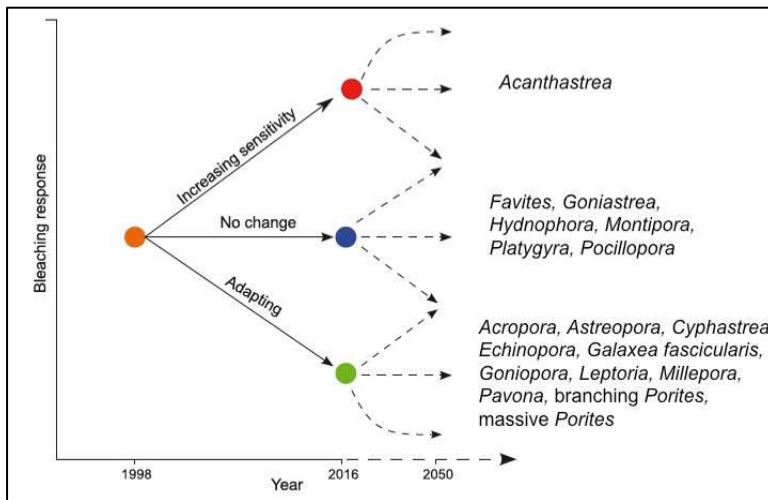
Mauritius and Seychelles will use both land-based and ocean nurseries. In Mauritius, building on previous experience at MOI, a land-based coral nursery will be built. This nursery will be used to propagate locally threatened species and selected massive corals. An experimental land-based set-up will be used to obtain new coral recruits obtained from collecting coral spawn, that can settle on pre-conditioned plates for a future relocation to the ocean nurseries. Small-scale ocean based nurseries including table nursery bottom attached model (for culture of up to 100 corals per nursery) (see Annex 1) and multi-layered rope nursery (for culture of up to 1000 corals per nursery) will be built for community-based coral farming at each MPA site and additional sites as per interest of adjacent hotels. These ocean nurseries will be filled with nubbins from asexual propagation and eventually will also include nubbins obtained from sexual propagation in the land-based nursery.

In Seychelles, the land-based nursery will be built on the premises of the Nature Seychelles Praslin marine laboratory. This nursery will be used to propagate massive corals (micro-fragmentation and fusion), and to hold briefly donor colonies to trigger spawning (because mass coral spawning is absent in Seychelles), collect the coral spawn and settle the coral larvae in pre-conditioned plates for a future relocation to the ocean nurseries. Based on the prior experience from Nature Seychelles, large-scale ocean nurseries (up to 5,000 corals per nursery) will be built using the midwater floating rope nursery model. These ocean nurseries will be filled with nubbins from asexual propagation and eventually will also include nubbins obtained from sexual propagation in the land-based nursery. The midwater ocean nurseries will be built at the nursery sites in both the Cousin Island Special Reserve and the Curieuse Island Special Reserve in order to spread potential risks (e.g. coral loss from invasive sponges, disease, or a freak hurricane event). At the community-based site (Anse Forbans), the midwater ocean nurseries will be sized to the capabilities of the community workforce. Hotels interested in coral reef restoration will purchase corals from the ocean nurseries (see business plan).

Selection criteria for species to be propagated and planted will be identified based on best available knowledge about bleaching resistant and resilient species. Research undertaken in Seychelles, Mauritius and globally provides some strong indications already. For example, in an extensive study of Kenyan coral reefs on back reef lagoons, twenty-one common coral taxa (mostly genera) were monitored for their response to the 1998 and 2016 thermal anomalies due to global El Niño events. Three response groups were identified: increased sensitivity, no response and adapting to coral bleaching³². The taxons identified as “no response” and “adapting to coral bleaching” can be targeted for coral reef restoration (Fig. 2).

³² McClanahan TR (2017) Changes in coral sensitivity to thermal anomalies. *Marine Ecology Progress Series* 570: 71–85.

Figure 2. Possible adaptation scenarios for the three response groups (increasing sensitivity, no change, and adapting) found in the Kenyan study (McClanahan 2017).



Coral species resistant and resilient to coral bleaching can also be screened through genetic analysis of the symbiotic zooxanthellae. Reef building corals host multiple types (clades) of zooxanthellae of the genus *Symbiodinium* within single colonies³³, known as clades A, B, C, and D. *Symbiodinium* clade D is known as thermally stress-tolerant and corals hosting this clade are more resistant to coral bleaching^{34,35}

The coral nubbins will be fragmented from donor corals located in donor sites in adjacent reef areas (i.e. no alien species will be used) and will be survivors of previous bleaching events (resistance or resilience to bleaching). Research in Mauritius has shown that although *Acropora* species generally suffer high mortalities following bleaching events, at least three species (*Galaxea fascicularis*, *Pavona decussata* and *Pocillopora damicornis*) have survival rates of over 65% in nurseries³⁶. Several species of *Pocillopora* in particular seem to be resilient and have been successful propagated in nurseries³⁷. Prior implementation of coral reef restoration in Seychelles used an assemblage of 34 donor species that had survived the 1998 mass bleaching event.

Once the colonies in the nurseries have reached a sufficient size and quantity, they will be transplanted onto the selected reef sites, which have been appropriately prepared. For example, where the Nature Seychelles model is used for reefs that are essential devoid of living corals, the point of contact where the coral is cemented to the substrate is “cleaned” with scrub brushes before transplantation. Methods for

³³ Baker AC (2003). Flexibility and specificity in coral-algal symbiosis: diversity, ecology, and biogeography of *Symbiodinium*. *Annual Review of Ecology Evolution Syst.* 34: 661–689.

³⁴ Baker AC, Starger CJ, McClanahan TR, Glynn PW (2004). Corals’ adaptive response to climate change. *Nature* 430: 741

³⁵ Stat, M., and Gates, R. D. (2011). Clade D *Symbiodinium* in scleractinian corals: a “nugget” of hope, a selfish opportunist, an ominous sign, or all of the above? *Journal of Marine Biology* 730715. doi: 10.1155/2011/730715

³⁶ Moothien Pillay R., Bacha Gian S., Bhooyroo V., Curpen S. (2012). Adapting coral culture climate change: the Mauritian experience. *Western Indian Ocean J. Mar. Sci.* 10 (2): 155-167.

³⁷ Bacha Gian S., Moothien Pillay R., Nicolas A., Bapoo-Dundoo P., Seeam V., Nazurally N. (2015). Small Scale Reef Rehabilitation in Mauritius. 9th WIOMSA Scientific Symposium 26–31 October 2015 Book of Abstracts; Oral presentation.

attaching the colonies (e.g. directly to the substrate, or on frames) and how farmed corals are best transported to the transplant sites will be selected as part of work under Component 3. Monitoring and maintenance activities will be undertaken according to the programmes developed in Component 3.

Target estimates for total colonies transplanted and area restored

An initial estimate of the number of coral colonies to be transplanted and the area of degraded reef that could be restored in each country is shown here. The actual numbers at the end of the project might be higher or lower depending on weather conditions, and team/s performance over the 5 year period. Given that the work involved will vary according to the characteristics of the sites selected for restoration, it is difficult to estimate in advance what can be exactly achieved. Therefore, projections are calculated for a theoretical maximum and an average value. Given the innovative nature of this project in terms of up-scaling restoration efforts, there are few if any examples from other parts of the world that could be used as a basis. Here, the USAID-funded Reef Rescuers Project undertaken by Nature Seychelles is used as a reference for obtaining initial estimates for Seychelles. This project transplanted a total of 24,431 corals over an area of 0.52 ha (4-5 colonies per m²) of degraded reef over a period of about 18 months distributed in a 3 year period (6-month transplant season each year), resulting in a 700% increase in coral cover by the end of the project, from 2% in 2012 to 14% in 2014. This project estimated that for a completely degraded reef, some 400-500 corals are needed to restore 100 m². For Mauritius, small-scale pilot projects transplanted 10-12 colonies per m² (equivalent to 1000-1200 per 100m²). However, at some locations it may be equally important to provide corals for “in-filling” small degraded areas, for example to restore the topography of the reef, which might require less effort and fewer corals. Knowledge on successful approaches is accruing rapidly however, and the review to be undertaken in Component 3 of the project will enable targets to be set.

The differences in transplantation density are related to the size of the nursery grown corals. In the Seychelles Reef Rescuers project³⁸, branching and tabular corals grew for up to 1 year in the floating midwater rope nurseries, from thumbsize to a football size (roughly 22 cm wide). At this size, the ideal transplantation density is 4 corals per m². This density is easy to visualize by the divers and implement during the limited dive time (3 h per dive, 2 dives per day), and incorporates possible post-transplantation mortality of up to 25 %, while still leaving a density high enough to have an positive impact on the transplanted site. A team of 6 highly trained scientific divers working in pairs (first diver cleans substrate and places coral, second diver cements coral to substrate) achieved a maximum transplantation rate of 200 corals per day (perfect weather conditions), and an average of 134.4 corals per day (SE 11.7 corals, range 69-200 corals). The Reef Rescuers project included research, development, implementation and teaching. Therefore, scientific divers were not transplanting corals at the maximum rate or the average rate for every working day during the 6 month transplantation season. The estimates shown on Table 1 assume every workday of the transplantation season is dedicated to cementing corals on the degraded reef.

³⁸ [Frias-Torres S, Montoya-Maya PH, Shah N.J \(Eds.\) 2015. Coral Reef Restoration Toolkit: A Field-Oriented Guide Developed in the Seychelles Islands. Nature Seychelles, Mahe, Republic of Seychelles.](#)

Table 1 Estimates of total corals transplanted and total area restored at the end of the 5 year project for one site in Seychelles. Corals grow in midwater floating nurseries for 1 year, and there is a 1 year delay at the start of the project (see logframe activities). Therefore, there are 3 transplantation seasons. A transplantation season is 6 months long, due to the changing sea conditions of the monsoons. Transplantation density is 4 corals per m². Workdays are Monday through Friday.

Estimates	Daily rate (corals/day)	Total corals in transplant season	Total corals in 5 year project (3 seasons)	Total square meters restored	Total hectares restored
Maximum theoretical values	200	24,000	72,000	18,000	1.8
Average values	134	16,080	48,240	12,060	1.2

Therefore, if the estimates in Table 2 can be replicated at both the Cousin Island Special Reserve and the Curieuse Island Special Reserve, then the total corals transplanted over the 5 year period ranges from 96,480 corals (average) to 144,000 corals (maximum) and the total hectares restored ranges from 2.4 hectares (average) to 3.6 hectares (maximum). For the community-based restoration at Anse Forbans, there are no base numbers for calculations. These estimates are for the asexual fragmentation only. Since the collection of sexual recruits and the growth of massive corals by microfragmentation and fusion will be attempted for the first time in Seychelles, there are no base values to provide estimates for such techniques.

For Mauritius, the transplantation efforts will be community based and the ocean nurseries are the table bottom type which at the most can hold 500 corals. Transplantation rates and the size of corals at transplant time are unknown. These values will be obtained during the validation workshop.

Workforce

Coral restoration is labor intensive. The stakeholder analysis (see separate document) includes an assessment of sources for the work force. Community members, including fishers, women, youth and boat operators are likely to be willing to take part. University students in both countries are likely to want to be involved, both for work experience and also to undertake dissertations and master's theses. It may also be possible to involve MPA, fisheries and NGO staff. The source of labor will require particular attention in Seychelles, as this has already been found to be a limiting factor. Nature Seychelles resolved this by recruiting scientific diver volunteers from overseas to implement the USAID-funded Reef Rescuers project.

A coral reef restoration project requires a good balance of academic and technical skills from the doctoral level to the trade school level to unskilled workers who can be certified for specific activities. A brief list of the human resources, skills and work specifications needed for the AFB coral reef restoration project is shown in Table 2.

Table 2. Recommended human resources for a coral reef restoration project. Number in brackets corresponds to the amount of people per job title (Modified from Frias-Torres et al. (2015)³⁹).

Job Title	Skills & Qualifications	Work Specifications
For the duration of the project		
Chief Scientist & Project Coordinator – PC	Solid conservation-oriented restoration experience; graduate degree in marine science, expert diver; capacity for developing and coordinating work plans, budgets, stakeholder involvement, managing field staff, and project monitoring and reporting.	Coordinate and manage all aspects of the project, notably liaising with the TSO to supervise the implementation of the project activities. Participate in designing, executing, monitoring, analysing experiments and writing scientific publications. Liaise with other institutional staff to manage project administration and logistics, performance & reporting, stakeholder involvement, communication, and serve as focal point for the scientific committee.
Technical & Scientific Officer - TSO	Coral reef restoration expert with significant coral nursery construction, coral transplantation and management experience; graduate degree in marine science, expert diver with superior technical skills, strong analytic and scientific writing skills, strong physical abilities; boat license and boat driving experience, diving and boat equipment maintenance.	Lead the implementation of all technical aspects of the project namely: building, stocking and maintaining the nurseries and performing transplantation efforts; designing, executing, monitoring and analyzing experiments, and assisting the PC in any other project aspects which demand his intervention, leading scientific reporting and publication
From the start of diving operations to the end of the project		
Scientific Dive Leader – SDL	Divemaster with high physical fitness; BSc/MSc degree in marine science and/or conservation; working experience in coral reef management or research, preferably in donor-funded projects and in coral reef restoration; proven leadership capabilities and experience leading staff in the field; boat license and boat driving experience; diving and boat equipment maintenance; strong physical	Lead the scientific diver volunteers team whenever is needed to help to implement all technical aspects of the project, notably building, stocking, maintaining underwater coral nurseries, performing transplantation of nursery-grown coral colonies and monitoring of transplantation “success”. Design, execute, monitor and analyze experiments in relation with the already established scientific framework. Assist the PC and TSO in any other aspects of the project which demand his/her intervention,

³⁹ Frias-Torres S, Montoya-Maya PH, Shah N.J (Eds.) 2015. Coral Reef Restoration Toolkit: A Field-Oriented Guide Developed in the Seychelles Islands. Nature Seychelles, Mahe, Republic of Seychelles.

Job Title	Skills & Qualifications	Work Specifications
	abilities.	particularly project planning, monitoring, reporting, management of project equipment, etc.
<i>Boatman and maintenance technician</i>	<i>Skipper license, basic knowledge in mechanics and experience with handling boat engines; acquaintance with local reefs and navigation hazards around working area.</i>	<i>Responsible for driving the project boat, and maintaining the boat and the engine. When not undertaking one of these tasks he will be an integral part of the crew and assist in whatever terrestrial activity that is taking place (e.g. construction building on land base, maintenance, helping to fill coral nursery, etc)</i>
<i>Scientific divers</i>	<i>Certified diver (Advanced PADI minimum), high physical fitness; BSc/MSc degree in marine science and/or conservation, experience in monitoring and analyzing scientific data (coral and fish monitoring an asset), underwater photography.</i>	<i>In addition to the routine work of constructing, filling and maintaining the nurseries and coral collection, the scientific divers will be involved in monitoring the experiments and the nurseries, and help analyze data collected. For the transplantation phase, scientific divers are also required to transplant coral colonies, monitor baseline and post transplantation conditions in transplanted plots. Responsible for filling the scuba tanks.</i>
<i>Field Assistants</i>	<i>Certified divers (Open Water PADI minimum), high physical fitness; no specific degree needed, but project-based coral reef restoration certification must be completed</i>	<i>Support surface and in water activities as directed by Scientific Dive Leader and Scientific Divers.</i>
<i>Land nursery staff Plant Maintenance Officer</i>	<i>Training received as part of project for land nurseries dedicated to proper functioning of the land base nursery</i>	<i>Proper functioning of the land base nursery system including sea water flow, pump maintenance, electrical & plumbing works</i>
<i>Land nursery staff Nurseryman</i>	<i>No certification needed. Basic training received to maintain land nursery</i>	<i>Regular maintenance of land based nursery,</i>
<i>Boat Cleaner</i>	<i>No specific license required; basic familiarity with boats; swimming and snorkel skills</i>	<i>Boat cleaning once a week on deck (detailed cleaning not completed by daily boatman activities) and on boat hull (scraping algae from hull, using snorkel gear, and brushes); Deep boat cleaning and engine cleaning when hauling boat on land</i>

Job Title	Skills & Qualifications	Work Specifications
		every 6 months.
Office Cleaning Person	No specific license required; basic familiarity with cleaning office and housing environments	Cleaning laboratory building (office space, kitchen and bathroom) and housing facilities (if available) connected to laboratory twice per week.
Receptionist	Basic familiarity with office environment; basic telephone and computer skills preferred	General receptionist activities: Keeping schedules for maintenance work, purchasing office supplies, interacting with visitors, keeping food supplies, answering phone calls, etc.
Electrician	Licensed electrician; familiarity with office and housing environments	Available when needed for fixing electrical issues: lights, pumps, outlets, generators, etc.
Plumber	Licensed plumber; familiarity with office and housing environments	Available when needed for fixing plumbing issues: pipes, pumps, kitchen, bathroom, etc.
Pest Control	License pest control worker; familiarity with office and housing environments	Available when needed for regular pest control
Driver	Driver's license required	Available for transporting people and materials if laboratory does not have own vehicle

The basic team operational unit consists of a senior team of 1 Chief Scientist/Project Coordinator, 1 Technical/Scientific Officer, and 1 Dive Leader per project site. To this senior team, 1 Boatman/Maintenance Technician and 4-6 Scientific Divers are added per project site. From there the team can grow with field assistants, land nursery staff and other personnel required for the secure implementation of the project. Institution administrators and leaders are not included in this table. To maximize project funds and maintain consistency in project aims, each country will need their own Chief Scientist & Project Coordinator who will be in charge of coordinating all in-country project sites. Then, starting with the remainder of the senior team (Technical/Scientific Officer, and Dive Leader), Scientific Divers, boatman, field assistants, land nursery staff and other personnel units are replicated at each project site.

In each country, participants will be trained in coral reef restoration, from the restoration activities (nursery and transplantation phase) to the maintenance and monitoring activities. At nurseries and initially on rehabilitated reefs, rigorous maintenance programmes are required to remove predators and algae. Growth rates of coral colonies, as well as abundance and diversity of associated reef species including fish and key invertebrates, will be monitored. Participants with previous experience of reef restoration will lead the training, with regional and international expertise brought in as required. A "training-of-trainers" approach will be taken, with

suitable leaders identified in the communities and partner organisations who will be taught the protocols and procedures and will be able to train others. An awareness and communication programme will be undertaken as well in each country, to ensure that the public and all stakeholders are aware of the project and why it is being undertaken and to sensitise people to the opportunities for employment and improved livelihoods.

In both countries hotels have expressed interest in participating. Many hotels globally are taking an interest in creating coral “gardens” for the enjoyment of their guests, given that good snorkelling and diving opportunities on their reefs are declining as a result of bleaching and reef degradation. In 2016, there were anecdotal reports that hotels are increasingly developing non-reef related attractions (other water-sports, honey-moon activities) for this reason. Diving will however continue to be an important activity and dive centres might be willing to take part, providing labour and equipment. The involvement of tourism enterprises may be attractive to their clients (it may be possible to involve tourists directly in the work involved), as well as beneficial to their long-term business through the improved health and scenic value of the reefs. While hotel involvement in coral reef restoration is promising, the number of diver hours invested in the restoration activity is highly variable and strongly depends on hotel leadership and tourist performance. Hotel participation will be sought in both Mauritius and Seychelles, but it is difficult to quantify at this point what will be their contribution. For example, Nature Seychelles secured funding from the GEF-Small Grants Program and collaborated with the Constance Lemuria 5 star resort in Praslin Island to restore a coral garden in Anse Kerlan. A team of 4 international scientific divers recruited for the project worked for 1.5 months intensively, to transplant 2,015 nursery-grown corals of branching, massive and encrusting species to a degraded path reef, 1-3 m deep. Hotel staff were trained to monitor the health of the transplanted reef, but neither tourists nor hotel staff were actually involved in the restoration activities due to lack of time and resources to train them⁴⁰.

⁴⁰ Frias-Torres S. 2015. Restoration of a coral garden at Praslin island, Seychelles. Final Report. GOS/UNDP/GEF. Tourism partnership programme: biodiversity mainstreaming project. 12 pp.

Annex [#]. Social and Environmental Screening Template

The completed template, which constitutes the Social and Environmental Screening Report, must be included as an annex to the Project Document. Please refer to the [Social and Environmental Screening Procedure](#) for guidance on how to answer the 6 questions.]

Project Information

Project Information	
1. Project Title	Restoring marine ecosystem services by rehabilitating coral reefs to meet a changing climate future
2. Project Number	5736
3. Location (Global/Region/Country)	Mauritius and Seychelles

Part A. Integrating Overarching Principles to Strengthen Social and Environmental Sustainability

QUESTION 1: How Does the Project Integrate the Overarching Principles in order to Strengthen Social and Environmental Sustainability?

Briefly describe in the space below how the Project mainstreams the human-rights based approach

The project integrates overarching human rights principles in order to strengthen social and environmental sustainability by including measures to assist the capacity of the republics of Mauritius and Seychelles to protect and restore their coral reefs, which will in turn protect the rights for food, for safety, for safe drinking water, for safe shelter, and for decent work of all population, but particularly of the vulnerable. UNDP consistently applies the Human Rights Based approach (HRBA) in all programming, taking into account the responsibilities of the duty-bearers and the obligations and entitlements of the right-holders. The project design includes the identification of the government authorities as the primary duty-bearer in ensuring effective management of the coral populations in the lagoons to ensure that the biodiversity protection as well as food security in the longer term and recognizes the importance of partnerships across various sectors, and the integral engagement and involvement of the rights-holders themselves in this agenda. These rights-holders include fishermen, NGOs and other community members participating in the project efforts and improving livelihoods.

Briefly describe in the space below how the Project is likely to improve gender equality and women's empowerment



Gender and social issues will be fully considered in the project, and gender accountability as a cross-cutting issue that will be tracked as part of the project's M&E system. During the project development phase, a gender assessment will be conducted to develop a project specific gender mainstreaming strategy and action plan. The project will pursue a gender-sensitive approach whereby gender equality in participation will be strongly promoted. Under all components, the principle of gender equality will be promoted in terms of both numbers involved and degree of participation in decision-making. Equal participation of men and women in decision-making forums and in capacity building activities will be encouraged. During the design phase of the project, the role played by women in different project components (gender baseline) will be documented and this information will be used in planning and implementing project activities to help ensure that the project promotes gender equality. UNDP will encourage qualified women applicants for positions under the project as per UNDP rules and regulations.

Briefly describe in the space below how the Project mainstreams environmental sustainability

The project will directly address and aim to improve the environmental sustainability through the coral reef restoration in Mauritius and Seychelles. Mauritius and Seychelles are highly vulnerable to climate change in several ways, none more so than the impact that elevated sea temperature is having on their coral reefs. Coral reefs provide a wealth of ecosystem services including food, coastal protection, recreational and tourism use, biodiversity benefits, and regulating services, all of which are vital to the local economies and food security of human populations living in vulnerable Small Island Developing States (SIDS) such as these two countries. In both Mauritius and Seychelles, corals have suffered heavy mortalities from bleaching events, caused by climate-change induced sea warming, over recent decades. Healthy and robust coral reefs, through the provision of these ecosystem services, ensure that coastal populations of tropical countries have increased resilience to the adverse impacts of climate change. Through strengthening both technical and institutional capacities in both countries for coral restoration with climate change impacts fully taken into consideration and with the active involvement of all concerned stakeholders, the project will ensure the coral reefs in both countries are/become resilient to climate change, the project will directly promote environmental sustainability.



Part B. Identifying and Managing Social and Environmental Risks

<p>QUESTION 2: What are the Potential Social and Environmental Risks? <i>Note: Describe briefly potential social and environmental risks identified in Attachment 1 – Risk Screening Checklist (based on any “Yes” responses.). If no risks have been identified in Attachment 1 then note “No Risks Identified” and skip to Question 4 and Select “Low Risk”. Questions 5 and 6 not required for Low Risk Projects.</i></p>	<p>QUESTION 3: What is the level of significance of the potential social and environmental risks? <i>Note: Respond to Questions 4 and 5 below before proceeding to Question 6</i></p>	<p>QUESTION 6: What social and environmental assessment and management measures have been conducted and/or are required to address potential risks (for Risks with Moderate and High Significance)?</p>
<p>Risk Description</p>	<p>Impact and Probability (1-5)</p>	<p>Significance (Low, Moderate, High)</p>
<p>Risk 1: The Project could lead to adverse impacts on enjoyment of the human rights (civil, political, economic, social or cultural) of the affected population and particularly of marginalized groups.</p>	<p>I = 2 P = 2</p>	<p>Low</p>
<p>Comments</p>	<p>In those areas where the project will implement coral restoration activities, in order to maximize the effectiveness of the coral restoration interventions to be supported by the project some restriction might be put on fishermen who have been fishing there and/or tourism operators who have been conducting tourism activities, either during the limited period or permanently. However, once the coral populations have been restored in a long term, the healthy and more robust coral reefs are expected to nature increase fish population, which will have positive impacts on fishing activities as well as tourism activities in a long run in the areas</p>	<p>Description of assessment and management measures as reflected in the Project design. If ESIA or SESA is required note that the assessment should consider all potential impacts and risks. In the period that the economic activities (fishing, tourism, etc.) would be curtailed, fishers and operators will be provided with authorization to operate in different areas. The details of such management measures will be developed during the project development phase through stakeholder consultations.</p>





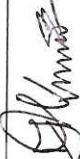
				where corals are restored and beyond. The impact is considered to be of low magnitude, limited in scale (site-specific) and duration (temporary) and can be managed and/or mitigated with relatively uncomplicated accepted measures. Further, a long-term impact can be expected positive rather than negative.	
Risk 2: The Project could potentially restrict availability, quality of and access to resources or basic services.	I = 2 P = 2	Low	The impact is considered to be of low magnitude, limited in scale (site-specific) and duration (temporary) and can be managed and/or mitigated with relatively uncomplicated accepted measures. Further, a long-term impact can be expected positive rather than negative considering that the restored coral reefs will support more fish and potentially increase the fish catch even outside of the restricted areas.	As per risk 1 above.	
Risk 3: Some Project activities are proposed within or adjacent to critical habitats and/or environmentally sensitive areas, including legally protected areas (e.g. nature reserve, national park), areas proposed for protection, or recognized as such by authoritative sources and/or indigenous peoples or local communities	I = 1 P = 5	Low	Project restoration activities will be undertaken in legally protected areas, but the proposed interventions are expected to bring positive impacts, not negative, to critical habitats and environmentally sensitive areas. Thus the risk of this project interventions making any adverse impacts on critical habitats or environmentally sensitive areas are low.	Any interventions proposed by the project in or adjacent to critical habitats and/or environmentally sensitive areas including legally protected areas, are carefully designed and monitored to avoid any intended or unintended negative impacts through careful selection of techniques and methodologies.	
Risk 4: The project poses potential risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during Project construction, operation, or decommissioning?	I = 2 P = 2	Low	Some activities will involve diving in the lagoon to plant the corals and monitoring their growth.	All project staff working in the lagoon on coral restoration and having to work underwater will be qualified divers and also trained in providing first aid in the event of any mishap.	
Risk 5: Does the Project involve utilization of genetic resources? (e.g. collection and/or harvesting, commercial development)	I = 1 P = 4	Low	The project will utilize and nature corals to promote and accelerate coral restoration activities. The selection of corals are done carefully based on the best scientific knowledge available to date for their climate resilience and for their suitability to be planted where the coral restoration activities are expected. Thus, any adverse impacts expected from coral restoration activities are low.		
Risk 6: Potential outcomes of the Project are sensitive or vulnerable to potential impacts of climate change	I = 4 P = 2	Low	It is widely believed that climate change will increase the water temperature of the lagoon further in the future and thus potentially lead to more coral bleaching and death in the long-term	The project is designed to enhance Mauritius' and Seychelles resilience to climate change to reduce the adverse	



			when no action is taken. The project cannot avoid the potential impacts of climate change and the Project outcomes are vulnerable to them but the project interventions are to reduce adverse impacts of climate change felt by vulnerable communities in the two countries by making the coral populations more resilient to climate change.	impacts of climate change felt by their vulnerable population.
QUESTION 4: What is the overall Project risk categorization?				
Select one (see SESP for guidance)				
		Low Risk	<input checked="" type="checkbox"/>	Comments
		Moderate Risk	<input type="checkbox"/>	Some risks are observed as shown under Q2 and in the attachment, but they are considered low and the project interventions will be designed during the project development phase to minimize these perceived risks as much as possible.
		High Risk	<input type="checkbox"/>	
QUESTION 5: Based on the identified risks and risk categorization, what requirements of the SES are relevant?				
Check all that apply				
		Principle 1: Human Rights	<input checked="" type="checkbox"/>	Comments
		Principle 2: Gender Equality and Women's Empowerment	<input type="checkbox"/>	
		1. Biodiversity Conservation and Natural Resource Management	<input checked="" type="checkbox"/>	
		2. Climate Change Mitigation and Adaptation	<input checked="" type="checkbox"/>	
		3. Community Health, Safety and Working Conditions	<input checked="" type="checkbox"/>	
		4. Cultural Heritage	<input type="checkbox"/>	
		5. Displacement and Resettlement	<input type="checkbox"/>	
		6. Indigenous Peoples	<input type="checkbox"/>	
		7. Pollution Prevention and Resource Efficiency	<input type="checkbox"/>	



Final Sign Off

Signature	Date	Description
 QA Assessor Satyajeet Ramchurn	29/08/2016	UNDP staff member responsible for the Project, typically a UNDP Programme Officer. Final signature confirms they have "checked" to ensure that the SESP is adequately conducted.
 QA Approver Roland Alcindor	29/08/2016	UNDP senior manager, typically the UNDP Deputy Country Director (DCD), Country Director (CD), Deputy Resident Representative (DRR), or Resident Representative (RR). The QA Approver cannot also be the QA Assessor. Final signature confirms they have "cleared" the SESP prior to submittal to the PAC.
 PAC Chair Luka Okumu	29/08/2016	UNDP chair of the PAC. In some cases PAC Chair may also be the QA Approver. Final signature confirms that the SESP was considered as part of the project appraisal and considered in recommendations of the PAC.



SESP Attachment 1. Social and Environmental Risk Screening Checklist

Checklist Potential Social and Environmental Risks		Answer (Yes/No)
Principles 1: Human Rights		
1.	Could the Project lead to adverse impacts on enjoyment of the human rights (civil, political, economic, social or cultural) of the affected population and particularly of marginalized groups?	Yes
2.	Is there a likelihood that the Project would have inequitable or discriminatory adverse impacts on affected populations, particularly people living in poverty or marginalized or excluded individuals or groups? ¹	No
3.	Could the Project potentially restrict availability, quality of and access to resources or basic services, in particular to marginalized individuals or groups?	Yes
4.	Is there a likelihood that the Project would exclude any potentially affected stakeholders, in particular marginalized groups, from fully participating in decisions that may affect them?	No
5.	Is there a risk that duty-bearers do not have the capacity to meet their obligations in the Project?	No
6.	Is there a risk that rights-holders do not have the capacity to claim their rights?	No
7.	Have local communities or individuals, given the opportunity, raised human rights concerns regarding the Project during the stakeholder engagement process?	No
8.	Is there a risk that the Project would exacerbate conflicts among and/or the risk of violence to project-affected communities and individuals?	No
Principle 2: Gender Equality and Women's Empowerment		
1.	Is there a likelihood that the proposed Project would have adverse impacts on gender equality and/or the situation of women and girls?	No
2.	Would the Project potentially reproduce discriminations against women based on gender, especially regarding participation in design and implementation or access to opportunities and benefits?	No
3.	Have women's groups/leaders raised gender equality concerns regarding the Project during the stakeholder engagement process and has this been included in the overall Project proposal and in the risk assessment?	No
4.	Would the Project potentially limit women's ability to use, develop and protect natural resources, taking into account different roles and positions of women and men in accessing environmental goods and services? <i>For example, activities that could lead to natural resources degradation or depletion in communities who depend on these resources for their livelihoods and well being</i>	No
Principle 3: Environmental Sustainability: Screening questions regarding environmental risks are encompassed by the specific Standard-related questions below		
Standard 1: Biodiversity Conservation and Sustainable Natural Resource Management		
1.1	Would the Project potentially cause adverse impacts to habitats (e.g. modified, natural, and critical habitats) and/or ecosystems and ecosystem services?	No

¹ Prohibited grounds of discrimination include race, ethnicity, gender, age, language, disability, sexual orientation, religion, political or other opinion, national or social or geographical origin, property, birth or other status including as an indigenous person or as a member of a minority. References to "women and men" or similar is understood to include women and men, boys and girls, and other groups discriminated against based on their gender identities, such as transgender people and transsexuals.

	<i>For example, through habitat loss, conversion or degradation, fragmentation, hydrological changes</i>	
1.2	Are any Project activities proposed within or adjacent to critical habitats and/or environmentally sensitive areas, including legally protected areas (e.g. nature reserve, national park), areas proposed for protection, or recognized as such by authoritative sources and/or indigenous peoples or local communities?	Yes
1.3	Does the Project involve changes to the use of lands and resources that may have adverse impacts on habitats, ecosystems, and/or livelihoods? (Note: if restrictions and/or limitations of access to lands would apply, refer to Standard 5)	No
1.4	Would Project activities pose risks to endangered species?	No
1.5	Would the Project pose a risk of introducing invasive alien species?	No
1.6	Does the Project involve harvesting of natural forests, plantation development, or reforestation?	No
1.7	Does the Project involve the production and/or harvesting of fish populations or other aquatic species?	No
1.8	Does the Project involve significant extraction, diversion or containment of surface or ground water? <i>For example, construction of dams, reservoirs, river basin developments, groundwater extraction</i>	No
1.9	Does the Project involve utilization of genetic resources? (e.g. collection and/or harvesting, commercial development)	Yes
1.10	Would the Project generate potential adverse transboundary or global environmental concerns?	No
1.11	Would the Project result in secondary or consequential development activities which could lead to adverse social and environmental effects, or would it generate cumulative impacts with other known existing or planned activities in the area? <i>For example, a new road through forested lands will generate direct environmental and social impacts (e.g. felling of trees, earthworks, potential relocation of inhabitants). The new road may also facilitate encroachment on lands by illegal settlers or generate unplanned commercial development along the route, potentially in sensitive areas. These are indirect, secondary, or induced impacts that need to be considered. Also, if similar developments in the same forested area are planned, then cumulative impacts of multiple activities (even if not part of the same Project) need to be considered.</i>	No
Standard 2: Climate Change Mitigation and Adaptation		
2.1	Will the proposed Project result in significant ² greenhouse gas emissions or may exacerbate climate change?	No
2.2	Would the potential outcomes of the Project be sensitive or vulnerable to potential impacts of climate change?	Yes
2.3	Is the proposed Project likely to directly or indirectly increase social and environmental vulnerability to climate change now or in the future (also known as maladaptive practices)? <i>For example, changes to land use planning may encourage further development of floodplains, potentially increasing the population's vulnerability to climate change, specifically flooding</i>	No
Standard 3: Community Health, Safety and Working Conditions		
3.1	Would elements of Project construction, operation, or decommissioning pose potential safety risks to local communities?	No
3.2	Would the Project pose potential risks to community health and safety due to the transport, storage, and use and/or disposal of hazardous or dangerous materials (e.g. explosives, fuel and other chemicals during construction and operation)?	No

² In regards to CO₂, 'significant emissions' corresponds generally to more than 25,000 tons per year (from both direct and indirect sources). [The Guidance Note on Climate Change Mitigation and Adaptation provides additional information on GHG emissions.]

3.3	Does the Project involve large-scale infrastructure development (e.g. dams, roads, buildings)?	No
3.4	Would failure of structural elements of the Project pose risks to communities? (e.g. collapse of buildings or infrastructure)	No
3.5	Would the proposed Project be susceptible to or lead to increased vulnerability to earthquakes, subsidence, landslides, erosion, flooding or extreme climatic conditions?	No
3.6	Would the Project result in potential increased health risks (e.g. from water-borne or other vector-borne diseases or communicable infections such as HIV/AIDS)?	No
3.7	Does the Project pose potential risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during Project construction, operation, or decommissioning?	Yes
3.8	Does the Project involve support for employment or livelihoods that may fail to comply with national and international labor standards (i.e. principles and standards of ILO fundamental conventions)?	No
3.9	Does the Project engage security personnel that may pose a potential risk to health and safety of communities and/or individuals (e.g. due to a lack of adequate training or accountability)?	No
Standard 4: Cultural Heritage		
4.1	Will the proposed Project result in interventions that would potentially adversely impact sites, structures, or objects with historical, cultural, artistic, traditional or religious values or intangible forms of culture (e.g. knowledge, innovations, practices)? (Note: Projects intended to protect and conserve Cultural Heritage may also have inadvertent adverse impacts)	No
4.2	Does the Project propose utilizing tangible and/or intangible forms of cultural heritage for commercial or other purposes?	No
Standard 5: Displacement and Resettlement		
5.1	Would the Project potentially involve temporary or permanent and full or partial physical displacement?	No
5.2	Would the Project possibly result in economic displacement (e.g. loss of assets or access to resources due to land acquisition or access restrictions – even in the absence of physical relocation)?	No
5.3	Is there a risk that the Project would lead to forced evictions? ³	No
5.4	Would the proposed Project possibly affect land tenure arrangements and/or community based property rights/customary rights to land, territories and/or resources?	No
Standard 6: Indigenous Peoples		
6.1	Are indigenous peoples present in the Project area (including Project area of influence)?	No
6.2	Is it likely that the Project or portions of the Project will be located on lands and territories claimed by indigenous peoples?	No
6.3	Would the proposed Project potentially affect the rights, lands and territories of indigenous peoples (regardless of whether Indigenous Peoples possess the legal titles to such areas)?	No
6.4	Has there been an absence of culturally appropriate consultations carried out with the objective of achieving FPIC on matters that may affect the rights and interests, lands, resources, territories and traditional livelihoods of the indigenous peoples concerned?	No

³ Forced evictions include acts and/or omissions involving the coerced or involuntary displacement of individuals, groups, or communities from homes and/or lands and common property resources that were occupied or depended upon, thus eliminating the ability of an individual, group, or community to reside or work in a particular dwelling, residence, or location without the provision of, and access to, appropriate forms of legal or other protections.

6.4	Does the proposed Project involve the utilization and/or commercial development of natural resources on lands and territories claimed by indigenous peoples?	No
6.5	Is there a potential for forced eviction or the whole or partial physical or economic displacement of indigenous peoples, including through access restrictions to lands, territories, and resources?	No
6.6	Would the Project adversely affect the development priorities of indigenous peoples as defined by them?	No
6.7	Would the Project potentially affect the traditional livelihoods, physical and cultural survival of indigenous peoples?	No
6.8	Would the Project potentially affect the Cultural Heritage of indigenous peoples, including through the commercialization or use of their traditional knowledge and practices?	No
Standard 7: Pollution Prevention and Resource Efficiency		
7.1	Would the Project potentially result in the release of pollutants to the environment due to routine or non-routine circumstances with the potential for adverse local, regional, and/or transboundary impacts?	No
7.2	Would the proposed Project potentially result in the generation of waste (both hazardous and non-hazardous)?	No
7.3	Will the proposed Project potentially involve the manufacture, trade, release, and/or use of hazardous chemicals and/or materials? Does the Project propose use of chemicals or materials subject to international bans or phase-outs? <i>For example, DDT, PCBs and other chemicals listed in international conventions such as the Stockholm Conventions on Persistent Organic Pollutants or the Montreal Protocol</i>	No
7.4	Will the proposed Project involve the application of pesticides that may have a negative effect on the environment or human health?	No
7.5	Does the Project include activities that require significant consumption of raw materials, energy, and/or water?	No





**Minutes of the Regional Steering Committee, held on 6 July 2016 at the
Seychelles Fisheries Authority.**

**Project: Restoring marine ecosystem services by rehabilitating coral reefs to
meet a changing climate future**

In Attendance: As Attached

1. Opening

The meeting was officially opened at 0930 hrs. by the UNDP Resident Representative, Mr Simon Springett, who also acted as chairperson for the first Regional Project Steering committee. The PS of Environment Mr Decomarmond also welcomed the colleagues from Mauritius and shared the importance of joint regional cooperation through this project and others.

The representative from the Mauritius Ministry of Finance and Economic Development, Mrs Ramsurn reiterated PS Decomarmond's sentiment and recalled how the idea and enthusiasm for this project was borne and the rapid collaboration between Mauritius and Seychelles.

Dr. Shah also commented on the collaborations and felt that the original concept of the Adaptive nature of the Coral Restoration focusing on Food Security and Disaster Risk Reduction must be kept.

The Agenda adopted was as follows:

- 09 30 to 11 00: Presentation and Discussion of Concept note by Ms Sue Wells, Consultant on Skype.
- 11 15 to 11 45: Presentation of UNDP – Project Board and Quality Assurance Mr Satyajeet Ramchurn, UNDP Environment Programme Officer
- 11 45 to 12 30 Presentation of MOI Coral Restoration Projects – Dr D Dumur, MOI

2. Presentation of Concept Note

The Concept Note Preparation consultant, Ms. Sue Wells, presented the concept note via Skype. There are 3 components; the first two are the country specific actions, are identically worded and the 3rd component will look at a regional experience. The committee agreed with the proposed structure.

Key points of the proposal to focus on

- Scientific Data to support increase in fish catch (at full proposal stage)
- Linking Food Security in relation to Tourism
- Linking Tourism and Restoration
- Documentation and Lessons learnt from both countries
- Development of Business Plans for Sustainable Management & Financing of Reef Restoration efforts
- Rehabilitation of Coral sites in Marine Protected Areas
- International Coral Reef Symposium June 2016 – Demonstrated worldwide interest in restoration of reefs

3.0 Discussion points:

The discussion points are not individualized. However, the points below emanate from representatives from both Seychelles and Mauritius counterparts attending the meeting.

General

- Important to identify gaps and support livelihoods and DRR links
- Benefits of research must be clear such as development of a Regional Research Platform to extend beyond lifetime of a project
- Build on comparative advantages of the two countries for Upscaling
- Capacity is an issue in Seychelles; AFB may not be willing to fund International Volunteers
- SNPA Structure and capacity also limited- could expand with financial support
- Tourism could play an increasingly critical role in training and mobilizing private sector resources.

Adaptation Aspects to be emphasized

- List Concrete Adaptation Activities
- Importance of such activities to build Climate Resilience
- Vulnerable Groups and benefits from the project – how to ensure
- Level of urgency – corals are degrading rapidly especially in Mauritius
- Emphasize cross/multi-sectoral approach

Timeline for submission

- 15 July for Concept Note (Review between 07-13 by partners/Regional SC)
- 18 July Submission to UNDP HQ
- National Office Endorsement by 18 July
- Submission to AFB is partners in agreement 1 August.

Project Board Guideline/Membership

- Possibly request Nairobi Convention/UNEP to be part of SC through SAPPHERE regional project which will be implemented in Seychelles.
- Will need more thought at full proposal stage given costs to be incurred

Site Selection: Justification

- Genetic Research
- Site selection and science
- Linkages important with community support
- Coastal mapping and zoning already advanced in Seychelles
- Site selection may serve one purpose not both but there is a need to review sites that may have more relevance in terms of Disaster Risk Reduction and Food Security
- Will need to examine Linkages between GEF6/AFB and other projects

Meeting Closure

The meeting closed at 12 30 pm with a vote of thanks to all those present despite the short notice. The help and collaboration of all stakeholders was sought in order to meet the 1 August Deadline.

ATTENDANCE LIST

SNO	NAME	DESIGNATION	ORGANIZATION	Contact
1	Mr. Alain Decommarmond	Principal Secretary	Ministry of Environment, Energy and Climate Change	adecommarmond@gov.sc
2	Dr. Andrew Greiser-Johns	Chief Technical Advisor and Programme Coordinator	UNDP-GOS-GEF Programme Coordinating Unit	a.grieserjohns@pcusey.sc
3	Mr. Flavien Joubert	Chief Executive Officer	Seychelles National Parks Authority	f.joubert@env.gov.sc
4	Mr. Denis Matatiken	Special Advisor to the Minister of Environment, Energy and Climate Change	Ministry of Environment, Energy and Climate Change	boga@seychelles.net
5	Mr. Savinien Leblond	Programme Officer	Marine Conservation Society of Seychelles	savi72011@gmail.com
6	Mrs. Meggy Tirant	Programme Assistant, Global Climate Change Alliance Project	United Nations Development Programme	meggy.tirant@undp.org
7	Mr. Jude Bijoux	Consultant	UNEP-Ecosystem Based Adaptation Project.	judebijoux@gmail.com
8	Mr. Rodney Quatre	Programme Manager, Global Climate Change Alliance Project	United Nations Development Programme	rodney.quatre@undp.org
9	Dr. Danishta Dumur-Neelayya	Associate Research Scientist	Mauritius Oceanography Institute, Mauritius	ddumur@intnet.mu
10	Mrs Rachna Ramsurn	Analyst/Senior Analyst	MOF, Mauritius	rramsurn@govmu.org
11	Mr. Simon Springett (Chair of the Regional Steering Committee)	UNDP Resident Representative/UN Resident Coordinator	United Nations Development Programme	simon.springett@one.un.org
12	Dr. Akiko Yamamoto	UNDP-GEF Regional Technical Advisor - International Waters	UNDP-GEF, Regional Service Centre, Addis Ababa	akiko.yamamoto@undp.org
13	Dr. Nirmal Shah	Chief Executive Officer	Nature Seychelles	nirmalshah@natureseychelles.org

SNO	NAME	DESIGNATION	ORGANIZATION	Contact
14	Mr. Andy Rylance	Technical Advisor Protected Area Finance Project	UNDP-GOS-GEF Programme Coordinating Unit	a.rylance@pcusey.sc
15	Mr. Peter Purvis	Legal Officer	Ministry of Finance, Trade and Blue Economy	ppurvis@finance.gov.sc
16	Ms. Helena Sims	Project Manager	The Nature Conservancy - Seychelles	h.sims@pcusey.sc
17	Mr. Roland Alcindor	Programme Manager	United Nations Development Programme	roland.alcindor@undp.org
18	Mr. Marille Benoit	Programme Assistant	United Nations Development Programme	marille.benoit@undp.org
19	Mrs. Preethi Nair	Project Officer	United Nations Development Programme	preethi.sushil@undp.org
20	Mr. Satyajeet Ramchurn	Environment Programme Officer	United Nations Development Programme	satyajeet.ramchurn@undp.org



**Minutes of the Second Regional Steering Committee, held on 8 May 2017 at
Le Meridien Hotel, Pointe aux Piments, Mauritius**

**Project: Restoring Marine Ecosystem Services By Rehabilitating Coral Reefs To Meet
A Changing Climate Future**

In Attendance: As Attached

1. Opening

- The UNDP's Environment Programme Officer welcomed all the participants to the Steering Committee and presented the objectives, agenda and the timeline of the project formulation. He then invited the UNDP Resident Representative for delivering his speech.
- The UNDP Resident Representative stated that there is only three months to prepare the full proposal. In this endeavour, we have the assistance of a Project Formulation Team to address the comments which the AFB has made on the concept note. The purpose of this meeting is therefore to enable us all to kick-start the preparation of the full proposal. This involves setting the baseline activities, and considering the development of the project logical framework, as well as the results framework.
- The UNDP GEF Regional Technical Advisor also delivered a short speech and emphasized on the benefits of the coral restoration and how if coral restoration is effective will lead towards food security benefits and disaster risk benefits. She mentioned that the input of all stakeholders here is important as it will help for the development of the full proposal. She added that the benefits of coral restoration will continue after the project closure.
- The Agenda adopted was as follows:

TIME	TOPIC	RESOURCE PERSONS / FACILITATOR
09:00 – 09 30	Registration	UNDP Mauritius
09 30 – 09 45	Opening remarks - UNDP Resident Representative,	
09:45 – 09 55	Objectives, Agenda of Regional Steering Committee, timeline of Project Formulation	S Ramchurn, UNDP Mauritius
09 55 – 10 30	Comments on concept note Presentation of Proposal Template Format and information requirements	Sarah Frias Torres, International Consultant
10 30 – 10 45	Tea Break	
10:45 – 11 00	Experiences in Coral Restoration/Expectations from the project with reference to the Business approach	Nature Seychelles

11 00 – 11 30	Experiences in Coral Restoration	Jude Bijoux David Rowatt	
11 40 - 11 45	Experiences in Coral Restoration//Expectations from the project	Mr S Bachagian, Mauritius Oceanography Institute	
11 45 – 12 00	Status of Marine Protected Areas in Mauritius	Ministry of Ocean Economy	
12:00 - 13:00	Lunch		
13 00 – 13 30	Initial consultations from the Mauritius Community Development specialist / Brief intro for Seychelles/ Workplan	E Wiehe/E Talma	
13 30 – 15 00	Logical Framework for the proposed project proposal	Sarah Frias Torres	
15 15 – 15 45	Environmental and Social Management – Risks identified	Akiko Yamamoto	
15 45 - 16 15	Tea Break		
16 15- 18 00	Discussion and way forward		

1. Presentations by Consultant and stakeholders

A) Presentation by Dr. Sarah Frias-Torres, International Consultant – Team Leader

- The Team Leader gave a brief of the concept note, proposal template format and information requirements.
- During her presentation she discussed on the following:-
 - a) The importance of coral reefs.
 - b) Why should we fund coral reef restoration?
 - c) What AFB wants to fund?
 - d) Objectives of a coral reef restoration project, etc.
 - e) 34 coral species transplanted
- Additionally, she mentioned that there is major death of corals because of bleaching and it takes 500 years for corals to regenerate/grow. Corals which are alive after bleaching gets adapted to future bleaching events.
- She added that Australia has huge stocks of corals, but their perception is that there is no hope for coral restoration. She mentioned that an increase in emissions, will lead to an increase in sea level rise and eventually lead to death of corals.
- The Team Leader provided the following reasons as to why coral reef restoration is important:-
 1. We do not have any choice and we can't wait as the corals are continuing to degrade.
 2. They won't grow or settle.
 3. We must continue until we stop using fossil fuel.
- She added that we must reach an agreement on how to do things, that is, scientific methods to be

used. There are many ways of knowledge generation, in terms of community consultations, scientific papers and social media.

- The Team Leader mentioned that we need to reach an agreement on the area we want to restore and the number of corals to grow. She highlighted that 35 Scientific divers from 10 countries were trained on coral reef restoration and that 6 trainees in ongoing training course from: Australia, Mexico, USA, UK, France and Philippines. Moreover, she mentioned that Mauritius and Seychelles must aim to become a coral reef restoration knowledge hub in the Indian Ocean.

B) Presentation by Mr. Nirmal Shah, Founder and Chief Executive Officer, Nature Seychelles

- The CEO of Nature Seychelles presentation was based in coral restoration/expectations from the project with reference to the business approach.

- He gave a brief on the following:

- a) Disappearing coral reefs
- b) Gardening coral reefs
- c) Gardening from the nurseries and transplant, etc.

- He stated that coral transplantation increased natural settlement and recruitment of corals onto the degraded reef.

- He added that most scientists and managers believe that coral reef restoration is not cost-effective.

- He proposed the following measures for making long term, large scale restoration financially viable: -

1. Mass-Produce and sell farmed (fast growing) corals for reef restoration and for the international aquarium trade –CITES compliant.
2. With facilities and capacity available, leverage other opportunities in mariculture notably low trophic level species.
3. With facilities and capacity available attract other marine R&D projects, partners, researchers and students: Platform and knowledge hubs.
4. Provide training and boot camp learning programs for national and international trainees in coral mariculture and coral reef restoration.
5. Explore Science and Technology opportunities for use of farmed coral
6. Partner with resorts, etc. for restoration using CSR funds

- The committee proposed that people from vulnerable communities could help in this project and not necessarily people from coastal communities.

C) Presentation by Mr Jude Bijoux, Technical Assistant for the UNEP-EBA Project and Mr David Rowatt, Chairman, Marine Conservation Society, Seychelles on experiences in coral restoration:

- The Technical Assistant of the UNEP-EBA Project elaborated on the 2015/2016 coral bleaching event and emphasized why we must be concerned by this. He shared best practices and lessons learned as follows: -

1. Coral reef restoration projects need time to implement
2. Climate resilience should be incorporated into the design of restorative works
3. Such efforts need to be focused in socio-economically important areas

4. Thin branches Acroporas seems to be the most ideal corals to use
5. There is much value in trying a number of techniques at the same time
6. Coral reef restoration need to be combined with complementary methods that can be applied on larger scales
7. There should be continued focus on reducing other stressors to help reefs to recover naturally

- The following observations were made from the committee:-
 1. Co-funding must be secured from outside partners and private sectors for these types of project.
 2. Long term financing needs to be predicted
 3. It is vital to reduce the impacts from tourists as this highly impacts the reefs negatively.
 4. The institutional set up and management is very important for these projects.
- The Chairman of the Marine Conservation Society, Seychelles presentation focussed on community & private sector partnership based coral restoration. He provided the following rationale for partnership coral restoration: -
 - a) Resources - Residents and tourism sector have wide resource base.
 - b) Manpower - MCSS provides technical support & helps develop funding and local community provides long-term continuity.
 - c) Materials - Private sector partners have easy access to most materials necessary.
- He provided the following points as lessons learnt: -
 1. Vulnerability of in-water nurseries to bleaching
 2. Sighting of / portability of nurseries key in areas of seasonal wave action or sedimentation
 3. Spacing of frags in nurseries
 4. Some species very susceptible to algal impairment (e.g. stylophora)
 5. Site selection for transplants or frames
- The potential areas of collaboration he identified are: -
 1. Broaden & expand current programmes
 2. Establish new programmes with local partners & communities
 3. Sharing knowledge & lessons learned will increase project impacts / outcomes
- The UNDP GEF Regional Technical Advisor pointed out that whatever must be done in terms of coral restoration must be the result of community consultations.
- The GEF SGP Mauritius National Coordinator highlighted that Balaclava Marine Park is a huge challenge as there is no management plan and illegal fishing. The challenge will mostly be with the end users in case this site is chosen.

D) Presentation by Mr Suraj Bacha Gian, Research Scientist, Mauritius Oceanography Institute.

- The Representative of the Mauritius Oceanography Institute focussed on experiences in coral restoration and expectations from the project. He gave a background on the status of the Mauritian reefs and listed the projects coral farming projects being implemented in Mauritius by different entities, which are as follows: -

1. Mauritius Oceanography Institute (MOI): -

- Land and Sea Based Coral Farming
- Small Scale Reef Rehabilitation

2. Albion Fisheries Research Centre (AFRC)

- Sea-based Coral Farming in Mauritius and Rodrigues (in collaboration with Rodrigues Regional Assembly and Shoals Rodrigues)

3. Non-governmental organisations (NGOs)

- ELI-Africa (UNDP GEF-SGP funded project): Community based small scale reef rehabilitation at Trou aux Biches (in collaboration with MOI)
- Sensitisation programmes by Reef Conservation, Lagon Bleu, MMCS, ELI Africa etc.

- The main achievements from these projects were as follows: -

1. Techniques developed for culture of various coral species
2. List of coral species suitable for culture
3. Technical report & scientific publication on Land Based Coral Culture in Mauritius
4. Locally adapted techniques developed for mass culture of corals & small scale reef rehabilitation
5. Reef sites rehabilitated at Albion (~350m²), Flic en Flac (~300m²) and Trou aux Biches (~200m²)
6. Transfer of scientific know how to stakeholders & local community for implementation of small scale reef rehabilitation. i.e. "Community-based small scale reef rehabilitation at Trou aux Biches".

- The following recommendations were provided based on the above projects: -

1. Nursery maintenance from fouling organisms, algae and predators.
2. LBN: Installation of a sea water cooling system to prevent coral bleaching during hot summers (El Nino events) – or eventually pump sea water from offshore.
3. OBN: Careful site selection is critical for establishment of sea-based coral farms (i.e. predator free, good flushing, water quality recommended for a healthy coral reef ecosystem etc.).
4. Sea-based nurseries do not provide shelter from predators and threats (therefore regular maintenance recommended).
5. Careful site selection is critical for establishment of coral farms & transplantation of colonies farms (i.e. predator free, good flushing, water quality recommended for a healthy coral reef ecosystem etc.).
6. Donor and transplantation sites should be as similar as possible with respect to environment conditions.
7. Small scale reef rehabilitation projects are labour intensive; recommended to involve local community & other volunteers.

E) Presentation from Mr S. Ramah, Ministry of Ocean Economy, Marine Resources, Fisheries & Shipping

- The Representative of the Ministry of Ocean Economy, Marine Resources, Fisheries & Shipping presentation was based on the status of the Marine Protected Areas in Mauritius. He spoke about the marine parks in Mauritius and elaborated mostly on Blue Bay Marine Park and Balaclava

Marine Park.

- He provided the following reasons for the management of the marine parks: -
 1. Zoning plans: Strict conservation, Conservation, Multiple use, Swimming, traffic, mooring and Skiing
 2. Enforcement of MPA regulations/Permit
 3. Long term Monitoring (coral, fish, benthic communities, water quality)
 4. Public awareness & Sensitization
 5. MPA Fund (provision in main Act 1998)
- He elaborated on coral bleaching and death of corals at Blue Bay Marine Park for the year 2016.
- Members of the committee highlighted that parrot fish are very important during coral farming and there is no fouling in the water with their presence.
- It was also proposed to include SEMPA and Voluntary Conservation Marine Areas (VCMAs).

The committee deliberated and agreed that Mr Satish Khadun, being the most senior from the Ministry of Ocean Economy, will be the Co-Chair for the Coral Restoration Project Steering Committee.

F) Presentation from Ms Emilie Wiehe, Community Development Specialist for Mauritius

- The Community Development Specialist for Mauritius elaborated on her scope of work which is as follows:
 1. Assess how the project will benefit vulnerable groups
 2. Gender and youth assessment for empowerment of women and youth
 3. Development of gender and youth action plan
 4. Identify roles and responsibilities
 5. Support the establishment of baselines and targets for community development
- She stated that she will need the collaboration of various stakeholders and the strategy put in place to gather information will be desk review, Key informant interviews, focus groups. Additionally, there would be participatory methods for;
 1. Gender and youth assessment.
 2. Gender and youth action plan.
 3. Community development plan.
- Finally, there would be sharing of information/restitution before final inclusion in the project proposal.
- According to her, the Civil Society Stakeholders to be considered would be as follows:
 1. Marine conservation and environmental NGOs
 2. Hotels / sustainability and CSR departments
 3. Registered fishermen and boat operators (both from boathouses and independent)
 4. Coastal community organizations, force-vives, and other NGOs (organizations working with vulnerable groups)
- The Community Development Specialist for Mauritius also discussed on the Coastal vulnerable groups, that is, the Registered Fishermen, illegal fisherman, women and youth. She highlighted the Gender mainstreaming requirements for the project.
- During her initial consultations with NGOs, AHRIM and Fishers and Boat operators she noted that there was a willingness to participate in the Coral restoration project from all of them however

some obstacles and resilience should be tackled.

- She stated that her next steps would be to have workshop with NGOs and civil society, establishing baselines disaggregated by gender and age, and working on the indicators for monitoring the Community development and socio-economic aspects of the project through:
 1. Individual consultations / canvassing
 2. Focus groups and meetings/workshops for development of action plan (gender, youth, community)
 3. Identify resources available and needed
 4. Dissemination of final drafts
- Finally, she presented her work plan and timeline for the project.

G) Presentation from Ms. Elke Talma, Community Development Specialist – Seychelles

- The Community Development Specialist for Seychelles presented briefly on the deliverable for Seychelles part namely:
 1. Community Development Plan
 2. Gender and Youth Assessment report
 3. Gender and Youth Assessment Action Plan
 4. Project Proposal for Adaptation Fund Board
- She also stated that during Sarah's mission in Seychelles stakeholders workshop, one-to-one meetings and site visit is planned on the 12th of May followed by site visits on the 13th of May 2017. On the 15th meeting with NGO Nature Seychelles and one-on-one meetings is planned.

H) Presentation from Dr Sarah Frias-Torres, Team Leader

- The Team Leader's presentation was based on the logical framework for the proposed project proposal. The log-frame shown on pages 11-12 "Expected Outcomes" column of the AFB proposal concept note was used to guide the group discussion. Some issues which were not answered completely will be completed via email for the final proposal document.

Discussion and Way Forward

- The Team Leader stated that we should decide on the site where to do the nursing and coral restoration.
- However, the UNDP GEF Regional Technical Advisor mentioned that to choose a site but do not compromise on the benefits on coral restoration and society at large.
- The sites targeted for coral reef restoration in both countries are marine reserves and VCMAs.
- It was noted that there was increased revenue from tourism activities and there should be community-based tourism.
- The size of the area to be restored, the species of corals to be planted has not been yet agreed on.
- It was agreed to use bottom fixed table nurseries of approximately 4-6 metres deep for coral restoration for Mauritius.
- The leading Institution for the AFB Coral restoration project would be the Ministry of Ocean Economy for Mauritius and Nature Seychelles for Seychelles. The third steering committee will be

held in Seychelles.

The steering committee ended at 17.30 hrs with a vote of thanks.

ATTENDANCE LIST

Name	Designation	Organisation
Mr. S. Springett	UNDP RR & UN RC	UNDP Mauritius & Seychelles
Mrs. Akiko Yamamoto	Regional Technical Advisor on International Waters	UNDP GEF
Mr. Satyajee Ramchurn	Head of Environment Unit	UNDP Mauritius
Mr. Roland Alcindor	Programme Manager	UNDP Seychelles
Dr. Sarah Frias-Torres	Team Leader – AFB Coral Restoration Project	AFB Coral Restoration Project
Mr. Nirmal Shah	Founder and Chief Executive Officer	Nature Seychelles
Mrs. Kerstin Henri	Director	Nature Seychelles
Mr. Jude Bijoux	Technical Assistant	UNEP-EBA project
Mrs. Lyndy Bastienne	National Coordinator	GEF SGP Seychelles
Mr. Satish Khadun	Divisional Scientific Officer	Ministry of Ocean Economy, Marine Resources, Fisheries and Shipping
Ms. Elke Talma	Community Development Specialist - Seychelles	AFB Coral Restoration Project
Mr. Flavien Joubert	Chief Executive Officer	Seychelles National Parks Authority
Mrs. Ashley Dias	Conservation Officer	Ministry of Environment (Seychelles)
Mr. David Rowatt	Chairman	Marine Conservation Society, Seychelles
Mr. Ramchurn Seenauth	Divisional Environment Officer	Ministry of Social Security, National Solidarity, and Environment and Sustainable Development (Mauritius)
Mr. A. Krishna	Marine Educator	Wise Oceans
Mr. Suraj Bacha Gian	Research Scientist	Mauritius Oceanography Institute
Mr. Fabiani Appavou	Analyst	Ministry of Finance & Economic Development
Ms. Emilie Wiehe	Community Development Specialist - Mauritius	AFB Coral Restoration Project
Mrs. Pamela Bapoo-Dundoo	National Coordinator	GEF SGP Mauritius
Dr. Yashvin Neehaul	Associate Research Scientist	Mauritius Oceanography Institute
Dr. D. Dumur-Neelayya	Associate Research Scientist	Mauritius Oceanography Institute

Mr. Prakash Mussai	Research Scientist	Mauritius Oceanography Institute
Mr. Vimal Ramchandur	Research Scientist	Mauritius Oceanography Institute
Mr. N. Bheemul	Technical Officer	Ministry of Ocean Economy, Marine Resources, Fisheries and Shipping
Mr. N. Soogun	Environment Officer	Ministry of Social Security, National Solidarity, and Environment and Sustainable Development (Mauritius)
Mr. S. Ramah	Technical Officer	Ministry of Ocean Economy, Marine Resources, Fisheries and Shipping
Mr. V. Munbodh	Scientific Officer	Ministry of Ocean Economy, Marine Resources, Fisheries and Shipping
Ms. Samanta Hardas	Programme Assistant	GEF SGP Mauritius
Mr. Sameer Khudaroo	Programme Assistant (Secretary)	UNDP
Mrs. Kamini Beedasee	Project Assistant (Secretary)	UNDP



**Minutes of the Third Regional Steering Committee, held on 20 and 21 June 2017
at Care House, Mahe, Seychelles**

**Project: Restoring Marine Ecosystem Services By Rehabilitating Coral Reefs To Meet
A Changing Climate Future**

Attendance is at **Annex 1**

I. Opening

1. The UNDP's Environment Programme Officer welcomed all the participants to the third Regional Steering Committee and presented the objectives, agenda and the timeline of the project formulation. He then invited the UNDP Resident Representative for delivering his speech.
2. The UNDP Resident Representative stated that there remains only one month to prepare the full project proposal. He appreciated the works carried out so far and requested the full participation of all stakeholders to finalise the project proposal.
3. The UNDP GEF Regional Technical Advisor (RTA) also delivered a short speech and pointed out that it was the last opportunity for a face to face meeting before the submission of the project to the AF Board. She wished for an open and collaborative interaction and relied on the technical input, sharing of expertise and knowledge among the countries and experts. She emphasized on the requirement to have a climate change resilience perspective and wished to present the best proposal to the Adaptation Fund (AF) Board.
4. Representative of the Designated Authority from the Government of Seychelles welcomed all members to Seychelles. He wished for collaboration among all members present. He thanked the experts for their works carried out so far and stressed on the community, gender and youth involvement issues that need to be taken on board for the final AF project proposal.
5. Representative of the Designated Authority from the Government of Mauritius thanked the government of Seychelles and UNDP for the organisation of the 3rd Regional Steering Committee. He recalled the works and collaboration that has been met during the last Regional Steering Committee. He wished for a fruitful deliberation for successful results so as to present the best proposal to the AF Board.
6. The Agenda adopted is at **Annex 2**:

DAY 1:

II. Presentations by Consultant and Stakeholders

7. **Presentation on "Status of proposal preparation and work accomplished since the Second Steering Committee and the proposed Outcomes and Outputs" by Dr. Sarah Frias-Torres, International Consultant – Team Leader**
 - 7.1. The **Team Leader** informed that 2018 will be the International Year of the Reef and that it would be an opportunity if the project could start implementation in 2018. Further to viewing of the trailer of the movie on coral bleaching "Chasing coral", the **Committee agreed** that the movie could be screened in Mauritius and Seychelles as this could be used for the sensitisation of the general public on coral reef rehabilitation under Component 3.
 - 7.2. The main outcomes of her presentation and discussion, were as follows:-
 - 7.2.1. During the implementation phase, each site would comprise of a dedicated team composed of technical/scientific and support staff; and would be led by a Project Coordinator (PhD level). The **Committee agreed** that the composition of the team could be amended as per country need and institutional arrangement.
 - 7.2.2. It was agreed that the objective of the project was to scale up of what is presently done without AF fund. As such, the **Team Leader proposed** that the target of 10,000 coral transplants for each restoration site be reached at the end of the 5 years. She informed that it would be carried out in two steps: 1st by asexual

reproduction to reach stabilisation and stop degradation; and 2nd step by sexual reproduction so as to increase genetic diversity.

7.2.3. **It was agreed** that the protocol and methodology used would be adapted according to each country specificities and requirements.

- i. Mauritius will adopt table and multi-layered rope sea based nurseries and a land based nursery.
- ii. Seychelles will adopt mid-water floating rope nurseries and land based nurseries.

7.2.4. Further to discussion, the importance of nurseries was confirmed by representative of Mauritius (MOI). He stated that according to Mauritian experience, the survival rate for small transplant without passing through nurseries was very low, since predators and grazers fed on the small transplanted corals.

7.2.5. It was agreed that donor site should be monitored so as to understand the implication of taking the samples. It was also agreed that care must be taken not to destroy donor colonies and that a maximum of 10% take off could be allowed to enable recovery of the donor colony.

8. “Community Consultations and Gender and Youth Assessment in Mauritius” Presentation by Ms Emilie Wiehe, Community Development Specialist for Mauritius

8.1. The Community Development Specialist (CDS) for Mauritius described the consultative process she had undergone to obtain information from stakeholders related to coastal and marine users. She noted that the Marine Parks Areas (MPA) in Mauritius are not remote areas and involve local users, and therefore the project might have impact on them. Sensitisation was made so as to ensure the success of the project, to have their cooperation and prevent potential vandalism. She then presented briefly the deliverables for Mauritius part namely:

- i. Community Development Plan
- ii. Gender and Youth Assessment report
- iii. Gender and Youth Assessment Action Plan

8.2. She presented a list of stakeholders consulted for Mauritius and Rodrigues, classifying them according to their importance and influence and she described the action plan for each stakeholders.

8.3. She stressed the importance of gender and youth inclusion in the project at all levels. She described how women, who have a high rate of unemployment in the selected sites, could help. It was noted that even though these women did not know how to swim, the CDS suggested ways in which these women and youth could collaborated, since they were good community mobilisers, had a good social networking and could help in awareness campaign. She suggested that youth and women should be incorporated in the Project Coordinating Unit (PCU).

8.4. Discussion:

8.4.1. The RTA pointed some of the weakness of the reports. Indicating that the information presented did not indicate the actual difficulties or challenges for women in Mauritius and suggested complementing the reports with data to reflect the actual requirement. She also suggested that the reports should indicate why these communities are targeted and how they contribute directly to the degradation of the reef due to their activities; to show how their engagement in the project will decrease the stress on the coral by recycling them in restoration works; and how this will provide job opportunities to women and youth (e.g. carrying out land based activities (outsourced) which do not need scientific/technical knowledge, ecotourism, monitoring etc).

8.4.2. Representative of Mauritius Oceanographic Institute (MOI) informed that maintenance of nurseries is labour intensive. As such community involvement was important. He added that training and seeds would be provided by Ministry of Ocean Economy/MOI.

8.4.3. With regard to sustainability of the project in Mauritius, it was suggested that restoration services could be provided to hotels by the community, through a well-established licensing mechanism. i.e. hotel could buy live corals to registered nurseries/licenced providers and the hotels should be able to show proof of source of transplant at any time for monitoring purposes. Further to discussion it was agreed that there was need to ensure that there is a good enforcement mechanism was put in place, to ensure that the corals come from licenced farms and not from other sources, such as wild corals. An Alternative proposed

would be for the hotels to hire trained community members. Furthermore, the representative of MOI informed that only Ministry of Ocean Economy/MOI will provide for the seeds (donor corals) and that the chain of custody will be strictly controlled. It was also noted that it was very difficult to operate land based nurseries by communities since they require permits (EIA) for pumping sea water. **RTA suggested that the proposed actions should be included in the project proposal.**

9. “Community Consultations and Gender and Youth Assessment in Seychelles” Presentation by Ms. Elke Talma, Community Development Specialist for Seychelles

9.1. The Community Development Specialist for Seychelles presented briefly on the deliverable for Seychelles part namely:

- i. Community Development Plan
- ii. Gender and Youth Assessment report
- iii. Gender and Youth Assessment Action Plan

9.2. She informed that Seychelles has no community per say. She presented a list of stakeholders consulted in Seychelles and listed them according to their importance and influence. She also presented an action plan of the involvement of the community, youth and women in the proposed project.

9.3. CDS Seychelles pointed out that women in Seychelles were not considered as vulnerable. **RTA requested to document this statement since there is an international belief that women are vulnerable.**

9.4. Discussion:

9.4.1. Representative of Seychelles informed that all the stakeholders listed could not be used (e.g. prisoners) and that the list should be reviewed. **It was agreed that representatives from Seychelles would submit their views on the list to the Team Leader.**

9.4.2. **In order not to indicate government institutions as “low importance”, which could be wrongly interpreted, it was agreed that “importance” of stakeholders would be replaced by “relevance”.**

9.4.3. It was pointed out that there was a shortage of experienced divers in Seychelles. Presently, the experienced divers that do monitoring works were composed of volunteer international divers that continuously need to be renewed. It was noted that one of the priorities of the project would be to **recruit an oceanographer/marine biologist with experience in coral reef restoration offering a long term contract** so as to ensure continuity. These leaders/scientists and other staffs could be recruited nationally or internationally. **It was also proposed that a training video be produced to assist in the training of new recruits.** It was also proposed to include courses at university level in coral rehabilitation.

9.4.4. One proposal made so as to generate some income from rehabilitation works is to have some sacrificial sites, whereby tourist divers could get access so as to get some restoration experience. RTA pointed out that there was a high risk whereby the tourists may believe that they can do the same thing outside the sacrificial nursery.

9.4.5. Alternatively, representative of Mauritius suggested having glass bottom boats passing through the sacrificial sites or snorkelling (not diving), which are less damaging practices. **It was agreed that the project could also evaluate how these practices affect the nurseries and coral reefs during the first 2 years of implementation.**

9.4.6. It was agreed that training need to be targeted (for both Mauritius and Seychelles):

- i. Public education: on importance of coral reef and the threat they are facing and the restoration programme so as to increase public interest, support and potential future funding and participation.
- ii. International coverage through in flight advertisement in international flights to Mauritius and Seychelles.

10. Presentation by Dr Akiko Yamamoto, UNDP GEF Regional Technical Advisor

10.1. The RTA presented the theory of change. She explained that there is the assumption that actions link to impacts. As such she requested all participants to use this theory in the preparation of the logical framework when presenting the impacts and outputs. She explained that this will provide the rational for

the implementation of the project by project managers and implementers. The assumptions need to be clear for all stakeholders so as to ensure successful implementation of the project in the future.

11. Presentation of the by Dr. Sarah Frias-Torres, International Consultant – Team Leader

11.1. The Team Leader elaborated on the proposed project alignment with the AF Results. She also presented the two tables of Part III, regarding the result frameworks (Table E) and the project alignment of the Result Framework to the Adaptation Fund (table F). She explained what was expected from the working sessions for Mauritius and Seychelles. She stressed on the importance to show SMART indicators, their baseline and targets. She also requested to work on the budget allocated for each budget as indicated in the table for “project components and financing”.

12. Outcome of working session –Component 1 and 2

12.1. It was agreed that the wording for outcomes should remain as in the Concept Paper and that the outputs could be modified in order to meet the respective outcomes.

12.2. Groups for Mauritius and Seychelles have worked on the results framework. Mauritius informed that due to limited budget only two sites will be considered (one in Mauritius and one in Rodrigues). The site at Anse La Raie has been excluded.

12.3. **It was agreed that the final draft result framework will be submitted to the Team Leader by Monday 26 June 2017. The team leader will thereafter merge all the components and submit same to the RTA on Tuesday 28 June 2017.**

13. First day of the Regional Steering Committee ended at 18:00hrs.

DAY 2

14. Outcome of working session – Component 3:

14.1. Half of the budget for Component 2 will be used for the payment of Chief Technical Advisor, local consultant, regional components (e.g. website, Regional Steering committee and relevant travel costs, publication, attending international symposium etc) and the remaining budget (USD 400,000) will be equally divided between Mauritius and Seychelles.

14.2. Due to limited budget, it was agreed genetic connectivity studies between Mauritius and Seychelles would not be implemented.

14.3. Subject to budget availability, Mauritius and Seychelles could present the results of the coral reef restoration project at a high-level international symposium (e.g. WIOMSA, the 2020 International Coral Reef Symposium ICRS). Estimated cost to send one representative from Mauritius and one from Seychelles is about USD 15,000 (conference registration, travel and accommodation, per diem). **RTA informed that the project proposal should include a rationale for the participation and reminded that the presentation should include climate change adaptation.**

14.4. Requirements for both countries:

- i. It was agreed that all publications for the proposed project will be done in open access journals and that the fees association (several hundred USD) for publishing will be earmarked.
- ii. It was agreed that a website will be created to present progress of the project. It will present project implementation progress for both countries.

14.5. Actions to be undertaken by Mauritius:

- i. Due to availability of molecular biology laboratory facility in Mauritius, genetic analysis for identification of resilient corals will be undertaken by Mauritius (MOI). Seychelles will send coral tissue samples to MOI for analysis. Seychelles will cater for the required permits and shipping cost. Mauritius will require funding for consumables and chemicals for genetic analysis.
- ii. Regional training on GIS mapping. It was agreed that the budget needs to be earmarked for equipment, GIS licences and workstations for both countries.

14.6. Actions to be undertaken by Seychelles:

- i. Regional training on micro fragmentation and fusion of massive corals.

- ii. Regional training on socio economic and environmental monitoring (e.g. fish population monitoring). The monitoring methodology should be standardised so as to have comparable results for publication.
- iii. Updating of Toolkit on lessons learnt to share the experiences in both countries. RTA requested that the toolkit should also take into consideration Climate Change adaptation, and benefits of scaling up.

14.7. The possibility to purchase giant clams (about 500) has been raised, subject to fund availability.

14.8. The Committee agreed that all expenses related to the regional training will be catered by the host country (i.e. venue, transport, DSA etc.)

14.9. It was agreed that the preliminary table for component 3 will be sent to the Team Leader by Monday 26 June 2017.

15. Outcome of discussion on Full cost of Adaptation reasoning and Project Justification

15.1. The UNDP Environment Programme Officer explained that contrary to GEF requirement, there was no need to secure letter of financing to secure funds from AF Board. However, there is need to describe how the funding from AF Board will improve on the baseline (works carried without AF Funding). There is need to justify all the funds going for adaptation.

15.2. It was agreed that Team Leader should provide a list of works that was being/would be carried out by NGOs and Governments for coral reef rehabilitation (e.g. erosion control, coral reef monitoring, marine protection actions put in place, MPA protection actions etc.). Based on these information, there is need to indicate how the AF funding will enable the countries and the region to improve coral reef rehabilitation and to strengthen climate change adaptation. It was noted that the project document required a small paragraph on each of the action already taken. If required the full document could be annexed in the AF project proposal.

16. Outcome of discussion on Project Implementation Arrangement and National and Regional Level.

16.1. The implementation arrangement has been agreed as follows:

16.1.1. Implementing Partners: UNDP

16.1.2. Executing Partners:

- i. Ministry of Environment, Energy and Climate Change (Seychelles)
- ii. Ministry of Ocean Economy, Marine Resources, Fisheries and Shipping (Mauritius) (including Albion Fisheries Research Centre, AFRC and Mauritius Oceanography Institute, MOI)

16.1.3. Project Coordination Unit:

- i. Project Manager : 1 for Seychelles, 1 for Mauritius
- ii. Project Assistant: 1 based in Mauritius
- iii. Chief Technical Advisor (part time): for the Region (Mauritius and Seychelles)
- iv. M&E : for the region

16.1.4. Responsible Parties:

- i. Nature Seychelles (It was noted that the responsible parties will sign an MOU with the Government of Seychelles)
- ii. Seychelles National Parks Authority (SNPA)
- iii. Marine Conservation Society of Seychelles (MCSS)
- iv. For Mauritius, the Ministry of Ocean Economy (Mauritius) need to decide on how NGOs will be involved. There are three possible options, through: (1) SGP (2) call for proposal by UNDP; or (3) call for proposal by Government of Mauritius. Some of the advantages and disadvantages of each options are as follows:
 - a) If opt to fund NGO through SGP, this will involve a fee of 16% (6% admin cost to UNOPS and 10% for SGP GEF). Advantage: SGP will do the monitoring.
 - b) If call for proposal is made by UNDP, a letter of agreement will be signed between UNDP and the NGOs, 10,000 USD charge will be levied for each call for proposal from

the project funds. Monitoring will be done through monitoring committee chaired by the Project Manager.

- c) If call for proposal is made by Government, no management fee will be required. Letter of agreement will be between Government and the NGOs. Monitoring will be through monitoring committee chaired by the Project Manager. The disadvantage is the lengthy government procurement procedure (approx. 6-9 months).

16.1.5. Regional Steering Committee and National Steering Committees. It was agreed that all gender and community issues will be taken on board at all Steering Committees. It was also suggested that the prodoc should be shared with the Gender Specialist at Regional Steering Committees to review and ensure due diligence with regard to mainstreaming gender in the prodoc.

16.1.6. Workshops (inception, midterm review, terminal, and final evaluation).

17. Way Forward

17.1. The RTA presented the way forward for the submission of the project proposal to the AF Board. The table showing the road map for AF submission and remaining task required for UNDP approval are tabled at **Annex 3**.

17.2. The major milestones include:

- Finalisation of the project proposal (require inputs from stakeholders, team leader, the National Community Specialists and the Project Coordination Unit) (18 July 2017)
- Submission of the final draft project proposal to UNDP HQ review (27 July 2017)
- Formal submission of final project proposal to AF Secretariat (07 August 2017). RTA informed that AF might require feedback with a very short deadline (end August/beginning September 2017). As such **rapid responses will be required from all stakeholders**.
- Preparation and submission of 2 project documents using UNDP format (one for each country) to stakeholders for review (21 August 2017);
- Approval of Project Documents in Local Project Appraisal Committee (LPAC) during the first week of October 2016. It was agreed that the LPAC meeting will be held in Seychelles. The Environment Programme Officer informed that depending on funds available, a site visit at the coral reef restoration sites at Praslin and Cousin Islands could be organised. Nature Seychelles informed that they would facilitate the organisation of the proposed site visits.

18. The second day of the Regional Steering Committee ended at 17.00 hrs with a vote of thanks from each Country.

ATTENDANCE LIST

Name	Designation	Organisation
Mr. S. Springett	UNDP RR & UN RC	UNDP Mauritius & Seychelles
Mrs. Akiko Yamamoto	Regional Technical Advisor on International Waters	UNDP GEF
Mr. Satyajeet Ramchurn	Head of Environment Unit	UNDP Mauritius
Mr. Roland Alcindor	Programme Manager	UNDP Seychelles
Dr. Sarah Frias-Torres	Team Leader – AFB Coral Restoration Project	AFB Coral Restoration Project
Ms Annouchka Ramcharrun	Project Assistant (Secretary)	UNDP Mauritius
Ms. Emilie Wiehe	Community Development Specialist – Mauritius	AFB Coral Restoration Project
Ms. Elke Talma	Community Development Specialist – Seychelles	AFB Coral Restoration Project
Mr. Jude Bijoux	Technical Assistant	UNEP-EBA project
Mrs. Lyndy Bastienne	National Coordinator	GEF SGP Seychelles
Mr. Satish Khadun	Divisional Scientific Officer	Ministry of Ocean Economy, Marine Resources, Fisheries and Shipping
Mr. Suraj Bacha Gian	Research Scientist	Mauritius Oceanography Institute
Mr. Fabiani Appavou	Analyst	Ministry of Finance & Economic Development
Mr. Nirmal Shah	Founder and Chief Executive Officer	Nature Seychelles
Mrs. Kerstin Henri	Director	Nature Seychelles
Mrs. Ashley Dias	Conservation Officer	Ministry of Environment (Seychelles)
Mr Alain de Comarmond	Secrétaire Principal	Ministry of Environment - Seychelles
Ms Isabelle Ravinia		Seychelles National Parks Authority
Mr Savinien Leblond	CICP	MCSS
Mr Ben Taylor	Marine Educator	Wise Oceans



Third Regional Steering Committee

AFB Project Formulation Grant –
Restoring marine ecosystem services by rehabilitating coral reefs
to meet a changing climate future



Care House, Mahe, Seychelles

Day 1 - 20 June 2017

	TIME	TOPIC	FACILITATORS
1	09:00 – 09 30	Registration	UNDP Seychelles
2	09 30 – 09 45	Opening remarks - UNDP Resident Representative, Representative of the Designated Authority from the Government of Seychelles Representative of the Designated Authority from the Government of Mauritius	
3	09:45 – 09 55	Objectives, Agenda of Regional Steering Committee, timeline of Project Formulation	S Ramchurn, UNDP Mauritius
4	09:55 – 10:45	Status of Proposal preparation and work accomplished since the Second Steering Committee Proposed outcomes. Outputs	Sarah Frias Torres, International Consultant
	10:45 – 11:00	Tea Break	
5	11:00 – 11:30	Presentation of Community Consultations in Mauritius – Gender and Youth Assessment, the proposed Gender/Community Action Plan (This session is linked to Part II Sections C & I)	E Wiehe
6	11 30 – 12 00	Proposed project alignment with the AF Results Framework. (This session is linked to Part III Section F)	Sarah Frias Torres
	12:00 - 13:00	Lunch	
7	13 00 – 13 30	Presentation of Community Consultations in Seychelles – Gender and Youth Assessment, the proposed Gender/Community Action Plan (This session is linked to Part II Sections C & I)	E Talma
8	13 30 – 13 45	Guidance on expectations on the working session	Sarah Frias Torres
9	13 45 – 15 15	Working group session – each group to go through the proposed Results Framework, verify the proposed text, fill in info gaps, and propose how sustainability will be ensured for each Outcome beyond the project. (This session is linked to Part III Section E, and Part II Section K: Sustainability, and Group 3 on Part III Section C)	Group 1 (on Comp 1) – Mauritius & SR Group 2 (on Comp 2) - Seychelles & RA Sarah roaming as a resource person
	15 15 - 15 30	Tea Break	
10	15 30 – 16 30	Presentation of Results Framework: Comp 1 and Sustainability Plan	Mauritius
11	16 30– 17 30	Presentation of Results Framework: Comp 2 and Sustainability Plan	Seychelles
12	17 30 – 18 00	Wrap up of the Day 1	Sarah Frias Torres

Day 2 – 21 June 2017

	TIME	TOPIC	FACILITATORS
13	9 00 – 10 30	Working group on Component 3 Mauritius Working group on Component 3 Seychelles	Sarah Frias Torres Akiko Yamamoto
	10:30 – 10 45	Tea Break	
14	10 45 – 11 30	Debriefing of working groups on Component 3	
15	11 30 – 12 00	Project Budget (Part III Section G)	Sarah Frias Torres, International Consultant
	12:00 - 13:00	Lunch	
16	13 00 – 13 45	Discussion on Full Cost of Adaptation reasoning and Project Justification (Part II Section J)	
17	13 45 – 14 15	SESP and proposed Social and Environmental Risk Management (Part III Section C)	Emilie/Elke
18	14 15– 15 30	Project Implementation Arrangement at national and regional level - proposed NIEs, potential partners (Responsible Parties), Project Governance Structure (Part III Section A)	Roland Alcindor, UNDP Seychelles
	15 30 – 15 45	Tea Break	
19	15 45 – 16 15	Monitoring and Evaluation (Part III Section D)	Satyajeet Ramchurn
20	16 15- 16 45	Way forward <ul style="list-style-type: none"> • Roadmap for AF submission • Remaining tasks required for UNDP approval • Expected next steps 	A Yamamoto
21	16 45 – 17 00	Closing Remark	UNDP RR Government of Seychelles

Required/Expected Actions	By whom	By when
Circulate the draft minutes of the 3 rd PSC meeting to all participants	UNDP	26 June
Submission of the Results Framework, the Full Cost of Adaptation Reasoning to UNDP and stakeholders	Sarah	28 June
Comments sent to Sarah	ALL	4 July
Submission of the revised proposal to UNDP and stakeholders for review and comments	Sarah	18 July
Comments sent to Sarah	ALL	24 July
Submission of the revised proposal to UNDP, incorporating comments	Sarah	27 July
Submission of the proposal to HQ for review and clearance	Akiko/Feven/Satyaj eet	1 August
Formal submission of the Proposal to AF Sec	UNDP HQ	7 August
Appraisal and Approval of the Proposal	AFB at the 30 th Board meeting	10-13 Oct
Submit the first draft Prodoc and SESP in the UNDP format to UNDP and stakeholders for review and comments	Sarah/ Annouchka	21 August?
Comments sent to Sarah	ALL	28 August?
Submit the revised draft Prodoc with all required annexes to UNDP and stakeholders	Sarah	4 Sept?
Circulate the revised Prodocs to stakeholders	UNDP	11 Sept?
PSC will meet to appraise and approve the prodocs - Local Project Appraisal Committee (LPAC) meeting	ALL	Oct?
Submission of the Prodocs with LPAC minutes to HQ for financial and technical clearance	Akiko/Feven	Oct
Delegation of Authority Letter is sent from HQ to UNDP Mauritius with the final prodocs	UNDP HQ	
2 prodocs circulated for signature	UNDP Mau	
Signing prodocs!!!	Govts, UNDP	



AFB Project Formulation Grant
Restoring marine ecosystem services by rehabilitating coral reefs
to meet a changing climate future

REPORT ON ALL CONSULTATIONS WITH STAKEHOLDERS
19 MAY 2017

This report provides a detailed analysis of stakeholder consultations related to the project proposal to the Adaptation Fund Board (AFB) for “*Restoring Marine Ecosystem Services by Rehabilitating Coral Reefs to Meet a Changing Climate Future*”. The consultation results shown here will be incorporated into the final project proposal.

The stakeholder consultations were completed during several meetings held in Mauritius and Seychelles and included the following:

In Mauritius

- AFB Regional Steering Committee Workshop, with Mauritius and Seychelles participants, 8th May 2017
- Mauritius Stakeholder Workshop, 9th May 2017
- Meeting with UNDP lead team, 9th May 2017
- Field visit to Blue Bay Marine Park, 10th May 2017
- Meeting with the Mauritius Oceanographic Institute, 11th May 2017
- Meeting with Rodrigues expert, 11th May 2017

In Seychelles

- Seychelles Stakeholder Workshop, 12th May 2017
- Field visits to potential coral donor sites in Praslin 13th-14th May 2017
- Meeting with Nature Seychelles, 15th May 2017
- Meeting with UNDP lead team, 15th May 2017

AFB Regional Steering Committee Workshop, 8th May 2017

Attendees-Mauritius: Ministry of Fisheries, Ministry of Ocean Economy, Mauritius Oceanographic Institute, Albion Fisheries Research Center

Attendees-Seychelles: Nature Seychelles, Seychelles National Parks Authority (SNPA), Ministry of Environment, Energy and Climate Change (MEECC), Marine Conservation Society of Seychelles (MCSS), Wise Oceans

Attendees-International: UNDP, UNDP Consultants (Team Leader, Mauritius Community Specialist and Seychelles Community Specialist).

Activities: The Workshop agenda is shown in Appendix 1. A detailed list of all attendees is included in Appendix 2

Logical Framework for the proposed project proposal

The log-frame shown on pages 11-12 “Expected Outcomes” column of the AFB proposal Concept Note was used to guide the group discussion. Some issues were not answered completely will be completed via email for the final proposal document.

Component 1 (Mauritius) and Component 2 (Seychelles): Enhancement of food security and reduction of risks from natural disasters through the restoration of degraded reefs

Employment establishing and maintaining coral nurseries and transplantation sites

The most important limitation here is that the group assumes the coral reef restoration project is going to generate employment opportunities for the local communities. This should be addressed in detail through the Mauritius and Seychelles stakeholder workshops.

Improved fish catches as reef health improves through the coral reef restoration activities

The fish population must increase where the communities are fishing. But the sites targeted for coral reef restoration in both countries are marine reserves. Therefore, an explanation should be provided at the final proposal on how the coral restoration activities are going to benefit the fishermen.

A solid body of research shows that marine reserves do increase opportunities for fishermen, through the spill-over effect, where the increasing fish numbers move in and out of the marine reserve, and become available for fishermen. However, the increases in fish landings as a result of the marine reserve are detected at least 5 to 10 years after the no take marine reserve is established. It is possible that fishermen will detect increases in biomass due to the coral restoration effort inside marine reserves after and beyond the timeline of project completion. Therefore, additional benchmarks of project success must be presented.

Increased revenue from tourism (glass bottom boat tours, snorkelling and diving trips)

This outcome needs community-based tourism, so the earnings generated through tourism go directly back to the community and not to a hotel consortium alone. The benchmarks to measure progress should be agreed on. For example, biodiversity surveys, recreational SCUBA divers and SCUBA diver satisfaction surveys should display an upward trend.

Coral colonies of appropriate species (resilient, maintaining genetic diversity) available at sufficient scale (quantity, time intervals etc) for transplanting onto degraded reefs.

During this workshop, there was no agreement on scale, number of corals and species that need transplanting. However, it was agreed to follow general guidance on heat tolerant species provided by McClanahan (2017) and species used during the USAID-funded Reef Rescuers project in Seychelles.

Methods (nursery to transplantation)

There was no general consensus on methods. However, a consensus was reached that what has worked so far for each country should be applied. For example, Mauritius has used bottom fixed

table nurseries (4-6 m deep) for small scale restoration (usually 100 corals per nursery) while Seychelles has used mid-ocean floating nurseries anchored at the seabed (18 m anchor depth, corals floating at 8 m below sea surface) for large scale restoration (5,000 corals per nursery for a total of a 40,000 coral stock, Nature Seychelles in Cousin Island).

The issue of how to obtain corals for filling up the nurseries was discussed briefly. Mauritius can obtain corals by fragmentation (asexual reproduction), where fragments are used to fill the ocean nurseries, and by collecting eggs from mass coral spawning events (sexual reproduction) which are then allowed to settle at inland nurseries, and either grow there or eventually moved to ocean nurseries. In contrast, Seychelles does not experience mass coral spawning because at equatorial latitudes, mass spawning is absent. Restoration efforts here have focused on fragmenting corals to fill nurseries. To ensure a large number of corals for restoration, inland nurseries will have to be used to host wild corals and trigger mass spawning by conditioning, then collecting the spawn and allow them to recruit in the inland nursery, including growth phase there, or moving to ocean nurseries for fast growth prior to transplantation.

Component 3 (Mauritius and Seychelles) Knowledge management and sharing, training and sensitization to build regional capacity for sustainable reef restoration

How to fill the knowledge gaps and join resources

Upscale scientific production (papers, conference attendance), training knowledge, wide use of broadcast media and social media

Genetic analysis training

The need for genetic analysis should be clearly articulated. For example, corals that have survived El Niño events are expected to be more heat resistant than those that died. Hence they can become donors for fragmenting and filling nurseries. This approach was done at the USAID-funded large-scale coral reef restoration project led by Nature Seychelles. Most of the restored reef survived the 2014-2016 El Niño.

Genetic analysis of symbionts clades resistant to high water temperatures provides an additional layer of assurance that the corals selected as donors will be more heat tolerant. Therefore, this kind of genetic analysis, and the subsequent training required, can be seen as a priority for the AFB project.

The group also proposed genetic analysis to see how coral reefs in Mauritius and Seychelles are connected through exchange of coral larvae. However, this type of connectivity studies is very time consuming and requires an extensive number of field sites to be analysed. Further, Seychelles coral reef restoration activities targeted for the 5-year AFB project will focus on the granitic islands of the Seychelles Plateau. Coral reefs in this region depend on self-recruitment, as they are effectively cut off from other sources of larvae by the pattern of ocean currents that go around (and not through) the Plateau. The genetic connectivity analysis could be an interesting addition to the project if additional funding, not direct AFB funding, is secured.

AFB Comments to Concept Note

Expand on how the approach taken in Mauritius will be done in synergy with other conservation measures, such as MPAs, which are said to have more potential for contributing to natural reef recovery, provided that some active reef restoration is undertaken at the same time

There was no full consensus on how Mauritius will address this point. However, it was agreed that the coral restoration effort should be implemented in MPAs where there is adequate enforcement.

Include a better description of the business-oriented approach proposed in the two countries, and particularly in Seychelles

A detailed business plan was presented by Nature Seychelles and will be included in the final proposal document

Ensure that, although rated as low, the risks identified during UNDP's Social and Environmental Safeguard Policy screening and requiring further assessment and management, are reflected in the table and other sections provided in the AF proposal template.

Risks will be better identified combining stakeholder input with the Gender & Youth Assessments

Mauritius Stakeholder Workshop, 9th May 2017

Attendees: Reef Conservation, Eco-Sud, VLH, AFRC, AHC, VOM/EMS, Constance Hotels, Atlantis Diving, Hilton Hotels, Shangri-la Hotels, UNDP, UNDP consultants (Team Leader & Mauritius Community Specialist). A detailed list of all attendees is included in Appendix 2.

Activities:

- Introduction of the project by S. Ramchurn, UNDP Mauritius/ Dr. S. Frias Torres, International Consultant
- Summary of Reef Rescuers: large-scale coral reef restoration in Seychelles by Dr. S. Frias Torres, International Consultant
- Summary of past & ongoing coral restoration implemented by NGOs: Reef Conservation, EcoSud and EcoMode Society
- Brainstorming

Brainstorming

The following section shows the questions addressed during the brainstorming session. Questions not answered or in need of more details will be completed via email for inclusion in the final AFB proposal.

Summary of past & ongoing coral restoration implemented by NGOs and other organizations

Reef Conservation

- Started in 2004 and dedicated to the Conservation and restoration of the coastal and marine environment of Mauritius
- Conservation outreach and community involvement with 9 dedicated staff

- Monitoring of coral bleaching and artificial reef structures, crown of thorns population control, identification of endemic species, voluntary marine conservation area program at Roches Noires Lagoon and Anse La Raie Lagoon
- No capacity in coral reef restoration
- Future plans: Development of coral rehabilitation / restoration actions including coral nurseries, coral transplantation on natural and artificial reefs within VMCA

EcoSud

- Started in 2000 and dedicated to the preservation of the natural resources of Mauritius
- Lagon Bleu project started in 2010, focused on community-based coral farming to enhance communities' capacity to contribute to management, conservation and rehabilitation of coral reefs ecosystems in order to improve their resilience for sustainable livelihoods and economic development.
- The Lagon Bleu project includes in-situ coral nurseries fragments (started in 2017) to facilitate the growth and expansion of coral cover in at-risk areas within the lagoon and a Community-based Marine Protected Zone (CMPZ) to help address overharvesting and anthropogenic degradation on marine ecosystems
- A coral transplantation site has not been selected yet
- Conflicts with the local fishing community because they are against the presence branching corals (Acropora), arguing the corals don't allow them access to their fishing grounds
- Disconnect between the importance of corals to provide habitat for the fish the fishermen want, and what the fishermen perceive as a nuisance (the corals)

EcoMode Society – University of Mauritius

- Project: Reef Rehabilitation of the Lagoon of Mauritius– An initiative of Sun Resorts to develop an eco-touristic approach for Climate Change Mitigation
- Aim: to create an in situ coral nursery at Point-aux-Feuilles to mitigate coral reef degradation
- Project still in initial phase; focus in 2010-2016 small scale research projects has been on coral aquaculture, coral recruitment, shipwrecks and measuring primary productivity

Capacity, skills and interests that stakeholders can bring to the project

Reef Conservation

No boat, 3 sets of scuba gear, cameras, surveys, temperature sensors, pH loggers. In need of: resources to build nurseries and transplant process. Team: community involvement, depends on site where nursery is located; people without scuba diving certification in need of training; NGO has existing team of 4 certified SCUBA divers but they can also outsource the work to recreational scuba divers through a volunteer program. Follow up with more detailed resources list via email.

Ecosud

Boat available with boatman and engine; team of 3 certified SCUBA divers, but gear must be rented; camera, and pH meter, but no temperature dataloggers. They have the resources to build nursery and complete transplantation. In need of more divers from the diving centers. Target restoration size is 5,000 coral fragments. Follow up with more detailed resources list via email.

EcoMode Society – University of Mauritius

Their representative left the session before brainstorming started. Follow up with more detailed resources list via email.

National and international expertise needed

Both Reef Conservation and EcoSud need training, for nursery techniques and coral transplantation

Benchmarks and monitoring requirements

Both Reef Conservation and EcoSud have their own coral reef monitoring in place including coral cover, water quality, temperature, salinity, pH, dissolved oxygen, fish counts, coral bleaching and coral diseases. Reef Conservation has a nursery site selected and they are still looking for transplantation site to expand future projects. Ecosud has a nursery site selected and working on it, but they are still looking for a transplantation site.

Knowledge production and communication (scientific papers, dissemination through the media)

Reef Conservation incorporates social media for general projects and it is interested in contributing with scientific papers. They are registered members of the Western Indian Ocean Marine Science Association (WIOMSA) and have presented work at WIOMSA conferences and attended the 2016 International Coral Reef Symposium. If the AFB project brings more funding, they are interested in increasing their scientific production, social media, broadcast media, and outreach.

Ecosud has an ongoing social media campaign, and involves the local community with brochures and pamphlets including an education program for schools. They are interested in producing scientific papers if funding support is available.

Training of trainers

Both Reef Conservation and EcoSud agreed that the best way to approach training needs was through the Training of Trainers scheme, where a selected group of their personnel gets trained in coral reef restoration techniques and they in turn become trainers for future participants within their respective NGOs.

Vulnerable groups and gender considerations

Reef Conservation: Now, the participating community depends on village location and private tour operators; women (40-50 years old), and younger people (20-25 years old); married women usually not involved depending on culture. For future expansion, they want to include the same people building on what experience they have, expand to more activities, trying to have more women included, and other social groups identified as vulnerable in the area where work is to be completed.

EcoSud: Now they involve boat operators, skippers, fishers in region, and they even have female skippers. For future operations they want to expand on what they have.

An added risk, that might affect already vulnerable groups, is the future occurrence of cyclones. The last one was in 1994, so they are now waiting for the big cyclone to occur.

Private sector involvement (hotels) in the coral reef restoration efforts

The hotel representatives were informed that the AFB project will not pay the hotels to do their own coral restoration work but the project will provide trained personnel to guide their restoration work. The actual cost of coral reef restoration within hotel/beach premises will be the responsibility of the hotels and resorts. The hotel representatives and Mauritius hotel association agreed to transfer what was discussed during the workshop to their supervisors.

The potential sponsoring schemes proposed where: several hotels sponsoring one coral garden, or one hotel/resort sponsoring one coral garden.

The hotel representatives listed their expectations for coral reef restoration (sponsoring coral gardens): Get Mauritius back to the status it had in the early 1990s, as an attractive diving destination with corals and colourful reef fish, and make Mauritius in general a more attractive destination to tourists.

An important challenge identified for coral reef restoration to succeed was the legal aspect of it. Many eco-projects have failed due to legal matters, the difficulty to set the project, and the extremely long permitting process due to excess bureaucracy in Mauritius.

Hotels confirmed that their clients are interested in contributing to sustainability and coral reef restoration is a good gateway to incorporate such need. Most hotels present at the workshop either have dedicated dive centers within their premises or have tight collaborations with dive centers. These are resources they can provide to restoring coral gardens. However, hotel staff is in need of training in coral reef restoration, and they have the willingness to learn. The core staff to be trained must be identified, and following the Training of Trainers scheme, they can then become trainers to other staff.

Potential participants also include the tourists themselves. Offering a 1-day dive pack of “coral reef restoration experience” can increase tourist participation and awareness. This approach can act as a positive feedback loop. For example, Blue Bell Travellers reported a 10 % increase among travellers choosing sustainable destinations from 52 % five years ago to 62 % last year.

Site selection for new hotels was also addressed, specially the need to reduce impacts on existing coral reefs, reduce sedimentation, monitoring before, during and after hotel construction.

Additional comments on Mauritius communities

Can Mauritius fishermen be recycled into other jobs? It depends on age, and resources. For example, fishermen trained as boatmen for ecotourism (new opportunities with the restored reef) need special license and boat requirements, insurance and new safety equipment; they are not able to cover the cost of the new job activity unless they receive some form of subsidy.

Younger fishermen with experience are easier to train in new jobs than older fishermen. Younger fishermen also know how to swim (older fishermen do not swim) so they also have the potential to become divers for coral restoration purposes.

There are fishermen that do not want to be trained in other jobs, but the system should provide training opportunities for those who are willing to change profession. Based on previous experiences with marine eco-guide training, even the fishermen who did not want to change jobs proposed to have their children participate in the training, so their children will have a different option in life, as the senior fishermen see there are less and less fish to catch. Therefore, when approaching training opportunities for fishermen, it is important to look at the potential training of different age groups. The use of the word fishermen is accurate for Mauritius, as the only fisherwomen are found in Rodrigues

A general problem in Mauritius is that many people do not know how to swim properly (no statistics were provided at the workshop). The main reason is that people are afraid of sharks that are no longer there. Parts of Mauritius are in danger of sea level rise, and the lack of swimming abilities in the majority of the Mauritius population has reached the level of a national emergency. Part of the actions for adaptation to climate change should include learning how to swim.

Meeting with UNDP lead team, 9th May 2017

This meeting served to compare notes of the AFB Regional Steering Committee meeting, with Mauritius and Seychelles participants, and the Mauritius Stakeholder meeting. It also provided further guidance on how to complete the remaining consultations.

Meeting with the Mauritius Oceanographic Institute (MOI), 11th May 2017

The MOI director was unavailable for interview. During this meeting MOI staff and Albion Fisheries Research Center staff were available. Throughout the meeting, they had several questions about methods and processes applied during the USAID-funded Reef Rescuers project in Seychelles. These questions were explained.

The log-frame shown on pages 11-12 “Expected Outputs” column of the AFB proposal Concept Note was used to guide the interview. Some issues were not answered completely due to the absence of the MOI director and will be completed via email for the final proposal document.

Stakeholder analysis completed and partnership agreements drawn up with private sector and community groups

The Gender and Youth assessment will be completed by the assigned UNDP consultant. The MOI staff clarified the Blue Bay Marine Park, one of the sites selected for coral reef restoration, is managed by the Albion Fisheries Research Center. They might require a Memorandum of Understanding (MOU) with the Ministry of Ocean Economy to define activities and ensure proper disbursement of funds. Further, the unique management structure of the Rodrigues South East Marine Protected Area (SEMPA), the second site for coral reef restoration activities, might require its own MOU.

Business plans in place for sustainable financing and maintenance of restoration initiatives

The business plan for Mauritius is unclear at this point. A number of hotels are interested in participating in coral reef restoration (see previous section on stakeholder meeting).

Fisher/women/youth community groups trained in establishment and maintenance of coral nurseries

Several skill levels are needed in the coral reef restoration activities and the different job profiles must be clearly defined. For example there are non-diving activities that can be done by women and youth. Fishermen can be trained as eco-guides, and also as boatmen for the coral restoration activities.

MOI staff proposed to focus the effort on the communities, for example, having the coral nurseries based at the community level, so the community takes care of growing the corals, and they can sell them to the hotels, so the hotels have corals to restore their coral gardens. This approach will ensure a new income line for communities, but it also requires strong enforcement to make sure communities are not selling wild corals, only corals grown in nurseries. More training is required to set up a regulatory framework.

Coastal communities and public aware of the need for reef restoration and the potential of coral farming as an alternative livelihood

Already covered in the section above. The national radio and television should be involved to increase public awareness of the restoration activities. The Ministry of Tourism should also be involved.

Reports on coral reef status, water quality, and other key environmental and social parameters for potential nursery sites

Baseline data (coral reef status, water quality, environmental data) and maps for the Blue Bay Marine Park in Mauritius and the Rodrigues South East Marine Protected Area (SEMPA) are available. These data and maps provide the baseline to select potential nursery sites. The social parameters will be added based on the reports of the other consultants.

A land-based nursery and 2 or more ocean nurseries established and maintained on a regular basis

The Blue Bay Marine Park (BBMP) in Mauritius and the Rodrigues South East Marine Protected Area (SEMPA) were selected as the sites to host ocean nurseries and restoration reefs. The BBMP has already a nursery site selected inside the reef lagoon with working table nurseries attached to the seabed (see site visits section), but no restoration site has been selected. The SEMPA has no nursery or restoration sites selected.

The land-based nurseries were set up by MOI as an experimental project, and have been dismantled, but they will be built again if the AFB project is funded. The nurseries will be used for coral spawning, post-spawning care and coral recruitment.

Stock of farmed corals available for transplantation

Since the MOI director was unavailable for consultation, it was not possible to agree on a specific target for the stock of farmed corals. The MOI staff has the capability of building ocean

nurseries to hold up to 1,000 corals. The first target to enter the large-scale coral reef restoration threshold is set at 10,000 corals. Building and maintaining 10 nurseries with 1,000 corals each was seen as a possible target, but the exact number needs confirmation from the MOI director.

The MOI staff also requested help in selecting the species to be grown in nurseries based on their hardiness to high water temperatures.

Reports on reef health and diversity, water quality, species diversity and key parameters for all transplantation and control sites

As in the previous section for the nursery sites, some baseline data are available for selecting transplantation and control sites, but a more detailed survey should be completed during Year 1 of the AFB project.

Component 3: Knowledge management and sharing, training and sensitization to build regional capacity for sustainable reef restoration

The MOI staff and Albion Fisheries Research Center staff were unsure how Component 3 could be accomplished. Input from the MOI director is needed. However, all participants agreed that field visits at the nursery and restoration sites in each country are needed to better understand how the different techniques can be adapted to the needs of each site.

Meeting with Rodrigues expert, 11th May 2017

Time limitations did not allow for a field visit to Rodrigues by the UNDP consultant-Team Leader. However, Mr. Azie Jean Lindsay, from Rodrigues, and a past Program Assistant for the Rodrigues South East Marine Protected Area (SEMPA) was available for an interview. An edited version of the interview follows.

The Rodrigues South East Marine Protected Area (SEMPA) is co-managed by the government and the community of Rodrigues. The SEMPA was initiated five years ago as part of a UNDP project. A map of Rodrigues with the different management areas color-coded was developed with the collaboration of the fishermen, private sector and government (The map is available for inclusion in the final AFB proposal). Although the conservation zone is respected with various levels of enforcement, it has extensive degradation and need for restoration. Within the conservation area, fishing is prohibited, but tourist access is possible. Within the multiple-use area, fishermen can use fishing line. The SEMPA is a coral lagoon system, with the start of the fringing reef towards its edges. This should be taken into consideration when planning the coral restoration activities.

The Rodrigues community is highly motivated and receptive to coral reef restoration. Due to the government/community co-management, the community must be involved during Year 1, when the baseline surveys will be used to choose the coral nursery and restoration sites within the SEMPA. Many community members are open to receive SCUBA training and participate in coral restoration activities. They expect restoration activities could generate new income and also bring in more tourism when the coral reef is restored. A potential source of conflict when selecting coral nursery and restoration sites is the octopus fishery. It is illegal to dive (SCUBA or free diving) to catch octopus. When the 10-month octopus fishing season is open, fishermen walk over the lagoon to spear the octopus. Therefore, coral nursery and transplantation site

selection must incorporate octopus fishermen zone use, because corals cannot be grown or transplanted where fishermen are walking.

Seychelles Stakeholder Workshop, 12th May 2017

Attendees: Nature Seychelles, Marine Conservation Society of Seychelles (MCSS), GVI, Wise Oceans, Seychelles National Parks Authority (SNPA), Ministry of Environment, Energy and Climate Change (MEECC), GEF-PCU, UNEP-EBA, UNDP, UNDP consultants (Team Leader & Seychelles Community Specialist). A detailed list of all attendees is included in Appendix 2.

Activities:

Summary of past & ongoing coral restoration implemented by NGOs and other organizations

- Nature Seychelles
- Seychelles National Parks Authority
- Marine Conservation Society of Seychelles
- Wise Oceans

Brainstorming

Capacity, skills, interests that stakeholders can bring to the project

- Nature Seychelles: large scale coral reef restoration experience, land-sea reserve at Cousin Island, marine laboratory in Praslin (in front of Cousin Island) with dive shed, dive gear, boat, land available to build land-based nurseries.
- Maritime Training Center has a SCUBA diving training module and could supply divers
- Use local dive centers for training purposes when SCUBA dive certifications are needed
- University of Seychelles students during their vacation breaks, and as part of their environmental projects
- Cast wider net to find the people needed for the project: Octopus divers can be retrained as SCUBA divers, some GVI volunteers are already SCUBA certified
- MCSS is community based: limitations on SCUBA certified personnel.
- SNPA has personnel limitations and are constrained by the administrative system in place so they cannot recruit anyone; a recruitment procedure must be followed controlled by the Administration. Scientific leaders are scarce: they have some skilled staff but they need new staff to get certified and leaders for the long-term sustainability of the project beyond AFB funding.

Current projects financed and value addition of AFB and sustainable framework

- There is a need for a long-term approach: the Seychelles government must be involved to ensure a long term investment into coral reef restoration. This request was repeated several times throughout the workshop and the government representative did not provide a clear commitment to a long term approach, although several funding schemes were suggested (i.e. SEYCCAT)
- MPAs need finance to implement their activities, including coral reef restoration
- The AFB Project is a Climate Adaptation Project, not just another environmental project. Long-term financial sustainability is only possible with institutional commitment beyond the 5-year project lifetime. Income generating activities should be added back into the

project, including the involvement of the private sector. There is a need to work around constraints institutions might have to ensure the long-term sustainability.

- There was emphasis on the good accountability and sustainability from the financing side, so the project goes on after AFB funds end.
- Potential financing opportunities through SEYCCAT: There will be set themes determined by the Board, and these themes will change with each call for proposals, although some themes might be consistent from one call to another. Therefore, SEYCCAT will not fund coral reef restoration indefinitely. Grants will be 1 year (Small Grants) or 3 years long (Large Grants) but not longer.
- Funding at the Regional level through the Western Indian Ocean Coastal Challenge: this funding scheme is still in its infancy (similar to Micronesia and Caribbean Challenge) in collaboration with Indian Ocean Commission.
- There is a need to show a business case so activities will continue as sustainable income streams
- The Seychelles government must treat coral reefs with the same importance it treats forests (i.e. Valle de Mai) and the government must take responsibility for sustained support to coral reef restoration nation-wide. If the government does not provide reliable long-term support to coral reef restoration then it is critical to seek business activities that will generate income.
- The Seychelles government aims for a 30 % protection of marine resources, which should include coral reefs. There is a financing plan with PCU involvement for MPAs; the proposals are there, but they are still waiting for Government Commitment for financing plans
- A potential venue for financial planning could include adjustments of visitor rates and incomes where the money is allocated to coral reef restoration. This is not a new funding line but a relocation of funds generated from increased visitor/tourist rates and retention of revenue into MPAS, so activities such as coral reef restoration are financed from this relocation of money

Human Resources

- The Principal Secretary for MEECC, Alain Decomarmond insisted in involving the University of Seychelles – Blue Economy Research Institute (UniSey-BERI) in the project, including student and researcher participation
- Current UniSey-BERI resources are limited: they are still recruiting researchers and developing their educational programs, now up to the BSc level, with planned MSc and PhD levels in the future
- Students can use their free time to incorporate into the work activities of the project, related to environmental work and considered part of their on the job training; this scheme would be similar to the work-study programs seen in British and US Universities.
- There is a pool of existing UniSey-BERI students already doing internships with various NGOs; the system is already in place but students must be made aware of the potential opportunities with the AFB coral reef restoration project. However, the project will be water based, and a review is needed to ensure students have the necessary in water training.

- The diversity of groups involved will need different opportunities tailored to the needs and abilities of the different groups. For example, boatmen are needed to operate the coral restoration boats; based on past experience, fishermen from Praslin are a great resource as boatmen but they need a contract (salary), and locating good boatmen requires asking through the community
- Women in the job market are not an issue in Seychelles as in other African countries because equality of opportunities has been reached. However, based on past experience, women were less interested than men in changing jobs. There are even ranger women, and their numbers are set to increase.
- Issues of youth and gender: at the University of Seychelles most students are girls, but at the Maritime Training Center, most students are boys. Then, boys drop without graduating at a higher rate than girls.
- Retraining: based on experience with forest training, currently employed people are willing to be retrained if the retraining will offer them an immediate opportunity of improvement in position or salary or both
- Other potential beneficiaries: the Youth Council could add more people, connecting with young people; they must be aware of the opportunity
- Key indicators for the AFB final proposal: it is critical to identify specific beneficiaries, communities, households, and other community indicators with actual numbers so benefits of the project can be quantified
- Justification to AFB: even within MPAs activities must be identified that can be measured and assessed at the start, middle, and end of project to better quantify benefits going into the community. For example, when quantifying tourism, the umbrella effect must be included: fee rates, boat use, people employed in associated tourism activities, engine parts, gasoline, and other workers related to the tourism effort. A benchmark can be obtained from previous project assessments such as those in Cousin Island. This approach can be built into the project as part of the assessment needed to show impacts
- The need for a holistic reef restoration approach was also suggested, meaning giant clams should be restored in addition to corals. There is a prior successful technique to restore giant clams, *Tridacna maxima* in Seychelles (Frias-Torres 2017), and a giant clam stock is available at the Black Pearl Farm in Praslin Island. However, the giant clams will have to be purchased from the Farm.
- Addition of institutions for Component 3 in Seychelles:
 - Marine Conservation Society of Seychelles (MCSS) has an ongoing small-scale community-based coral reef restoration project and could build on it.
 - GVI is not fully committed to coral reef restoration as it has other priorities but it could be a potential source of divers that need training
 - Wise Oceans can contribute to education and outreach
- Other institutions which currently have no experience in coral reef restoration can provide staff to be trained as part of the capacity building component, for example Island Conservation Society (ICS)
- There was a discussion for a call for proposals, as suggested for the Mauritius project component, where different institutions could propose additional coral restoration projects. However, neither the review system needed to select proposals through such call nor the amount to be earmarked to support the call were indicated.

Meeting with Nature Seychelles, 15th May 2017

This meeting allowed to review the information gathered during the previous workshops (Regional Steering Committee and Mauritius and Seychelles stakeholders) as it related to the Seychelles component of the AFB project.

To keep a consistent structure with the AFB approved Concept Note and within the final proposal and in future communications, it was agreed to reference the original institutional structure listed in the cover page of the Concept Note as follows.

Implementing Entity: UNDP

Executing Entities for Seychelles:

- Ministry of Environment, Energy and Climate Change (MEECC) receives funds from AFB and distributes to the other executing entities
- Nature Seychelles (lead role in the implementation of project activities)
- Seychelles National Parks Authority (SNPA)

Other institutions that will participate in the project are added through Component 3. These institutions include the Marine Conservation Society of Seychelles (MCSS) with an ongoing small-scale community-based coral reef restoration project, and other institutions that could benefit from capacity building.

Due to the mixed government-NGO characteristics of executing entities for the Seychelles project component, Nature Seychelles proposed the need to set up a Memorandum of Understanding (MOU) where the responsibilities and amounts assigned to each entity are clearly explained. The MOU suggestion was explained to UNDP-Seychelles in the final meeting for feedback.

One of the core AFB comments to the Concept Note was the need to further explain the business plan for Seychelles. The business plan was shown during the AFB Regional Steering Committee Workshop by a presentation from Nature Seychelles. This information will be added to the final proposal.

Nature Seychelles, as the executing entity with a lead role in implementing project activities further clarified the selection of coral restoration sites. The selected sites include:

- Cousin Island (a land-sea no take reserve managed by Nature Seychelles) the location of the USAID-funded Reef Rescuers project, with an existing restored reef (25,000 nursery grown corals transplanted), and a nursery site with midwater ocean nurseries
- Curieuse Island (a no take reserve managed by the Seychelles National Parks Authority) with an ongoing small scale coral reef restoration project

Both sites can benefit from use of common nurseries, as Cousin and Curieuse Islands are close enough to be supplied from the Cousin nursery site if needed.

Other sites for coral reef restoration activities can be added through Component 3 with the collaboration of other NGOs (i.e. Marine Conservation Society Seychelles, MCSS).

The mid water floating ocean nurseries at Cousin Island will be filled with fragments from coral survivors of previous El Niño events and with sexual recruits. Nature Seychelles also owns land

next to their marine laboratory in Praslin Island (in front of Cousin Island), to build land-based nurseries using AFB project funds. These nurseries will allow conditioning of corals, trigger mass spawning, and obtain sexual recruits for later seeding of the ocean nurseries.

Meeting with UNDP-Seychelles, 15th May 2017

This meeting involved setting the dates for the upcoming validation workshop in Seychelles. To avoid conflicts with national holidays and other agenda issues, the workshop was set for 20-21 June 2017.

A major concern addressed at this meeting was the inability or lack of interest of representatives from the University of Seychelles/Blue Economy Research Institute (BERI) to participate in the Seychelles stakeholder meeting, or to attend repeated calls for face-to-face interviews. In spite of several requests of Principal Secretary for the Ministry of Environment, Energy and Climate Change (MEECC) Alain Decomarmond to include the University as a main stakeholder in the AFB project, it is unclear at this point how UniSey/BERI can be involved.

Further to UniSey/BERI involvement is the lack of infrastructure for genetic analysis. Component 3-Capacity building identifies the need of Mauritius and Seychelles selected participants to be trained in genetic analysis. Mauritius has laboratory facilities to complete genetic analysis but Seychelles has no facilities, and there is no current UniSey/BERI or Seychelles Government commitment to build such facilities. Therefore, UNDP-Seychelles agreed the best approach would be for Seychelles selected participants to still receive the genetics training but upon return to Seychelles, focus on collecting biological tissue, send the tissue samples to Mauritius and have the genetic analysis completed in the Mauritius facilities.

Unlike the Mauritius component of the AFB project, where all executing entities are part of the government, the Seychelles component has two government entities (MEECC receiving and distributing funds from AFB, and Seychelles National Parks Authority) and one NGO (Nature Seychelles) as executing entities. Therefore, it was agreed that the mixed nature of the executing entities in Seychelles requires the drafting of a Memorandum of Understanding (MOU) where the responsibilities and amounts assigned to each entity are clearly explained.

Field visits

Blue Bay Marine Park (BBMP), Mauritius

This Marine Protected Area has been selected as one site to implement the coral reef restoration project activities in Mauritius. The other site will be located in Rodrigues. A guided field visit was provided by staff from the Mauritius Oceanographic Institute (MOI). BBMP is a reef lagoon system, with freshwater river discharges and fringing red mangroves at one end, and a fully developed lagoon ending at a reef crest throughout the park. The reef crest at the edge of the park is well developed, and does not seem to have suffered erosion of its three-dimensional structure resulting from coral death, which suggests the more exposed side of the Park was not significantly affected by the 1998, 2010 and 2014-2016 El Niño. Therefore, the reef crest is effective at dispersing ocean wave energy, the reef lagoon is protected from major wave swells,

and the beaches do not show signs of erosion. This situation is reversed in Seychelles, where massive coral death from the 1998 El Niño effectively reduced the three dimensional structure of the reef crest. The result in some islands, such as Praslin, is that the reef crest around the island only protects from wave energy during mid to low tides. During high tide, the waves wash over the reef crest and reach the beaches, causing chronic erosion.

The BBMP has an assigned coral nursery site, with three table nurseries currently operational, each holding approximately 75 corals. There are plans to set up more nurseries. A coral restoration site will be selected during year 1 of the AFB project. The table nurseries are anchored at the sandy seabed, about 6 m deep. They are made of galvanized metal and the corals are located at the intersections of length-width crossbars. Due to the shallow depth of the lagoon, this nursery structure is the most appropriate for the characteristics of the site. The water quality allows for good light exposure to the corals (low suspended sediment load). MOI has long-term water quality data of the site, and the data are available for inclusion in the AFB final proposal if needed. A freshwater layer rested on top of the deeper marine layer covering the first 25-50 cm of the sea surface. This was probably the result of recent rains before the field visit. The presence of freshwater suggests the possibility of nutrient transport from the freshwater tributaries on the edge of the lagoon, and enhanced feeding opportunities for the corals growing at the nurseries, when the coral polyps come out at night to feed on plankton. Therefore, the location of the coral nurseries in the lagoon could accelerate coral growth with additional feeding opportunities. The nurseries are located near a shallow water reef. This lagoon reef has a high diversity of coral species, mostly dead, but showing signs of recovery. There is a significant fish fauna associated with the reef. During the visit, parrotfish and surgeonfish were seen feeding on the nurseries, eating the algae and invertebrates stuck to the metal bars. Hence, the fish community is reducing diver time needed to clean the nurseries, a situation that was well documented in the USAID-funded Reef Rescuers project implemented in Seychelles (Frias-Torres et al 2015).

Rodrigues, Mauritius

Time limitations did not allow for a field visit to Rodrigues by the UNDP consultant-Team Leader. An interview with Mr. Azie Jean Lindsay, from Rodrigues, and a past Program Assistant for the Rodrigues South East Marine Protected Area (SEMPA) is provided in this report.

Cousin Island and Curieuse Island, Seychelles

In Seychelles, coral nurseries and restoration sites will be based at Cousin Island (managed by the NGO Nature Seychelles) and Curieuse Island (managed by the Seychelles National Parks Authority). The UNDP consultant-Team Leader led the USAID-funded Reef Rescuers project in Cousin Island, and conducted additional research in Curieuse Island. Therefore, field visits to these sites were not needed. Details about the sites have been published in the scientific literature (Frias-Torres & van de Geer, 2015; Frias-Torres et al, 2015; Montoya-Maya et al, 2016; Frias-Torres, 2017).

Anse Lazio, Praslin, Seychelles

In Seychelles, the mass coral bleaching and death from the 1998 El Niño (up to 97% of corals died in the granitic islands), and recurrent coral death in the 2014-2016 El Niño make the search for healthy coral donor sites a priority for successful coral reef restoration. Ideally, these should

be corals that have survived both El Niño events, because they show resilience and adaptation to high water temperatures as confirmed by scientific studies (Baker 2003, 2004; McClanahan 2017). In addition to the donor coral sites targeted during the USAID-funded Reef Rescuers project (Frias-Torres & van de Geer, 2015; Frias-Torres et al, 2015; Montoya-Maya et al, 2016), a new donor coral site was surveyed during the field visit. This site is located in Anse Lazio, starting on the East side of the beach, and following the contour of the glaciais boulders. Large bommies (isolated submerged reefs) of branching acroporid and pocilloporid corals, and isolated massive corals were found in good condition alternating with dead corals. The depth range was 4-8 m. The Anse Lazio site is a potential donor site that should be considered in the field site assessments planned for Year 1 of the AFB project.

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APPENDIX 1



Second Regional Steering Committee

AFB Project Formulation Grant – Restoring marine ecosystem services by rehabilitating coral reefs to meet a changing climate future

8 May 2017

TIME	TOPIC	RESOURCE PERSONS / FACILITATORS
09:00 – 09 30	Registration	UNDP Mauritius
09 30 – 09 45	Opening remarks - UNDP Resident Representative, Representative of the Designated Authority from the Government of Seychelles Representative of the Designated Authority from the Government of Mauritius	
09:45 – 09 55	Objectives, Agenda of Regional Steering Committee, timeline of Project Formulation	S Ramchurn, UNDP Mauritius
09:55 – 10:45	Comments on Concept Note and Presentation of Proposal Template Format and information requirements	Sarah Frias Torres, International Consultant
10:45 – 11:00	Tea Break	
11:00 – 11:15	Experiences in Coral Restoration/Expectations from the project with reference to the Business approach	Nature Seychelles
11:15 – 11 30	Experiences in Coral Restoration	Jude Bijoux David Rowatt
11:30 - 11 45	Experiences in Coral Restoration//Expectations from the project	Mr S Bachagian, Mauritius Oceanography Institute
11 45 – 12 00	Status of Marine Protected Areas in Mauritius	Ministry of Ocean Economy
12:00 - 13:00	Lunch	
13 00 – 13 30	Initial consultations from the Mauritius Community Development specialist / Brief intro for Seychelles/ Workplan	E Wiehe/E Talma
13 30 – 15 00	Logical Framework for the proposed project proposal	Sarah Frias Torres
15 15 – 15 45	Environmental and Social Management – Risks identified	Akiko Yamamoto
15 45 - 16 15	Tea Break	
16 15- 18 00	Discussion and way forward	
18 30 – 20 00	Cocktail	

APPENDIX 2

This appendix contains a detailed list of attendees for the:

- AFB Regional Steering Committee meeting, with Mauritius and Seychelles participants, 8th May 2017
- Mauritius Stakeholder meeting, 9th May 2017
- Seychelles Stakeholder meeting, 12th May 2017

Meridien - 2017

Second Regional Steering Committee

Restoring marine ecosystem services by rehabilitating coral reefs to meet a changing climate future

Le Meridien Hotel, Balalava

	Name	Designation	Company	Email	Tel	Signature
1	Samanta Haridas	Programme Assistant	GEF SGP UNEP	SamantaH@unep.org	213 5384	
2	Verstik trui	Director	Nature Sey	nature@seychelles.net	271 8350	
3	SUDE BISOUX	Technical ASSISTANT	UNEP-ESA PRO SECT	julien@unep.org	+3248 21111277	
4	Lynedy Bastiene	National Coord.	GEF SGP-UNEP	lynedy.bastien@unep.org	+248 8521896	
5	Aleko Yamamoto	Regional Tech. Advisor	UNEP-GEF	aleko.yamamoto@unep.org	+251.91.250.3316	
6	S. Kradice	P.S.O	Min. of Fisheries	skradice@unep.org	828 0100	
7	E. Talma	Consultant	UNDP	elie.talma@unep.org	259 972	
8	E. Lambert	CEO	SNTRA Sey.	Elm.lambert@unep.org	2722890	
9	A. Dias	Cooperation	Ministry of Environment (SEY)	a.dias@env.gov.sc	2727006	
10	D. Ravary	Director	MCSS	david@mcss.sc	2513671	
11	S. Fairstokes	Part consultant	Smithsonian	SFairstone@unep.org	—	
12	R. Sereau	Director	M/INM	rsereau@unep.org	5918242	
13	A. KRISHNA	MARINE EDUCATOR	WISEOCEANS	KRISHNA@WISEOCEANS.COM	—	
14	S. Sachin GAO	Research Scientist	NOI	spachin@noim.in	2060560	
15	F. Apparov	Analyst	MOFED	Fapparov@unep.org	20127491	
16	E. W. Vire		UNEP/CDS	ecwires@unep.org	52578780	
17	S. Spangest					
18	Paulek Ahoi	VC	GEF SGP UNDP			

Second Regional Steering Committee

Restoring marine ecosystem services by rehabilitating coral reefs to meet a changing climate future

Le Meridien Hotel, Baladava

	Name	Designation	Company	Email	Tel	Signature
1	Dr. Y. Neelband	ARS	MOI	yneelband@moi.intel.mg	2060560	
2	Dr. B. Samur-Nelogy	ARS	"	adamur@moi.intel.mg	"	
3	B. Nussari	RS	MOT	bnussari@moi.intel.mg	"	
4	P. Ramelbandu	RS.	MOI	vanramelbandu@moi.intel.mg	"	
5	N. Ramoanond	Technical Offia.	Ocean Economy	nramoanond@ocean.mg	2384100	
6	N. Saoson	Environment	M/ENVISD	nsaoson@env.mg	59189241	
7	S. Panah	Technical officer	N. Ocean Economy	spanah@ocean.mg	2384100	
8	J. Ramboalle	Scientific Office	N. Ocean Economy	jramboalle@ocean.mg	2384100	
9	S. Kludoro	Programme Assistant	UNDP	skludoro@undp.mg	2075431	
10	K. Bedesoe	Proj. Assistant	"			
11	R. Alendar	Manager	"			
12	P. Ramelbandu	Programme Officer	"			
13						
14						
15						
16						
17						
18						

Consultation with NGOs on Coral Restoration Projects and Opportunities
The Ravenala Attitude
09-May-17

S.N	Name	Company	Tel No.	E-mail Address	Signature
1	Kathy Young	Reef Conservation	262-6775	kyoung@reefconservation.mu	
2	Prasidh K Chumun	Flo-sud	6311994	shashi-chumun@gmail.com	
3	Emmeline Forget	VLH	59420276	emmeline.forget@vlh.mu	
4	Djavad FARKED	Constance Hotel	52566752	eham@constancehotel.com	
5	Ittenique Céline	Reef Conservation	2626775	research@reefconservation.mu	
6	Emilie Wiene	COS	52578780	ecwiene@gmail.com	
7	Vellin Shurtun	Atlantis D.C	54227126	atlantis.vb@atlantisliving.info	
8	Surdy Ramah	AFRC	2384100	sturdyramah@gmail.com	
9	Vineth Emnith	AFRC	2384100	vennith@gmail.com	
10	X. Venkama	AHC	2122966	venkama@ahc.mu	
11	Linley	Hilton	52578780	Linley.marjoline@hilton.com	
12	Anista Buldan-Taullo	Shangri-La	5877294	anista.buldan@shangri-la.com	
13	Sarah Inez Torres	Team Leader			
14	Sameer Khudroo	UNDP			
15	Kamini Beedasee	UNDP			
16	Nadeem Nazmully	WM/EMS	52518870	n.nazmully@womacka.com	
17	Satyajit				
18	Akiko Yamamoto				
19					
20					
21					
22					



ADAPTATION FUND



AFB PROJECT PROPOSAL GRANT: STAKEHOLDER CONSULTATION

SFA TRAINING ROOM · 12th May 2017

NAME	ORGANIZATION	EMAIL/PHONE	SIGNATURE
Chloe Pocos. Schaefer	Ocean Conservation Society Seychelles	chloe-pocos@hotmail.fr 25 00 756	Pocos
Andrew Ginnu John	PCU	2582964	
David Rowat	MCS	david@mcs.sc	
Chris Meson - Parker	AVI	seychelles@avi.sc	
Kerstin Heuer	Nature Se2	nature@seychelles.net	
BEN TAYLOR	WISE OCEANS	Ben@wiseoceans.com 2766 726	
Georgina Beresford	WiseOceans	georgina@wiseoceans.com 2883207	
SUDE BISOUX	UNEP-EBA	judebijoux@gmail.com 2711472	
Frances A Benstrong	A level student. Blue Economy Champion	chessgirl@gnat.com	
DR. Sarah Frias-Torres	SMITHSONIAN INSTITUTION	sfrias@torres@gmail.com	
Elhe Talma	CONSULTANT	elhe.talma@gmail.com	
Preeti Nail	UNDP	preeti.nail@undp.org	
PS Deconard	MEECC		
Savi Leblond	MCS / CIEP	Savi 72011 Savi72011@gmail.com	
Kevin Norman	MEECC	knorman@env.gov.sc	
Isabelle Ravinia	SNPA	iravinia@snpa.gov.sc	
Flavier Tubert	SNPA	flavier.tubert@snpa.gov.sc	

Community Development Plan Mauritius

*In preparation of the proposal submitted to the Adaptation Fund Board:
Restoring Marine Ecosystem Services by Rehabilitating Coral Reefs to Meet a
Changing Climate Future*



Community Development Plan

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1. Introduction

The Community Development Plan was commissioned as part of the development of the proposal “Restoring Marine Ecosystem Services by Rehabilitating Coral Reefs to Meet a Changing Climate Future” submitted by UNDP to the Adaptation Fund Board, for implementation in the Republic of Mauritius and Seychelles. The Community Development Plan aims to:

- Assess how the project will benefit vulnerable groups and coastal communities in general
- Select potential communities to benefit from the project
- Identify community concerns and linkages with UNDP and AFB corporate gender mainstreaming requirements (addressed in the Gender and Youth Assessment)

Community engagement in coral nurseries provides potential opportunities to local stakeholders – NGOs, community members, coastal users - to become key players in ecosystem based adaptation, supporting increased involvement and awareness, local economic development and a skilled workforce for coral reef rehabilitation. Experience in other sites around the world have shown that community based interventions coupled with adequate training can support the co-management and rehabilitation of coral reef resources in a cost-effective way. The success of the community based approach has been said to rely on, amongst others:

- strengthening of community based participants in theoretical as well as hands-on training and education in coral farming
- strengthening preventive management and maintenance of coral farming facilities
- participation and engagement as a means to enable effective behavior change communication and outreach for coastal resource management and
- empowering communities in decision making and problem analysis tools to manage coral reefs in the face of climate change¹

The above objectives are key to meeting the overall project objectives, as the proposed intervention aims to (1) increase food security through the rehabilitation of coral reefs which support fish habitats and encourage the recovery of reef fish communities important to the local community; (2) reduce disaster risks by restoring the protective barrier function provided by coral reefs.

During the Second Steering Committee meeting, three potential sites were earmarked for coral reef rehabilitation namely: Blue Bay Marine Park, Anse La Raie voluntary conservation area, and SEMPA. The sites were further narrowed down to two during the Third Regional Steering Committee meeting due to budgetary constraints and the risks surrounding enforcement in a voluntary conservation area. The following report provides a brief socioeconomic background for each site, the main challenges faced by local communities with a particular emphasis on fisher and vulnerable groups, as well as these communities’ aspirations in relation to the project. These combined with exchanges with Executing Entities as to roles and responsibilities provide the basis for the development of the action plan.

¹ Hernández-Delgado, E et al (2014) Community-Based Coral Reef Rehabilitation in a Changing Climate: Lessons Learned from Hurricanes, Extreme Rainfall, and Changing Land Use Impacts. *Open Journal of Ecology*, 4, 918-944.

2. Methodology

Desk review – a list of major stakeholder groups was drawn up at the onset of the project development phase using existing reports of projects funded on the coastal area and emphasis on women led projects and project integrating youth to inform the subsequent fieldwork. Consideration was also given to local private sector stakeholders.

Key Informant Interviews and Informal Interviews – Interviews were carried out in consideration of coastal villages most likely to benefit from the project and based on the feasibility of coral gardening and farming. These have in turn informed the mapping of stakeholders and provide the basis for the elaboration of the community development plan, the gender and youth assessment and action plan. Discussions and interviews were conducted in: Mahébourg and Blue Bay, Cap Malheureux and Anse-La-Raie, and Balaclava Marine Park, as well as consultation meetings in Rodrigues. A meeting was held with the Association des Hôtelier et Restaurateurs de l'île Maurice (AHRIM). Interviews were also conducted with key non-governmental organizations intervening in coral reef conservation and rehabilitation, namely:

- Reef Conservation
- Eco-Mode Society
- Eco-Sud Lagon Bleu Programme
- Le Barachois Project – Environmental Protection and Conservation Organisation

In Rodrigues, the following organisations were consulted:

- The Commission for Environment, Forestry, Fisheries and Marine Parks (Rodrigues)
- Shoals Rodrigues (NGO)
- Rodrigues Council of Social Services

Canvassing – Canvassing was carried out proposed to ensure that vulnerable and underserved groups would not be left out of the equation. Through key informants, informal interviews were held with village inhabitants and information was gathered in order to include the maximum number of stakeholders as well as underserved and underrepresented groups and stakeholders.

Focus Groups – Focus groups were carried out among community members in the coastal areas of Cap Malheureux and Mahébourg/Blue Bay as well as consultations among key stakeholders in Rodrigues:

- The focus groups have identified processes that already work well and common visions of success for the project and their communities in relation to climate change adaptation
- A SWOT analysis was developed following the focus groups to identify Strengths, Opportunities, Aspirations and Results taking into consideration what each stakeholder group will bring to the project
- Definition of Goals, Objectives and Action Plan: From the above processes, SMART goals and objectives and subsequent action plan were developed based on overall feedback and expectations expressed by stakeholders.
- Partnerships and Roles & Responsibilities: partnerships and roles and responsibilities were defined following input from community members through the

focus groups and through the consultation workshop held on Tuesday 9th May, 2017 with local stakeholders.

- Due to time constraints, community workshops per say were not carried out. Community members in Cap Malheureux and Mahébourg requested that more time be given to sensitize members of their communities in climate change and ecosystem-based adaptation as well as larger environmental issues, in order to gather sufficient support and garner active participation.

3. Background

As a Small Island Developing State, Mauritius is highly dependent on its coastal resources for survival. These very resources are highly threatened by climate change. Most coastal villages historically have been developed as a result of fishing which has been passed on from one generation to the next, with tourism, hotels and bungalow development occurring much later as of the 1970s. In contemporary Mauritius, tourism has replaced fishing as the main coastal economic activity, however fishing has remained very important culturally and economically at village and household levels on the coastal zones.

Coastal fisheries include lagoon and outer reef areas and are the main source of fresh fish supply. It is estimated that there are currently 3,700 fishermen registered with the Ministry of Ocean Economy, Marine Resources, Fisheries and Shipping, using around 1,500 boats and with an annual production of approximately 900 tons. The types of gears used include pole and lines, basket traps, large nets, gill nets and harpoons.

Fisher communities have described as being among the poorest in Mauritius. According to the Report of the Truth and Justice Commission (2010):

“An alarming situation faces this category of workers, and their problems need to be addressed by Authorities. Over the years, the lagoon of Mauritius and its outer reefs have been over-exploited, so much so that, presently, the average catch per fishermen is estimated at 6.4 kg. This represents, on the basis of 180 fishing days, an income of only Rs. 3,000, one of the lowest in the country. The allowance granted to professional fishermen in times of bad weather, and during the close season for net fishers, is far from sufficient for a decent living. This Sector is thus witnessing desertion by the young generation of fishermen.”²

Amateur fishing has been cited by registered fishers in this same report and re-iterated during interviews as an important consideration in addressing overuse of lagoon resources as well as food security concerns. This claim is further supported by Macclanahan et al. (2013) which found that there was an important mismatch between country level statistics and the local realities of dependence on fishing either as a primary or a secondary source of income³.

Amateur fishermen are perceived as individuals who have access to other sources of income yet still decide to fish in the lagoon. Interviews with amateur fishermen in Mahébourg has revealed that for many – though not all – this is their only source of revenue, and often live in very precarious conditions. These negative perceptions of amateur fishermen also

² Truth and Justice Commission “Volume 1: Report of the Truth and Justice Commission”, 2010, 255-260

³ Timothy R Macclanahan, Edward H Allison and Joshua Cinner, “Managing fisheries for human and food security”, *Fish and Fisheries* 16, no1 (2013):8

reflect the dearth of information and data on their activities, impact, as well as their own living conditions: how many are solely dependent upon the marine environment, how many fish as a means of subsistence to complement their meagre incomes in other fields, and how many are more “organized poachers”. This lack of information and data is partly explained by the difficulty for new fishermen to register with the relevant Ministry due to government policies to reduce the impact of artisanal fishing on the lagoon.

Focus group discussions revealed a lack of contact between amateur fishers and government institutions as well as NGOs. Due to the illegal nature of their activity, they revealed that they are not always comfortable in formal discussion forums. Nonetheless, the amateur fishermen interviewed were very eager to take on a more important role in the management of their resources. In some areas such as in Résidences La Chaux (Mahébourg) they had good relations with registered fishermen whereas in others such as Balaclava, registered fishers had very negative perceptions of amateur fishermen. Further in-depth studies on the situation of amateur fishers, their profile and impact on the lagoon is recommended. It is clear that such a study does not fall within the scope of this project. Nonetheless, amateur fishermen could negatively impact the management of the project and could potentially be negatively impacted by it as well. Ways to improve inclusion of amateur fishermen/women are explored in section 3 “Stakeholder engagement”.

Tourism businesses, most importantly hotels, were identified as key project partners in the implementation of the project. Hotels occupy 41.9 km of the 322 km coastline of Mauritius⁴. Tourism employs 45,500 persons representing 8.2% of total employment in 2016. This figure is augmented to 24.3% of total employment when considering jobs indirectly supported by the industry. The direct contribution of travel and tourism to GDP for the same year was estimated at MUR36.0bn (USD1.0bn) representing 8.4% of total GDP⁵. The impact of tourism on the health of reef ecosystems has been important. Tourism was identified as the second most important stressor of back-reefs after sea surface temperature, followed by artisanal fishing⁶.

Hotels have been very keen to engage in coral restoration activities. Their interest is partially driven by the prospect of engaging their clients in restoration activities in order to provide value-addition to the tourism product offered by their establishments. It has been reported that at times, their endeavors were ill-advised for the proposed sites, or the facilities inadequate. In the gradual shift away from artisanal fishing, many youth have turned to tourism jobs, and tourism remains an important alternative for vulnerable groups in coastal areas. The role of hotels in terms of mitigating their impact on the coral reef ecosystem, ensuring the financial sustainability as well as community involvement is key to ensure the long-term sustainability of the project.

The Blue Bay Marine Park Area

The Blue Bay Marine Park has been earmarked as a site for the implementation of the project. The Marine Protected Area’s legal framework came into effect in 1997 first through the National Parks Act of 1993 and was subsequently declared a Marine Park in 2000

⁴ Ministry of Ocean Economy, Marine Resources, Fisheries and Shipping

⁵ World Travel and Tourism Council “Travel and Tourism Impact 2015 Mauritius”, retrieved from <https://www.wttc.org/-/media/files/reports/economic%20impact%20research/countries%202015/mauritius2015.pdf>

⁶ Jennifer Elliott, “Coral reef status in Mauritius: historic trends and recent perturbations” (Phd diss. Northeastern University, 2016), 7-8

through the Fisheries and Marine Resources Act of 1998. Blue Bay consists mostly of a tourist village, with beach bungalows used by Mauritians and some rented out to tourists, a public beach which accommodates a large number of Mauritians on the weekends, approximately 100 boat operators registered in the park carrying out glass bottom visits in the park and other outings - though not all every day - and currently two main hotels directly adjacent to the Park: Shandrani Resort and Spa, a five star hotel, Le Peninsula Bay Resort and Spa, the construction of a new hotel on La Cambuse beach and last, a number of guesthouses in the near vicinity.

Many people who work in and around Blue Bay Marine Park are Mahébourg residents, with an important proportion living in Résidences La Chaux. The latter neighborhood is located directly on the coast and its socio-economic structure is intimately tied to the sea. Résidences La Chaux commonly referred to as “Cité La Chaux” has been designated a pocket of poverty by the National Empowerment Foundation. Other vulnerable areas include Cité EDC in Beau Vallon and Cité Tôle, an extension of Cité La Chaux occupied by squatters for several decades. The latter area counts approximately 30 registered fishermen who operate at fish landing stations in both Mahébourg and Pointe d’Esny, but it has been deemed by villagers that the area counts almost double the number of amateur fishermen. Mahébourg has been designated as a vulnerable coast, with 1442 persons likely to be affected by coastal inundation by 2065⁷. The total number of registered fishermen in Mahébourg including Cité La Chaux and Cité Beau Vallon is 164. The majority (approximately 72% identified in a survey) of registered fishermen in the area are over 50 years old⁸, whereas it has been reported by community members interviewed that the individuals known as “amateur fishers” are youth. Fishermen in the Mahébourg area overall deemed that fishing conditions had degraded over the years, and most described a fish catch decrease; others attributed the degrading conditions to overfishing (15%), illegal fishing activities (11%) and instability in weather and climate (10%)⁹.

There are a number of other coastal villages further north of the Blue Bay Marie Park and the Grand Port Fishing Reserve, the latter which is the closest Marie Protected Area located in proximity to Blue Bay Marine Park. These include Ville Noire, Grand Port, Grand Sable, Bois des Amourettes, Quatre-Soeurs in addition to the Blue Bay area itself. These villages are heavily dependent on the marine environment for their livelihood. The villages north of the Park described above, namely Vieux Grand Port, Grand Sable, Bois des Amourettes have been listed among the most deprived and vulnerable in the country. They rely heavily on fishing and micro-scale farming for subsistence as well as seasonal work and cash from informal labour.

Despite the management measures in place, the over reliance of these communities on coastal resources for fishing and tourism puts pressures on the very resources which they depend on to survive. There is an urgent need to shift some of the pressures put on the lagoon on sustainable livelihoods, and linking coral restoration efforts – a labour intensive endeavor – holds promise as a means to ensure alternative livelihoods, especially for fishermen.

⁷ Japan International Cooperation Agency Kokusai Kogyo Co. Ltd., “Guideline for Climate Change Adaptation Strategy - Coastal Setback” (2016) The Republic Of Mauritius Ministry Of Environment, Sustainable Development, And Disaster And Beach Management

⁸ EPCO “Feasibility study: developing community-based mariculture in the Barachois of Residences la Chaux/Mahebourg: final report” 2016

⁹ Ibid.

The implications of ecosystem-based adaptation measures must thus be considered in the context of these local realities and the intricate ties that these communities hold with the sea and coral reef ecosystem, the links between coastal resource use in the greater Blue Bay and Mahébourg area and the Blue Bay Marine Park.

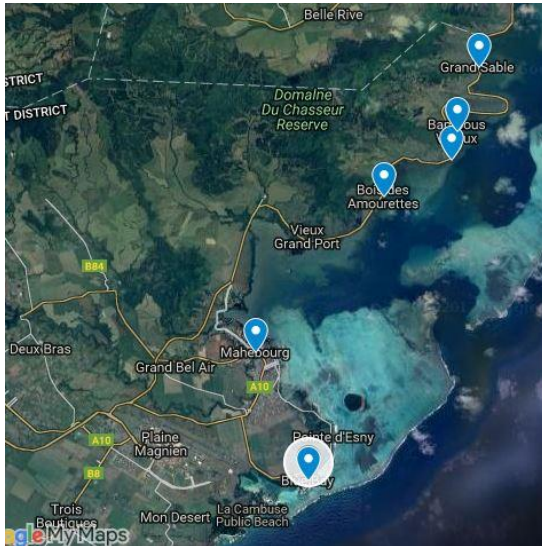


Figure 1 Blue Bay Marine Park and surrounding villages



Figure 2 Blue Bay Marine Park and zoning



Figure 3 Map of Blue Bay Marine Park and targeted neighbourhoods

Marine Protected Areas in Rodrigues: Northern Marine Reserves and South East Marine Protected Area

Rodrigues is a semi-autonomous state in the Republic of Mauritius governed by a Regional Assembly, with a surface area of 108 km², a lagoon area of 300 km, and over 41,000 inhabitants¹⁰. In the Republic's Regional Development Index, Rodrigues was estimated at 0.557 which was on par with the least developed areas of mainland Mauritius¹¹. Tourism, fishing, agriculture, as well as small and medium enterprises are the main sectors of the economy.

Fishing is one of the largest employment sector on the island and is part and parcel of the island's culture, with 13% of the workforce dedicated to this activity, and the same amount engaged in fishing on a casual basis¹². With fisheries in serious decline, fishers have suffered from a loss of income and many have turned to other sources of income to make ends meet¹³ ¹⁴. Rodriguans are much more dependent on their lagoon fishery than in Mauritius, both in terms of employment, cultural practice and protein intake.

In order to tackle this growing problem, the Rodrigues Regional Assembly proclaimed four marine reserves in the northern lagoon: Rivière Banane, Anse-aux-Anglais, Grand Bassin and Passe Demi with locations decided upon after extensive consultations with fishers by Shoals Rodrigues, a local marine conservation NGO established in 2001 and other major stakeholders.

With the support of the project "Partnerships for Marine Protected Areas in Mauritius and Rodrigues" funded by the GEF and implemented by UNDP, the Rodrigues Regional Assembly established the South East Marine Protected Area (SEMPA) in 2009, the largest to date in Mauritius. The MPA developments favoured a co-management framework. At the time of the establishment of SEMPA, fisheries were in overcapacity, with more than 950 fishing within its vicinity, and a high number of unregistered amateur fishermen also operating in the same area. Fishing pressures resulted in chronic habitat destruction and degradation of the reef ecosystem.

In the greater SEMPA region, fishing is a core economic activity and households heavily depend on their catch for their own consumption. A socio-economic survey carried out in 2008 revealed that within the villages surrounding the SEMPA area, 66% of households responded that at least one household member is involved in fishing activities; registered fishers are present in 52% of households. The importance of fishing in the region is further accentuated by local consumption, and a vast majority of respondents of the same survey

¹⁰ <http://www.tourism-rodrigues.mu/discover-rodrigues/geography-climate>

¹¹ S. K. Sobhee, V. Tandrayen-Ragoobur Dr H. Kasseeah Mr A. Gopaul Mr R. Thoplan "Drinking Behaviour in a Small Island Economy: A Gender Perspective", *Journal of Research for Consumers* 30 (2016)

¹² Hardman, E. R., Desiré, M. S., Raffin, J. S. J., Perrine, S. and Gell, F. R "Marine Reserves for Sustainable Fisheries Management in Rodrigues"

¹³ Empowering the SEMPA Fisher Community Through Eco-Tourism Development

https://sgp.undp.org/index.php?option=com_sgpprojects&view=projectdetail&id=14364&Itemid=0

¹⁴ Angelie M. Peterson and Selina M. Stead "Rule breaking and livelihood options in marine protected areas", *Environmental Conservation* 38 no.3 (2011): 342–352

indicated that they consume seafood on a daily basis. Household use was the most important use of their catch, however 60% of households also sell seafood for income. The most important fishery is the octopus fishery; other common fishes caught are ‘Cordonnier’, ‘Capitaine’, ‘Vielle’ and other reef fish¹⁵.

The heavy reliance on marine resources for these coastal livelihoods renders these coastal communities very vulnerable the impacts of climate change. During ecological monitoring carried out between 2009 and 2011, patchy coral bleaching was observed both inside and outside SEMPA, corresponding with higher seawater temperatures at the time.¹⁶ In 2016, the worst coral bleaching event was observed, with an average dead coral cover due to bleaching estimated at 51.40% and a remaining mean live coral cover of only 15.63%. Live coral cover has decreased from >35% in 2010 to 15% in 2016¹⁷. Strengthening MPA management measures and using an ecosystem based approach to adaptation is a high priority for Rodrigues.

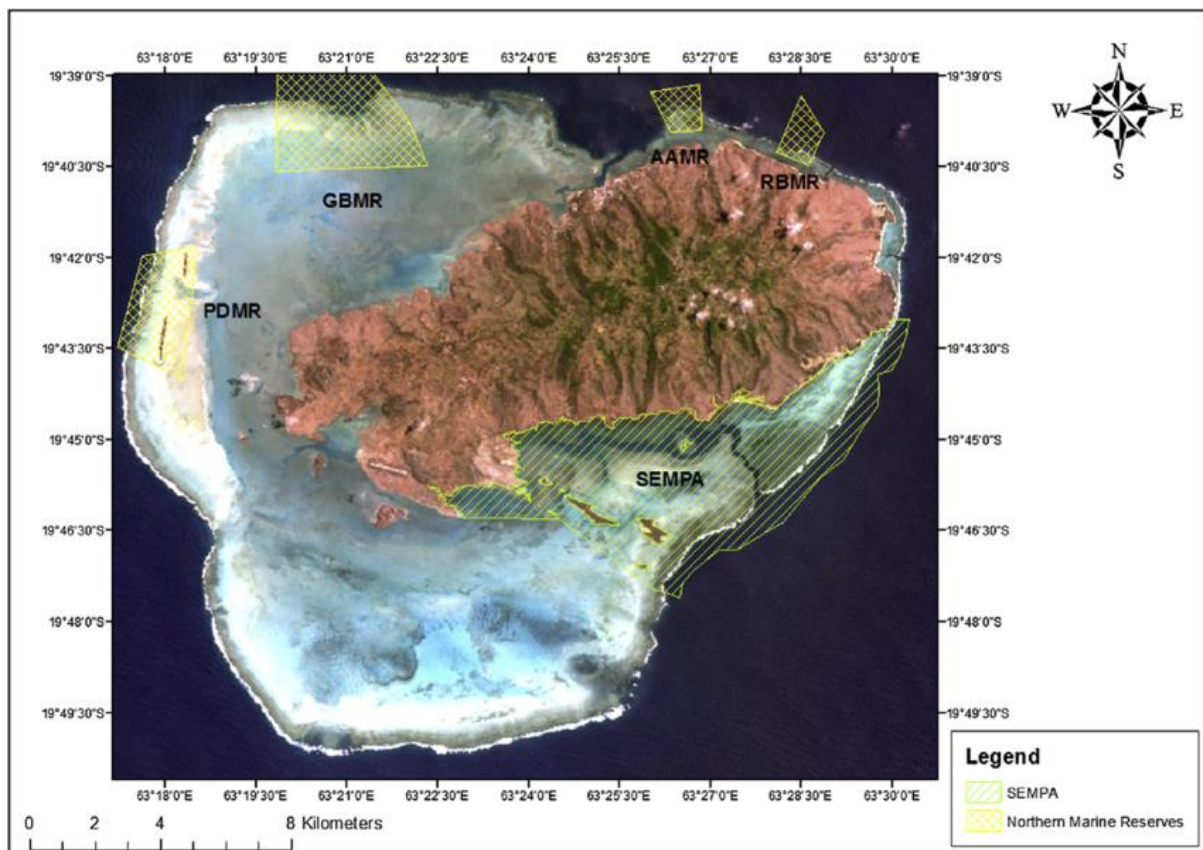


Figure 4 Marine Protected Areas in Rodrigues

¹⁵ Professor Selina Stead Angelie Peterson Dr Aileen Mill Professor Steve Rushton “Analysis of the 2008 Socioeconomic Baseline Survey of the South East Marine Protected Area in Rodrigues” University of Newcastle (2010)

¹⁶ Final Report of the Ecological Survey and GIS Team – Partnerships for Marine Protected Areas in Mauritius and Rodrigues

¹⁷ Rebecca Klaus, Jovani Raffin, Emily Hardman, Runolph Raffaut “Assessing the impact of the coral bleaching event on Rodrigues (Republic of Mauritius) in 2016”, prepared by Shoals Rodrigues for the Indian Ocean Commission Biodiversity Project

4. Regulations and Requirements

Both the Adaptation Fund and UNDP require that all projects and programmes be screened for their environmental and social impacts. The social and environmental impacts identified then inform the different project categories.

Stakeholder engagement is a key aspect of project development, and AFB and UNDP require that identification of stakeholders and their involvement shall be carried out as early as possible in the planning and project development phase, with the purpose of building constructive relationship with the stakeholders and mitigating any potential risks in a timely manner.

The Adaptation Fund will disclose the final environmental and social assessment on its website as soon as it is received, and the implementing entities will be responsible for sharing the final assessment to project stakeholders and all project affected people.

UNDP specifies that stakeholder engagement processes should seek to empower stakeholders, particularly marginalized groups, include all relevant views of affected people and other stakeholders into decision-making processes, such as Project goals and design, mitigation measures, the sharing of development benefits and opportunities, and implementation issues.

5. Stakeholder engagement during the project development phase

Following the approval of the concept note by the Adaptation Fund Board, a second phase of stakeholder engagement was undertaken. A list of non-governmental organizations, community groups and stakeholders was drawn up based on reports and personal knowledge of the stakeholders by the consultant.

Meetings and focus groups were held during throughout the month of May 2017 during the elaboration of the full project proposal. The stakeholders consulted included organizations that could contribute to the project as well as community members in the localities adjacent to the sites identified during the Second Steering Committee Meeting held on 8th May 2017.

Organizations/individuals	Location and date
Eco-Mode/University of Mauritius (Nadeem Nazurally, Lecturer and President of Eco-Mode)	University of Mauritius 02/05/2017
Reef Conservation (Kathy Young, Managing Director, Céline Mitermique, Head of Research)	Reef Conservation Office, Pereybere 03/05/2017
Lagon Bleu (Josheena Naggea, Programme Manager)	Lagon Bleu office, Blue Bay 03/05/2017
Community member, Cité La Chaux, Mahébourg	Mahébourg 03/05/2017
AHRIM (Jocelyn Kwok, CEO)	Port-Louis 04/05/2017

Boat operators, fishers and “banyan” of Balaclava (brief meeting/introduction)	Balaclava 05/05/2017
Consultation workshops with Team Leader Dr Frias-Torres	Balaclava 09/05/2017
Site visits and bilateral meetings with Executing Agencies (Team Leader)	Blue Bay and Albion 10/05/2017 and 11/05/2017
Meeting with community members of Cap Malheureux (4 women, 1 man) + 1 representative of Reef Conservation (1 woman)	Cap Malheureux 17/05/2017
Meeting with community members of Cité La Chaux, Mahébourg (amateur fishermen, women and youth part of Le Barachois Project), interview with Project Manager Estelle Deja and Community Facilitator Sandy Monroe (EPCO)	Le Barachois, Cité La Chaux 18/05/2017
Meeting with key informant, Cap Malheureux, Marie Anne Grein (President of Groupement Volontaires Cap Malheureux)	Cap Malheureux 23/05/2017
Focus group with community members and boat operators of Cap Malheureux (4 women, 7 men)	23/05/2017
Focus group with community members of Mahébourg/Cité La Chaux (boat operators, amateur fishers, registered fishers, 5 men, 2 women, 1 NGO representative)	Cité La Chaux 26/05/2017
Rodrigues consultations meeting – multiple stakeholders: <ul style="list-style-type: none"> • Commission for environment, forestry, fisheries and marine parks (Fisheries Research and Training Unit and Environment Unit) • Shoals Rodrigues • Ter Mer Rodriguez • Kitesurfing association • SEMPA • Rodrigues Kitesurfing Association 	Port Mathurin 06/06/2017
Meeting with Rodrigues Council of Social Services	Malabar – Rodrigues 06/06/2017
Meeting with SEMPA Management	Port Sud-Est - Rodrigues 06/06/2017
Meeting with Shoals Rodrigues	Pointe Monier - Rodrigues 07/06/2017
Meeting with R. Jhangeer Khan	Port Mathurin – Rodrigues

	07/06/2017
Meeting with N. Nazurally – University of Mauritius / Eco-Mode Society	University of Mauritius

During each meeting, a brief of the project was provided verbally and the concept note sent through email either prior to or after each meeting. Where possible, photos of different coral nurseries and transplantation sites and projects were also shown in order to provide more insight and clarity with regards to what reef rehabilitation entails and its benefits. Sub lists of local stakeholders, key concerns, strengths, weaknesses, opportunities and threats are detailed for each potential site below.

Responses and follow-up actions

- Some issues raised do not fall within the direct scope of the project. However, there are opportunities to raise some of these concerns as part of the management of the Voluntary Marine Conservation Area with local NGO intervening on the site: Reef Conservation.

5.1 Blue Bay – Mahébourg – Cité La Chaux

Mahébourg, most precisely Cité Résidences La Chaux includes communities living on the coastal area which are heavily tied to the marine environment and fishing. The following stakeholders were identified for the region:

- Three main hotels (Shandrani, Blue Lagoon, Preskil) as well as smaller guesthouses
- Boathouses and dive centres of these hotels
- Registered fishermen (approximately 60 in the zones closest to Blue Bay Marine Park, up to 200 in the wider region)
- Amateur fishermen (50+, of which approximately 20 to 30% are women)
- Ecosud and Lagon Bleu NGOs
- Mauritian Wildlife Foundation (management of Ile-aux-Aigrettes islet wildlife reserve)
- Barachois Project (EPCO)
- Mauritius Commercial Bank Forward Foundation – Cité Tôle social housing project
- Community-based organisations:
 - Mahébourg Espoir (local school for youth who dropped out of the formal school system, ages 13+)
 - Ocean Women (women’s association)
 - Nou Zanfan Cité (led by women, for children’s activities such as outings)
 - Jeuness Ouvrière Chrétienne – youth group
 - Mouvement Bien-Etre Cité La Chaux, provides alternative schooling among other activities
 - Association des Personnes Agées
 - Collectif Eco-Guards
 - I Love Mahébourg
 - La Voix de Mahébourg
 - La Patte Canard (snorkelling and diving lessons for underserved youth)
 - Sailing Club

There are 44 registered fishermen in this particular neighbourhood, but there have been reports of up to 50 amateur fishermen. These amateur fishermen are a diverse group of persons who include:

- Individuals who rely almost exclusively on fishing for their livelihoods (subsistence and cash). They are organized in groups of 6-10 who use boats to go out fishing at night. Since they are not registered, they do not receive any bad weather allowance or grants/loans provided by the government for fishing.
- Individuals who rely on fishing as complementary income or for subsistence. These may include individuals who have seasonal employment, masons, are retired, or unemployed youth
- It was estimated by local amateur fishermen and women that women comprise 30% of this group. These women are mostly gleaners or carry out pole-and-line fishing from the shore.
- A large proportion of these amateur fishermen are also youth who are unemployed.

Strengths	Weaknesses
<ul style="list-style-type: none"> • All those interviewed individually or during focus groups expressed support for the project and its long term benefits • The area in Blue Bay Marine Park is the area where there is most need for coral reef rehabilitation • Coral nurseries in the lagoon facing Mahébourg next to Ile-aux-Aigrette reserve should be considered, as the water circulation is good and there are specific areas where the nursery would not affect fishing or boating activities • Coral reef rehabilitation provides further incentives for coastal users to protect their resources and respect the code of conduct 	<ul style="list-style-type: none"> • There needs to be more time allocated to get the community on board with this project – between 6 months and 1 year of meetings and consultations as well as annex activities which benefit the community will ensure better participation • The opportunity for direct revenue generation besides tourism and visits of the nurseries and transplantation sites by boat operators remains limited: selling coral fragments from community nurseries to hotels or other interested hotels would open the door to more overexploitation of lagoon resources • Due to the nature of the coral rehabilitation effort and the need to have SCUBA certification in order to be employed by such a project, there is little opportunities to engage marginalized groups on a larger scale, and limited direct employment opportunities
Opportunities	Threats
<ul style="list-style-type: none"> • Address other climate change and 	<ul style="list-style-type: none"> • Some amateur fishermen and

<p>lagoon management issues and create more synergy between different stakeholders of the area</p> <ul style="list-style-type: none"> • The project provides an opportunity to raise awareness about climate change, environmental issues at large as well in their respective communities as adaptation measures and solutions to their environmental and ecological problems • More training opportunities including basic trainings on marine ecosystems provided to existing operators as well as marine guides as income generation and alternative livelihoods • The project provides an opportunity for coastal users and stakeholders to address other lagoon management challenges in parallel to the project. Any participatory process in the development of a community-based nursery would provide a channel to address other issues. • Amateur fishermen are interested in having a more important role in the development of the project • The presence of a Community Coordinator/Facilitator would support the community engagement process during project implementation 	<p>community members may not find benefit in the project even if they have much to gain from it and can cause disruption of the project stakeholder engagement process during implementation</p> <ul style="list-style-type: none"> • Conflicts in lagoon use may be further exacerbated by the project (local fish farm contested).
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Other discussion points:

- While there is communication between Marine Park officials and boat operators, the opportunities for meaningful participation in MPA management are limited. Boat operators gave the example of feeding fish at snorkel sites: while they have been told that they should not do this, they are unsure as to why, and would welcome more training, including more on reef ecology as well as climate change issues.
- There is conflict with regards to the existing fish aquaculture project and its plans for expansion. Amateur fishers have noted that this project encroaches on their fishing grounds and the wastes produced from the cages attract commercially important fish that they cannot catch as the fish hide underneath the cages; the wastes produced also are a pollution problem and the presence of the farm attracts large predators.
- Some acropora species (locally referred to as 'Zinzamb') have grown so much that they overtake other corals such as tabular corals, and block boat passage. These types of corals do not attract other commercially important fish. They hope that the coral nurseries will not include these specific species, and if they do, that other

species that can help support the development of habitats for commercially important fish would be supported.

Responses and follow-up actions

- Some issues raised do not fall within the direct scope of the project. However, there are opportunities to raise some of these concerns as part of the management of Blue Bay Marine Park and synergies between Blue Bay MPA management and the AFB project should be created.

5.2 Rodrigues: Rivière Banane Marine Reserve and South East Marine Protected Area

The following stakeholders were identified for Riviere Banane Marine Reserve and South East Marine Protected Area. This is not an exhaustive list and will be added on as the project further develops:

Government stakeholders: the Rodrigues Regional Assembly, the Commission for Environment, Forestry, Fisheries and Marine Parks, the Commission for Tourism, the Commission for Youth, Community Development, Library Services, Archives and Museum.

Non-governmental organizations: Shoals Rodrigues, Ter Mer Rodriguez, the Rodrigues Council of Social Services, Youth Council

Community based organizations: Comité Villageois, Coopérative d’Ecotourisme de SEMPA, Women’s groups.

Fishermen: There are approximately 950 fishermen in the SEMPA region, from the 7 villages located along the SEMPA coastal boundaries

Strengths	Weaknesses
<ul style="list-style-type: none"> • There is good institutional support for the project • High level of collaboration between commissions and NGOs • Co-management frameworks already established which helps the support community involvement and integration in coral restoration activities • 14 Community Resource Observers (fishermen) already trained in coral reef monitoring, swimming and snorkeling – a basis that can serve for further training • There is generally high compliance with the MPA rules. Out of 950 fishers, there are only about 20 who may be disruptive or infringe MPA regulations. • Community engagement has been part of the development process of 	<ul style="list-style-type: none"> • Limited number of qualified/experienced individuals • Limited experience in coral reef rehabilitation and restoration • The opportunity for direct revenue generation besides tourism and visits of the nurseries and transplantation sites by boat operators remains limited: selling coral fragments from community nurseries would open the door to more overexploitation of lagoon resources • Due to the nature of the coral rehabilitation effort and the need to have SCUBA certification in order to be employed by such a project, there is little opportunity to engage marginalized groups on a larger scale, and limited direct

<p>Rodrigues: historically, villagers have been actively involved in the development of their villages, volunteering for infrastructural works (carrying and installing poles for electricity, pipes for water)</p> <ul style="list-style-type: none"> • Coral reef monitoring and research has been carried out since the late 1990s, early 2000s around the island and is well documented and available, providing good basis for further research on coral reef restoration • The Club Mer programme managed by Shoals which teaches youth how to swim and snorkel could also bring 30 youth volunteers over the course of the 5 years (approx 8 per year but some may come back from one year to the next) • A group of 8-10 qualified divers are already designated as being able to participate in the project - these persons work for the Commissions/NGOs and other entities that will collaborate on this project. 	<p>employment opportunities</p>
<p>Opportunities</p>	<p>Threats</p>
<ul style="list-style-type: none"> • Building local capacity in coral reef rehabilitation • Building on previous lessons learned in coastal management and on existing co-management frameworks • Further re-inforce and build capacity of local community stakeholders • During consultations, it was agreed that a group of 5 fishers / community members could receive dive training, among the Community Resource Observers in order to provide support to the project. 	<ul style="list-style-type: none"> • Some amateur fishermen and community members may not find benefit in the project even if they have much to gain from it and can cause disruption of the project stakeholder engagement process during implementation (minimal threat) • Coral diseases present not well recognized

Other discussion points

- In and around SEMPA, there are approximately 20 individuals who are known to have been disruptive and not respect the MPA rules and regulations. There are risks

that these individuals may be reluctant against any new project within the MPA however the risk is considered low.

- The representatives present during the consultations requested further technical assistance for the installation of nurseries, choice of donor corals. As of date, assessments had not yet been carried out by the representatives present as to the exact sites of transplantation, but general areas were discussed.

Responses and follow-up actions

- Both the representatives of the commissions and the NGOs present agreed that the best institution to house the project would be the Commission for Environment, Forestry, Fisheries and Marine Parks and responsibilities then divided among the different Rodrigues Regional Assembly bodies, the non-governmental organizations and the community based organizations. This requires further clarification and approval from the Executing Entities in Mauritius and UNDP Country Office.

4. Project Stakeholders

Stakeholders	Interest of stakeholder in relation to AFB project	Effect of AFB project on interest (+/-)	Importance of stakeholder for success of AFB project 1 = little/no importance, 2 = some importance, 3 = moderate importance, 4 = very important, 5 = critical player	Degree of influence of stakeholder over AFB project 1 = little/no influence, 2 = some influence, 3 = moderate influence, 4 = very influential, 5 = critical player
UNDP Mauritius - Implementing Entity	helping to realize directly the objectives of SDG 14	(+)	4	5
	UNDP's resources/oversight and management during project implementation	(+)		
	facilitate networking with various technical experts	(+)		
	Encouraging south-south cooperation with other islands in the Indian Ocean.	(+)		
Ministry of Ocean Economy, Marine Resources, Fishing and Shipping -	PCU Implementation support	(+)	5	5
	PCU Implementation support	(+)		
	Primary recipient of AFB funds	(+)		

Executing entity	Responsible for disbursing AFB funds to relevant agencies that are part of the Ministry	(+)		
		(+)		
UNDP GEF SGP	Project implementer (Call for Proposals to NGOs through SGP)		4	5
	Technical support and facilitation of networking with local NGOs and community groups (Mauritius and Rodrigues)			
Mauritius Oceanography Institute (Executing Entity)	Lead agency - Para-statal	(+)	5	5
	Project implementer	(+)		
	Technical expertise in reef restoration	(+)		
	Research (e.g. genetic analysis)	(+)		
	Partnerships with AFRC	(+)		
	Collaboration with private sector and NGOs for restoration	(+)		
	Institutional, reasearch and logistic capacity	(+)		
Albion Fisheries Research Centre (Executing Entity)	Project implementer	(+)	5	5
	Existing coral restoration project	(+)		
	scale up coral nursery	(+)		
	Increase reef restoration area in project area	(+)		
	Expand reef restoration outside project area	(+)		
	Experience in coral restoration	(+)		
	Manages Blue Bay and Balaclava MPAs + 9 fishing reserves around Mauritius	(+)		
	Research	(+)		
	Institutional and logistic capacity	(+)		
	Regulate and monitor artisanal fishing	(+)		
University of Mauritius	Engaged in research (Faculty of Ocean Sciences)	(+ / -)	3	3
	Several years experience in coral restoration	(+)		
	Pool of marine biology students who can receive training/volunteer/participate in research	(+)		
	Research that can be plugged into component 3 as add-on	(+)		

	Social scientists if required for further studies of impact of coral restoration on coastal communities	(+)		
	scale up coral nursery	(+)		
	experience with private partnership	(+)		
Reef Conservation	Potential partner/implementer in community-managed nursery on Voluntary Conservation Area site (through SGP CFP)	(+)	2	3
	Implemented first Voluntary Marine Conservation Area (VMCA) in Mauritius (Anse-La-Raie)	(+)		
	Community engagement experience - empowerment of local boat operators	(+)		
	Housed doctoral student during her research on coral restoration/fragments	(+)		
	Research in Anse-La-Raie area (potential designated site for community-managed nursery site)	(+)		
	Coordinator of Eco-Schools programme in Mauritius (local representation of FEE)	(+)		
	Extensive experience in environmental education and awareness (availability of <i>Bis Lamer</i> - an awareness and education interactive bus, production of print education tools, outreach, open days)	(+)		
	Availability of research centre Nauticaz housed in Attitude Hotels resort in Anse-La-Raie	(+)		
	Can participate in ToT (registered with the Mauritius Qualifications Authority) - experience delivering training to local communities and boat operators	(+)		
	Willingness to participate in training activities and interest in coral restoration in VMCA	(+)		
Eco-Sud/Lagon Bleu Programme	Potential partner/implementer in community-managed nursery on Voluntary Conservation Area site (through SGP CFP)	(+)	2	3
	Conservation activities since 1999	(+)		

	Active programme surrounding Blue Bay Marine Park and area since 2010	(+)		
	Research in collaboration with UK universities on coral health in the Pointe d'Esny lagoon (next to BB Marine Park) and in the marine park itself	(+)		
	Extensive experience in environmental education and awareness (organisation of open days, production of education materials)	(+)		
	Pool of volunteers (foreign students who participate in monitoring in Blue Bay Marine Park area)	(+)		
	GEF SGP Funded project for coral restoration in Mahébourg area. Site identification ongoing. Synergy/collaboration with AFB project beneficial	(+)		
	Availability of boat			
	Marine eco-guide training course associated with regional african field guides - (Training over 6 months, first time in 2016)	?		
	Participate in ToT	(+)		
Mauritius Marine Conservation Society	25+ years experience in marine conservation	(+)	2	1
	Research on coral reef health, marine mammals, feasibility of Marine Park on West Coast (Black River Fishing Reserve already exists), Octopus Fishery closure pilot study	(+)		
	Extensive experience in environmental education and outreach, mostly in the western and southern regions	(+)		
Eli-Africa	5 years experience in coral reef restoration (GEF SGP UNDP funded grant in 2009)	(+)	2	1
	Mobilizing of volunteers and youth	(+)		


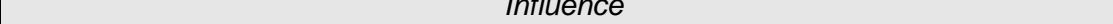
	Sharing of experience and lessons learned and participation in Training/outreach	(+)		
Eco-Mode Society	Potential partner/implementer in community-managed nursery on Voluntary Conservation Area site (through SGP CFP)	(+)	3	3
	Experience in coral restoration 5+ years	(+)		
	Several restoration projects ongoing in collaboration with Sun Resorts, University of Mauritius and other partners	(+)		
	Youth and volunteer engagement	(+)		
	Research (University of Mauritius)	(+)		
AHRIM and associated hotels	Strong interest in coral reef restoration	(+)	3	4
	Some hotel members next to designated sites	(+)		
	Important for long term success and sustainability of project	(+/-)		
	Several initiatives by individual hotels	(+)		
	Interest in increased collaboration and synergy both between hotels and with government institutions, NGOs and international funders	(+)		
	Initiatives already taken by hotels	(+/-)		
	Add-on of new nursery sites in addition to project sites as long as they can benefit from technical expertise	(+/-)		
	Some hotels may have marine biologists on staff who may wish to participate in Training/ ToT	(+)		
	CSR as source of finance for community managed nurseries	(+)		
	Not always a lot of synergy between hotels and initiatives in the past	(-)		
Concerned about meeting clients' needs	(+/-)			
Association des Hotels de Charme	Interest in coral reef restoration	(+)	3	3
	Coastal hotels may be close to chosen sites	(+)		
	Potential important partner in terms of CSR	(+)		

	Concerned about meeting clients' needs	(+/-)		
Boat operators	Opportunities to participate in training activities	(+)	4	2
	Pool of potential certified scuba divers (limited)	(+/-)		
	Assist with maintenance of coral nursery and boat rides	(+)		
	Community engagement	(+)		
	Possible complementary livelihood	(+)		
	Stakeholders benefiting most directly from MPAs	(+)		
	Mahébourg in Blue Bay vicinity (168 registered fishermen)			
	Registered fishermen population relatively aging in both sites	(+/-)		
	Can have key role in management of community-based nursery	(+)		
	Can have role in outreach and community participation	(+)		
	Some conflict among fishermen and between fishermen groups of different regions	(-)		
Some conflict between registered fishermen and unregistered fishers	(-)			
Fishermen (registered or otherwise) who depend on the sea for their livelihood	Group of people comprising of: unregistered fishers depending largely on fishing for their livelihoods, pole and line amateur fishers who fish to complement their food source/income, gleaners (Mahébourg: 50+ persons in this group / North to be confirmed)		2	4
	Unregistered fishermen groups are at times more numerous than registered fishermen in area - vulnerable group , no official recognition, not always organised	(-)		
	Potential alternative/complementary livelihood	(+)		
	Some certified scuba divers (in Mahebourg, 2 out of a sample group of 10 identified, certification unclear)	(+)		

	Because of lack of recognition and organization, some might be against/potential for conflict	(-)		
Community groups North	Participation in VMCA management	(+)	3	3
	Participation in training for marine eco-guiding	(+)		
	Participation in sensitization sessions	(+)		
	Key player in community engagement and outreach on project site	(+)		
	Added value for tourists coming to the area	(+)		
	Pool of volunteers for maintenance (non-diving)	(+)		
Community groups South (near Blue Bay/Mahébourg/Gr and Port area)	Overlaps with unregistered fishermen	(+)	3	3
	Community engagement project and lessons learned for crab mariculture and "barachois" restoration site (active participation of members)	(+)		
	Source of income/alternative livelihood	(+)		
	Beneficiaries of training	(+)		
	Pool of volunteers (non-diving)	(+)		
	Some conflict potential, reluctance from community members	(+)		
Mauritius Scuba Diving Association	Indirect beneficiaries	(+)	2	3
	Assist with populating coral nursery	(+)		
	Pool of non-scientific SCUBA divers	(+)		
	Restored dive sites attract fish	(+)		
	increase customer satisfaction	(+)		
	Increase revenues from restored reefs and replace Mauritius as international dive destination	(+)		
	Some anchor damage	(-)		
Mauritius Underwater Group	Interest with regards to dive sites	(+)	2	3
	Knowledge of dive sites needing restoration around Mauritius	(+)		
	Pool of volunteer divers among regular divers (~30)	(+)		
	Platform for outreach to members of the diving community	(+)		
Roches Noires Eco-Marine	Active in community engagement, outreach, local conservation	(+)	1	1
	Pool of volunteers	(+)		

	Not close to selected implementation sites	(-)		
National Women's Council	Can support/facilitate women's integration in project	(+)	2	1
Rodrigues				
Rodrigues Regional Assembly, Commission for Environment, Forestry, Fisheries and Marine Parks	Earmarked funding for coral restoration/coral nurseries in addition to AFB project	(+)	4	4
	Institutional support to implementation of project in Rodrigues	(+)		
	Logistical support to project	(+)		
South-East Marine Protected Area (SEMPA)	MPA Staff and researchers involved in training to set up coral nurseries	(+)	4	4
	Determine transplantation site in Rodrigues	(+)		
Shoals Rodrigues	Conservation programme ongoing since 2001 (environmental education and training, establishment of marine reserves, research)	(+)	3	3
	Boat and research facilities	(+)		
	Can benefit from training/Participate in ToT	(+)		
	Engagement with other stakeholder groups and local communities	(+)		
	Limited number of staff but potential pool of volunteers	(+/-)		
Ter-Mer Rodriguez	Active around SEMPA	(+ / -)	3	3
	Research and outreach work	(+)		
	Work with fishermen	(+)		
	communication tailored to tourist	(+ / -)		
	potential grants from international hotel chains	(+)		
Community groups around SEMPA and Rivière Banane	Cooperative set up for glass-bottom boat touring and eco-guiding around MPA	(+)	3	3
	Active engagement in MPA management, framework can be used for follow-up of coral nursery	(+)		
	Experience with community outreach	(+)		
	Gender balance	(+)		

Importance and influence

<p>Importance</p> 	<p><i>High Importance / low influence stakeholder</i></p> <p>AHRIM/ Association des Hotels de Charme University of Mauritius Mauritius Research Council Coastal community groups (sub lists in each site section) Hotels and resorts near sites Dive centres Conservation non-governmental organizations (Lagon Bleu, Eco-Sud, Reef Conservation, Mauritius Marine Conservation Society, Shoals Rodrigues, Ter-Mer Rodriguez) Hotel boathouses Youth groups Rodrigues Council of Social Services</p>	<p><i>High importance / high influence stakeholder</i></p> <p>Ministry of Ocean Economy, Marine Resources, Fisheries and Shipping Mauritius Oceanography Institute Albion Fisheries Research Centre Blue Bay Marine Park Rodrigues Regional Assembly Commission for Environment, Forestry, Fisheries and Marine Parks (Rodrigues) South East Marine Protected Area Management (Rodrigues)</p>
	<p><i>Low importance / low influence stakeholder</i></p> <p>Village councils Other environmental NGOs National Women’s Council Youth Council</p>	<p><i>Low importance / high influence stakeholder</i></p> <p>Fishermen (registered) Independent boat operators Unregistered and <i>amateur</i> fishermen</p>
<p>Influence</p> 		<p>High</p>
<p>Low</p>		

5. Community engagement and development plan

Community-based approaches have been underlined as an avenue for expansion of coral rehabilitation initiatives and ecosystem based adaptation in the proposal to the Adaptation Fund Board and beyond, through local nurseries implemented in collaboration with government institutions, NGOs and active participation of local communities. A detailed community action plan and budget is provided in **Annex 1**. The main vulnerable groups identified are fishermen and unemployed community members or individuals who work in the informal sectors. The project provides an opportunity to train young fishermen in new skills such as diving which would broaden their employment opportunities, and engage them in the protection and rehabilitation of the marine resources which they depend on.

Development of sustainable partnerships and community-based approaches to coral reef restoration

Following the 3rd Regional Steering Committee Meeting held on June 21, 22nd in Seychelles, roles and responsibilities were clarified for the involvement of local community members and civil society as a whole. The Executing Entities will be responsible for the technical expertise, selection of donor corals, and set up of nurseries. They will also provide support to the NGOs and community members to transplant corals to rehabilitation sites and other requirements as needed. NGOs have an important role to play in the sustainability of the project as many are locally based, know the local stakeholders very well and have an on-going coral reef monitoring programme. This is the case of Lagon Bleu located in Blue Bay near the Marine Park and the case of Shoals in Rodrigues. Through a Call for Proposals, NGOs will be selected and will be required to: work closely with the Executing Entities to implement the community aspect of the project, communicate with and mobilize local stakeholders for the project, identify community beneficiaries of the project, receive training of trainers on coral reef rehabilitation and provide training in turn to community members, and ensure the long-term follow-up of the nursery and rehabilitation sites.

Community mobilization and participation

All local stakeholders consulted have expressed the need to allow for at least 3-6 months for in-depth community participation and mobilization. This will be done to ensure buy in of the larger community, ensure that each participant, particularly youth and amateur fishers coming from vulnerable backgrounds be carefully selected after broad based meetings involving the maximum number of people. These meetings will also help involve all fishers in the selection of nursery sites and ensure that they are not negatively impacted by the project. On the other hand, this will also ensure that the majority of fishermen support the project.

Training and revenue generation for fishers and youth of the selected areas

For community members to participate in the project, they will require training in scuba diving as well as set up of nurseries, maintenance, monitoring and . Many community members are very comfortable underwater and some use scuba gear – even without official certification. These community members are the best placed to receive training through the project, mainly in:

- Dive training: Community members will be trained in at least Advanced Open Water Diver (PADI) level or the equivalent. There are at least two dive centres located close to the Blue Bay MPA which can provide training. In addition, the Mauritius Underwater Group (MUG) provides British Sub Aquatic Club (BSAC) training on a non-commercial basis. Members of MUG have already trained up two youth of the area as Ocean Divers through “La Patte Canard”, a local association focusing on snorkel and dive training, the first level of BSAC which is considered to be equivalent to the second level of PADI. In Rodrigues, there are at least three dive centers that are equipped to provide training. In addition, Shoals Rodrigues team have dive masters on board who can support training of community members.
- Training of trainers of NGO staff on set up of nurseries. This training does not have to be limited to the NGOs operating directly next to the nursery sites; opening the training to all those interested and qualified (MSc or equivalent) will allow the replication of nurseries throughout the island and the building of capacity of local stakeholders.
- Training of community members in coral reef rehabilitation (nursery set up and maintenance, transplantation, monitoring): Once community members have the relevant diving qualifications, they would be able to participate in the set up and maintenance of nurseries. The ultimate responsibility of the installation of nurseries and the collection of donor corals lie with the Executing Entities. However it is proposed to involve community members in these activities as described above.

Research involving university students

At least 30 university students have been involved in pilot coral reef restoration projects up until now. They have participated in the setup, maintenance and monitoring of the nursery sites as well as the transplantation. In order to allow knowledge management to continue beyond the project duration and to build capacity of the Mauritian population, the involvement of University students is key.

Communication and awareness raising

From discussions with NGOs and other community members, it was revealed that collaboration between NGOs for communication campaigns on the ground have been very successful in the past. These collaborations have allowed to streamline the communication messages across the island, develop tools and materials with broad collaboration between authorities and non-governmental organizations and carry out Open Days open to the public on selected sites. Previous successful campaigns carried out by NGOs together include collaboration for communication on MPAs and mobilization for the octopus fishery closure. Other local stakeholders such as scouts and sailing clubs have an important role to play in the communication in their respective communities.

Sustainability of community based approaches and avenues for Mauritius

Community-based coral rehabilitation and restoration has taken many forms. In Mauritius, involvement of local stakeholders, community members and youth has only been undertaken through volunteer mobilization, as was also done in multiple sites around the world. An alternative to volunteer mobilization is to create employment opportunities for local community members and fishers, and developing the commercialization of corals that have been grown in nurseries for sale to hotels in their rehabilitation efforts, as well as to local

aquarium shops. This has shown to be profitable in Madagascar, among others.¹⁸ While this was proposed as an option for Mauritius, most stakeholders disagreed that the country was ready for this. Management measures in place, whether through MPAs or other measures were deemed currently insufficient to counter the risk of illegal activity. Other employment opportunities suggested were focused on further developing eco-tourism activities in relation to coral nursery and transplantation sites.

Hotels and tourism businesses

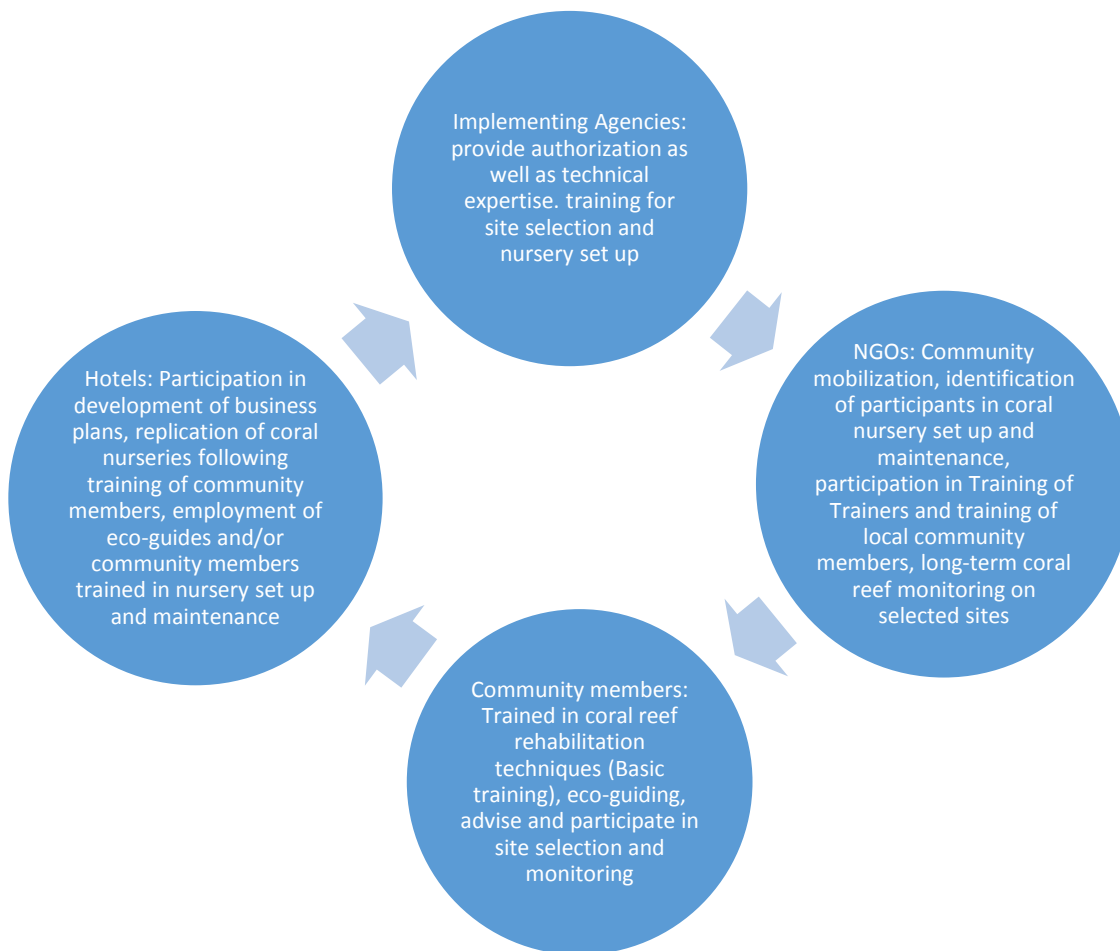
Hotels have expressed that they are very eager to support coral restoration activities. This has been evidenced through a number of initiatives, such as Wise Oceans at Four Seasons Anahita, and projects recently started by Sun Resorts as reported by the stakeholders consulted. Following consultations, a hotel contacted Albion Fisheries Research Centre in order to obtain expertise on coral nurseries and the potential for restoration at Flic-en-Flac. Up until 2016, hotels were able to use their Corporate Social Responsibility funds to support such projects, which has enabled greater collaboration between hotels and NGOs and hotels' implication in marine resource management. The national CSR framework has recently changed, such that focus is being laid on priority development areas such as housing, with a proportion of the 2% earmarked being redirected to the National CSR Foundation for this purpose. While this limits the potential direct financial support of some hotels, their interest remains high as the future of the industry relies on healthy coral reefs. Their implication in site selection, project follow-up as well as employment of vulnerable groups who have been trained through the project in coral nursery set up and maintenance or employment of eco-guides is still considered viable.

Eco-tourism

Three of the NGOs – Reef Conservation, Lagon Bleu and Shoals Rodrigues - consulted have already developed a marine guide course, with two of them certified by the Mauritius Qualifications Authority, with training occurring over a period of three to six months. Eco-guide training not only offers potential for revenue generation and value addition to the tourism products offered by hotels but also offers the opportunity for empowerment of local communities in marine resource management, conservation and climate change adaptation. An effort to recruit members of vulnerable groups, women and youth would further ensure the social sustainability of the project. The implementation of these courses carried out with local CSR funding is recommended as an added value if project budget priorities do not allow for the inclusion of such training costs. The project should nonetheless make provisions for rules and regulations to safeguard the sites from human impacts if eco-tourism is pursued as an income-generating activity.

¹⁸ ildas Georges Boleslas Todinanahary, Thierry Lavitra , Herinjatovo Hardinat Andrifanilo, Nicolas Puccini, Philippe Grosjean, Igor Eeckhaut, *Community-based coral aquaculture in Madagascar: A profitable economic system for a simple rearing technique?* Aquaculture 467 (2017) 225–234

Roles and responsibilities for community-based approach



Project component	Target groups	Actions/Strategy	Indicators and targets	Responsible Party	Timeline	Budget
COMPONENT 1 (MAURITIUS): Enhancement of food security and reduction of risks from natural disasters through the restoration of degraded reefs in Mauritius						
Development of a sustainable partnership and community based approach to reef restoration						\$ 130,000
Outcome 1: Coastal communities benefit from improved livelihoods through: <ul style="list-style-type: none"> • employment establishing and maintaining coral nurseries and transplantation sites; • improved fish catches as reef health improves; 	Fishermen and fisherwomen (registered) in and around Blue Bay Marine Park area, Southeast Marine Protected Area and Riviere Banane Marine Reserve	1.2. According to final stakeholder analysis, identify fisher groups based on selected community-based sites as well as location of coral rehabilitation efforts implemented by the Executing Agency	<u>Baseline:</u> Approximately 60 registered fishermen identified in sites close to projected nursery and transplantation sites <u>Indicator:</u> Stakeholder analysis and meetings lead to successful appropriation of project by local stakeholders. <u>Target:</u> At least 60% of fishermen in selected communities support the project and participate in decision-making at a local level	Project Management Unit (stakeholder analysis), NGOs selected through Call for Proposals	Year 1, month 1-3	N/A
		1.3. Encourage fishers' participation and carry out meetings and workshops with fishermen in villages close to selected coral rehabilitation sites in BBMP and SEMPA/Rivière Banane	<u>Baseline:</u> N/A <u>Indicator:</u> Number of fishers attending meetings (disaggregated by sex and age) <u>Target:</u> At least 60% of fishermen in selected communities support the project and elect a representative to participate in decision-making at a local level	NGOs selected through Call for Proposals	Year 1, month 3-6	\$100/ meeting x at least 3 meetings \$500 per workshop x 2 workshops

Project component	Target groups	Actions/Strategy	Indicators and targets	Responsible Party	Timeline	Budget
		1.4. Engage fishermen in identification of nursery sites and transplantation sites (use of traditional knowledge alongside science), monitoring of fish catches	<u>Baseline:</u> N/A <u>Indicator:</u> Number of fishers participating in identification of nursery and transplantation sites; total number of fishers participating in fish catch monitoring (disaggregated by sex and age) <u>Target:</u> At least 2 fisher representatives elected to help identify sites and participate in monitoring for each site	NGOs selected through Call for Proposals, Albion Fisheries Research Centre	Year 1, month 3-6	\$20/fisherman/day
	Recreational fishers and local coastal resource users	1.5. Identify vulnerable fishermen willing and able to participate in the implementation of the project	<u>Baseline:</u> Approximately 70 amateur fishermen identified in Mauritius during project development phase <u>Indicator:</u> Number of meetings with meeting/workshop objectives set and met; total number of amateur fishers and those willing to participate are confirmed (disaggregated by sex and age) <u>Target:</u> At least 20% of amateur fishers are reached and participate in local-level decision-making	NGOs selected through Call for Proposals	Year 1, month 3-6	N/A

Project component	Target groups	Actions/Strategy	Indicators and targets	Responsible Party	Timeline	Budget
		1.6. Carry out meetings and workshops with fishermen on selection of nursery sites	<p><u>Baseline:</u> Approximately 10% of community members who use fishing for a living in Blue Bay area identified were either interviewed or participated in consultation meetings</p> <p><u>Indicator:</u> Total number of amateur fishers and those willing to participate are confirmed (disaggregated by sex and age)</p> <p><u>Target:</u> At least 20% of amateur fishers are reached and participate in local-level decision-making</p>	NGOs selected through Call for Proposals	Year 1, month 3-6	\$100/ meeting x at least 3 meetings \$500 per workshop x 2 workshops
	Women's groups and community groups	1.7. Engage women through women's groups identified in the stakeholder analysis, identify women to participate in (1) local follow-up of project including identification of nursery sites (2) sensitization campaigns (3) direct participation in the project	<p><u>Baseline:</u> 8 women from local communities reached during project development phase</p> <p><u>Indicator:</u> Total number of women involved in local implementation of project, representatives for women chosen or elected by women's groups</p> <p><u>Target:</u> Increase women's participation to at least 30% of all local decision-making frameworks in relation to the project</p>	NGOs selected through GEF SGP Call for Proposals	Year 1, month 1-3	\$100/meeting; \$300/workshop

Project component	Target groups	Actions/Strategy	Indicators and targets	Responsible Party	Timeline	Budget
	Hotels and tourism business	1.8. According to final stakeholder analysis, identify and engage hotels and tourism businesses through in-kind support (technical expertise for business plans, provision of facilities for meetings, support through boat rides and/or diving equipment, for example) and/or financial support through Corporate Social Responsibility (CSR)	<p><u>Baseline:</u> Hotel associations consulted during bilateral meetings as well as participation of hotels in consultation workshop</p> <p><u>Indicator:</u> Participation of hotels solidified through Memorandum of Understanding</p> <p><u>Target:</u> Major hotel associations sign MoU with Ministry of Ocean Economy; at least 60% of hotels located directly next to the nursery and transplantation sites are consulted and are active participants to the project</p>	NGOs selected through Call for Proposals, Albion Fisheries Research Centre	Year 1, month 1-3	N/A
		1.9. Engage hotels to identify new sources of tourism revenues and relevant marketing strategies in relation to coral reef rehabilitation sites (i.e. eco-tours of the sites)	<p><u>Baseline:</u> N/A</p> <p><u>Indicator:</u> Realistic sources of revenue identified to elaborate business plans and inclusive of vulnerable groups; projected amount of new revenue lines and projected employment opportunities</p> <p><u>Target:</u> Major hotel associations sign MoU; at least 60% of hotels located directly next to the nursery and transplantation sites are consulted and are active participants to the project</p>	NGOs selected through Call for Proposals, Albion Fisheries Research Centre	Year 1, month 3-6	\$1000/workshop

Project component	Target groups	Actions/Strategy	Indicators and targets	Responsible Party	Timeline	Budget
	Boat operators (including independent boat operators, hotel boat houses and dive centres)	1.10. According to final stakeholder analysis, identify boat operators based on selected community-based sites as well as location of coral rehabilitation efforts implemented by the Executing Agency	<p><u>Baseline:</u> Approximately 10 boat operators consulted in villages close to projected nursery and transplantation sites</p> <p><u>Indicator:</u> Stakeholder analysis and meetings lead to successful appropriation of project by local stakeholders.</p> <p><u>Target:</u> At least 60% of fishermen in selected communities support the project and participate in decision-making at a local level</p>	Project Management Unit (stakeholder analysis), NGOs selected through GEF SGP Call for Proposals	Year 1, month 1-3	\$100/meeting; \$300/workshop
	Local community stakeholders	1.11. Set up local management committee composed of representatives of local stakeholder groups to ensure increased dialogue and collaboration between all stakeholder groups (Executing Agency representative, community representative, women's groups' representative, fishermen's representative, village council representative, hotel representative,	<p><u>Baseline:</u> Representatives from most stakeholder groups consulted during project development phase</p> <p><u>Indicator:</u> Number and percentage of women and men (disaggregated by age group and stakeholder group) serving in leadership positions related to the areas of intervention or in the project context; diversity of stakeholder groups represented;</p> <p><u>Target:</u> 100% of all major stakeholder groups represented in local management committee</p>	PMU and Executing Agencies, NGOs selected through Call for Proposals	Year 1, month 3-6	\$2,000/ multi-stakeholder workshop for set up; \$200/meeting x2/year

Project component	Target groups	Actions/Strategy	Indicators and targets	Responsible Party	Timeline	Budget
		NGO representative, amongst others)				
Establishment of coral farming and nursery facilities						800,000
Outcome 2: Coral colonies of appropriate species (resilient, maintaining genetic diversity) available at sufficient scale (quantity, time intervals etc) for transplanting onto degraded reefs	NGOs	2.1 According to final stakeholder analysis, identify NGOs to contact and launch Call for Proposals for community-based coral reef rehabilitation t	<u>Baseline:</u> 5 NGOs / community groups engaged in conservation identified during the project development phase <u>Indicator:</u> NGOs develop successful proposals to act as facilitators and community coordinators in each selected site <u>Target:</u> At least 3 NGOs engaged for community based coral rehabilitation for each selected site	GEF SGP UNDP and/or Project Call for Proposals	Year 1	According to final project proposal - allocation to SGP (\$200,000 mentioned as a figure)
	Fishermen (registered and community members who rely on fishing for their livelihood) boat operators, coastal community members	2.2. Integrate traditional knowledge from communities fishermen/women (registered and amateur) as well as boat operators for selection of donor sites and donor corals particularly for community-based nurseries and transplantation sites	<u>Baseline:</u> Indications of preferences for donor corals <u>Indicator:</u> Number of fishers and other coastal users consulted (disaggregated by sex and age and social group) <u>Target:</u> Views of all stakeholders are integrated inasmuch as this can be supported by science	PMU/Technical Advisor/Executing Agencies + NGOs	Year 1, month 3-6	Boat trips = average of \$100/trip Stipend of \$10/participant per workshop, trip or meeting

Project component	Target groups	Actions/Strategy	Indicators and targets	Responsible Party	Timeline	Budget
		2.3 Integrate views of community members, particularly fishers (both registered and amateur) on nursery site selection and their input taken into consideration particularly for community-based site but also for nurseries in MPAs	<u>Baseline:</u> Indications of different sites for nurseries were given briefly during project consultation phase. <u>Indicator:</u> Number of fishers and other coastal users consulted (disaggregated by sex and age and social group) <u>Target:</u> Views of all stakeholders are integrated inasmuch as this can be supported by science	PMU/Technical Advisor/Executing Agencies + NGOs	Year 1, month 3-6	Boat trips = average of \$100/trip Stipend of \$10/participant per workshop, trip or meeting Nursery costs: \$16,000
		2.4 Train selected fishermen and boat operators in diving (certification PADI or BSAC) and in set up and maintenance of nurseries	<u>Baseline:</u> N/A <u>Indicator:</u> Number of fishers and other coastal users participating and generating revenue from coral reef restoration (disaggregated by sex and age) <u>Target:</u> At least 10 persons trained per site			
	Youth groups, University of Mauritius students, Mauritius Underwater Group volunteer divers	2.4. On selected days, involve local volunteers with adequate diving experience to participate in nursery maintenance	<u>Baseline:</u> Volunteers have participated in past projects in Rodrigues and Trou-aux-Biches <u>Indicator:</u> Number of volunteers (disaggregated by gender and age and social group) <u>Target:</u> At least 20 volunteers participate in maintenance in all project sites (frequency to be determined)	NGOs and University of Mauritius	End of Year 1, Year 2, Year 3, Year 4, Year 5	Boat trips = average of \$100/trip Stipend of \$10/participant for field days
Active restoration of degraded reefs, with maintenance and monitoring of survival						700,000

Project component	Target groups	Actions/Strategy	Indicators and targets	Responsible Party	Timeline	Budget
Outcome 3: Rugosity and structure of reefs restored, leading ultimately to greater protection of shore from flooding and storm damage	NGOs	3.1. NGOs participate in research support coral rehabilitation efforts wherever necessary (Reports on reef health and diversity, water quality, species diversity and key parameters for all transplantation and control sites)	<u>Baseline:</u> 2 NGOs currently carry out coral reef monitoring on selected nursery locations <u>Indicator:</u> Number of NGOs participating in monitoring; contribution of NGOs to project reports <u>Target:</u> At least 2 NGOs carry out long-term monitoring on community based sites	NGOs and Executing Agencies	Year 1 baseline + 2x/year during project cycle	\$15,000/monitoring (all community sites)
	Fishers and other coastal users	3.2. Wherever possible, community members participating in the set up of coral nurseries are trained in monitoring methods	<u>Baseline:</u> N/A <u>Indicator:</u> Number of community members participating in monitoring (disaggregated by sex and age and social group) <u>Target:</u> At least 5 community members from each selected site	NGOs	Year 1 baseline + 2x/year during project cycle	
COMPONENT 3 (SEYCHELLES & MAURITIUS): Knowledge management and sharing, training and sensitization to build regional capacity for sustainable reef restoration.						
Improved understanding and knowledge management of use of reef restoration as an adaptation measure						150,000
restoration are known; cost-effective approaches, constraints and challenges identified and lessons learned documented)	Coastal communities near selected sites	4.1. NGOs collaborate with Ministry to design and implement a communication campaign including local outreach events (Open Days) and related communication materials (print, social media, broadcast media) to disseminate	<u>Baseline:</u> N/A <u>Indicator:</u> Number of community members reached during events and sensitization sessions, social media viewing numbers, number of pamphlets distributed <u>Target:</u> At least 500 individuals reached at each site	NGOs	Year 4 and 5	\$50,000 - \$10,000/site for outreach and events x3 sites, \$20,000 for communication materials (short video, pamphlet, social media)

Project component	Target groups	Actions/Strategy	Indicators and targets	Responsible Party	Timeline	Budget
		information about coral reef rehabilitation, climate change and ecosystem-based adaptation				
Lessons learned regionally and globally on methods and approaches to sustainable reef restoration are disseminated						44835.5
Outcome 5: Improved understanding within the WIO and globally of successful approaches to reef restoration, the constraints and challenges, with lessons learned incorporated into new initiatives	Implementing agencies, NGO representatives, researchers from the region	5.1. Document and share lessons learned of community involvement and business approach in community-based coral reef rehabilitation and climate change adaptation	<u>Baseline:</u> Local community involvement documented only through donor reports and media <u>Indicator:</u> Lessons learned documented; best practices mainstreamed through conference presentations/papers and/or development of Training of Trainers for best practices in Community Based Approaches for Ecosystem Based Adaptation <u>Target:</u> Best practices and recommended approach available to the scientific community and practioners either through published paper, conference presentation or user manual	NGOs	Year 4 and 5	\$ 10,000/assessment for each site (mid term and final) TBC
Training to build capacity for sustainable coral reef restoration						200,000
Outcome 6: Regional capacity developed for coral restoration	NGO representatives, University of Mauritius students	6.1. NGO representatives (marine biologists, research scientists) participate in Training of Trainers in coral reef restoration	<u>Baseline:</u> 3 NGOs have undertaken coral farming projects (2 in Mauritius and 1 in Rodrigues) <u>Indicator:</u> Number of marine biologists and researchers from NGOs and University of Mauritius participating in Training of Trainers (disaggregated by sex and age group)	Executing Agencies	Year 1	\$10,000 travel costs Rodrigues to Mauritius for each training session unless training is feasible in Rodrigues; \$ 7500 dive training

Project component	Target groups	Actions/Strategy	Indicators and targets	Responsible Party	Timeline	Budget
			<u>Target:</u> At least 10 NGO representatives trained			
	Community members	6.2. Community members are selected to participate in upgrading SCUBA certification to be employed on nursery sites (5 community members per community based site)	<u>Baseline:</u> No certification <u>Indicator:</u> Number of community members certified at least Open Water divers <u>Target:</u> At least 15 members trained throughout the Republic of Mauritius	NGOs in collaboration with dive centers	Year 1	
		6.2. Community members participate in Basic Training	<u>Baseline:</u> Community members have been trained on ad-hoc basis in different projects <u>Indicator:</u> Number of community members (disaggregated by gender and age) trained <u>Target:</u> Best practices and recommended approach available to the scientific community and practioners either through published paper, conference presentation or user manual	Implementing Agencies	Year 1	

Costs	# of units	Unit value (in MUR)	Total Cost (in MUR) ³	Total Cost (USD)
1. Human Resources				
Community Based Site Project Coordinator (Marine biologist or equivalent, Msc level, Rescue or Dive Master)	54	35,000	1,890,000	52,500
Project Assistant - Community Outreach Coordinator	54	25,000	1,350,000	37,500
Subtotal Human Resources			3,240,000	90,000
2. Administrative costs				
Overall costs including project management and administrative costs	54	15,000	810,000	22,500
Subtotal administrative costs			810,000	22,500
3. Equipment and supplies				
Nursery equipments and supplies (including maintenance and replacement)	1	576000	576,000	16,000
Diving Equipment (1 full set: regulator, octopus, BCD, tank, mask and fins, wetsuit, weights)	5	70,000	350,000	10,000
Data loggers	4	8,500	34,000	944
Quadrats (to be made)	4	500	2,000	56
Mis survey items	1	10,000	10,000	278
Subtotal Equipment and supplies			972,000	27,278
4. Community mobilization and training				
Community meetings	40	2,500	100,000	2,857
Community training with stipend (20 persons) @ Rs 1000 / participant for 10 days	10	800	8,000	229
Dive instruction - Padi Advanced (7participants)	7	30,000	210,000	6,000
Installation of Nursery with community - stipends - 40 man days x 7 participants	280	800	224,000	6,222
Installation of Nursery with community - boat rental (2 boats)	40	3,500	140,000	4,000
Maintenance of nursery 150 days per year for 4 years - community stipends for 7 participants at 800 rupees per day	600	5,600	3,360,000	96,000
Maintenance of nursery boat costs	150	3,500	525,000	15,000
Transplantation of corals with community - stipends (MUR 800/participant/day x 7 participants x 200 days)	200	5,600	1,120,000	32,000
Transplantation of corals with community - boat rental for 200 days	200	3,500	700,000	19,444
Subtotal Other			4,042,000	181,752
Total			9,064,000	321,530

Community Budget without Nursery equipemnt:

305,530

Gender and Youth Assessment and Action Plan

IN SUPPORT OF THE PROPOSAL SUBMITTED TO THE
ADAPTATION FUND BOARD: RESTORING MARINE ECOSYSTEM
SERVICES BY REHABILITATING CORAL REEFS TO MEET A
CHANGING CLIMATE FUTURE

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Gender and Youth Assessment

I. Introduction

Following the submission and approval by the Adaptation Fund Board in October 2016 of the project “*Restoring marine ecosystem services by rehabilitating coral reefs to meet a changing climate future*” in Mauritius and Seychelles, a project preparation grant was approved and a Gender and Youth Assessment and Action Plan was commissioned to be annexed to the project proposal.

The Executing Entities identified in the Concept Note are:

- Seychelles Ministry of Environment, Energy and Climate Change,
- Nature Seychelles and Seychelles National Parks Authority,
- Mauritius Ministry of Ocean Economy, Marine Resources, Fisheries, Shipping and Outer Island (MOE) including the Mauritius Oceanography Institute (MOI) and the Albion Fisheries Research Centre (AFRC)

The project proposed lays out an ecosystem-based approach to adaptation, using coral reef rehabilitation and restoration as a means to adapt climate change. Mainly, it is based on the premise that coral reef rehabilitation will help increase food security by restoring fish habitats and increasing fish biomass and diversity on degraded reefs, and provide disaster risk reduction by restoring the barrier function provided by coral reefs. The community development plan developed in conjunction with this assessment and action plan aims to facilitate gender and youth mainstreaming and empowerment in the design and implementation of the project.

The following document provides a gender and youth assessment in relation to the aims of the project, identify gaps and potential avenues for more meaningful participation of women, define roles and responsibilities, establish baselines, targets and potential further sources of finance to assist with wider economic development and community development needs. In order to achieve this, a background on key issues concerning gender and youth in Mauritius is provided. A brief gender analysis for coastal resource use was developed to better inform women and youth involvement in coral reef rehabilitation. Last, a review of past studies undertaken in the proposed sites of intervention as well as interviews and focus groups provide the basis for the development of a proposed Gender and Youth Action plan.

II. Methodology

The following assessment provides an overview of major gender and youth issues in Mauritius, identified through secondary sources through a desk review. It is followed by a gender analysis relative to coastal climate change and coastal resource use, as the direct stakeholders of the project are fishers and their families, boat operators and hotel workers.

- **Desk review**
- **Key Informant Interviews and Informal Interviews**
- **Canvassing**
- **Gender Analysis**
- **Focus Groups**

Most of the information provided in this assessment results from a desk review and key informant interviews as well as small focus groups in coastal areas designated as targeted sites for coral reef restoration.

III. Gender Inequality in Mauritius

Over the past few decades, Mauritius has made great strides in closing the gender gap at a national level, but important challenges remain. The country's investment in public education and public health has allowed broad access to individuals in all strata of society. Two of the main areas to tackle for closing gender inequalities are economic and political participation. The following sections provide an overview of the status of Mauritius as a whole in terms of gender equality through human development and gender indices, as well as the sector-specific gender imbalances that exist in education, health, economic participation, political participation and gender-based violence.

Human development and gender indices

Human development and gender indices provide an indication of the relative status of Mauritius in terms of gender inequality in relation to other countries. Mauritius has experienced sustained economic growth over the past few decades, despite a slow-down in recent years reflecting what many refer to as the “middle income gap”¹. This trend is coupled with a solid education and health care system which has translated into a Human Development Index value of 0.781 in 2015, up from 0.779 in 2014, placing it in the high human development category and positioning it at 64 out of 188 countries². The HDI value of the country has been consistently increasing from the time of its measurement in 1990 from 0.620 to 0.781³. When the HDI value is adjusted for inequality, however, it falls 14.4% down to 0.669.

The Human Development Index disaggregated by sex shows slight contrast between male and female. The female HDI is 0.759 and the value is 0.796 for males. This results in a Gender Development Index of 0.954 in 2015.

The Life-Course Gender gap further details the challenges for gender equality across a lifespan using 14 key indicators measured during childhood and adolescence, adulthood and older age, with indicators referring to health, education, labour market and social protection. The Life-Course Gender gap revealed higher scores in indicators for childhood and adolescence, reflecting the generational gap mentioned above. The indicators are ranked in a three-tiered hierarchy. For childhood and adolescence, 4 out of 6 indicators were in the top third, one in the middle third and one in the bottom third. Within the adulthood category, the 6 indicators were split equally between the middle third and bottom third. Finally for older age, Mauritius ranked with one indicator in the top third and one in the bottom third.

The Global Gender Gap Index (GGI) aims to measure relative gaps between women and men across a large set of countries and across four key areas: economic participation and opportunity, educational attainment, health and survival and political empowerment. The equality benchmark is considered to be one with no gap between men and women. The GGI index for Mauritius is 0.652 ranking at 113 out of 144. Within the different indicators, Mauritius

¹ The Economist Intelligence Unit, *Stuck in a Middle-Income Trap*, August 18th, 2015

² UNDP, [Human Development Report 2016 – Mauritius](#).

³ Note: the authors of the report caution to not compare values due to changes in methodology between reports.

pered differently: it ranked at 121 with regards to economic participation and opportunity, 71 for educational attainment, and 116 for political empowerment⁴.

Health

Mauritius has performed relatively well in health indicators with regards to gender. Nonetheless, women remain more vulnerable to health issues than men, with higher percentages of women dying from diabetes – the leading cause of death in Mauritius (27.3% of deaths among women versus 23% of death among men). Diseases specific to women are more numerous and comparatively result in higher death rates than diseases specific to men (breast cancer, cervical cancer, cancer of the uterus and complications of pregnancy and childbirth accounted for 5.1% of death among women while prostate cancer caused 1.5% of deaths among men)⁵. Climate change is expected to cause negative impacts on health and is likely to have a differentiated impact on women and men. For example, coastal saltwater intrusion and water supply contamination may possibly be linked to higher rates of preeclampsia, eclampsia and hypertension among women. ⁶ Increases in life expectancy have been also been consistent, with women having a higher life expectancy than men, although improvements over the years have been more pronounced among males.

Education

On its path towards gender equality, Mauritius has reached in large part its Millennium Development Goal 'Education for All'. However when considering the entire population, overall education attainment has been higher among males than females. Based on the 2011 population census, 92% of women in Mauritius completed their primary education versus 97.45% of men, although the gross enrollment ratio for girls has been higher than for boys in the more recent years. This higher enrollment ratio also carries on to secondary education, with 78% of girls versus 66.6% of boys, and the primary school certificate examinations results as well as the School Certificate and Higher School Certificate pass rates are also higher among girls. In Mauritius, drop-out rates are higher for boys than for girls, while the opposite is found in Rodrigues. This is attributed to a high rate of teenage pregnancies on the island⁷.

The number of persons who have not gone to school at all is also unequal between women and men: 8% of the female population have never been to school versus only 3% for men. At the higher education level, 3.9% of women held a university degree versus 5.6% for men⁸. This is expected to decrease as this percentage does not reflect the current enrollment ratios.

Furthermore, a New National Curriculum Framework has been developed at primary school level which has removed gender stereotypes from teaching materials and efforts are being made to integrate more girls into disciplines that have been traditionally male dominated at the secondary level.

Economic participation

As indicated above, Mauritius particularly lags in gender equality measures when it comes to economic participation, ranking 121 out of 144 countries at a value of 0.550 according to the Global Gender Gap Index. Several gaps in indicators falling under this category can explain

⁴ Ministry of Gender Equality, Child Development And Family Welfare December, Republic of Mauritius "Statistics In Mauritius A Gender Approach". 2015

⁵ Ministry of Gender Equality "Statistics in Mauritius A Gender Approach"

⁶ World Health Organization. [Gender, Climate Change and Health](#)

⁷ Decentralized Cooperation Programme of the European Union, "Study on Gender Analysis in Mauritius", 2016

⁸ Ministry of Gender Equality "Statistics in Mauritius A Gender Approach"

this low number. There is a significant difference in labour force participation, as reflected in the following national statistics: in 2014, only 45.5% of women 16 years and above were active in the economy against 75.2% of men in the same age group. While the wage equality gap was 0.62, the estimated earned income was much lower, with a ratio of 0.43 women to men. A larger proportion of women find themselves at the lower income ranges and the mean income is 25% lower for women as compared to men. Women employed in government services constituted only 34.3%. This income gap partly reflects the gendered division of labour: women tend to predominate lower paid jobs such as domestic work, primary level teaching, nursing, secretarial and clerical posts, and men higher paid professions and decision-making roles⁹.

Political empowerment

Political participation of women in Mauritius remains low. In the Global Gender Gap Index, Mauritius ranks 116 out of 144, at a value of 0.087. The highest levels of decision-making are still dominated by men. At present there are only three female Ministers out of a total of 23. Women occupy 11.4% of parliamentary seats representing 8 seats against 88.6% for men, representing 61 seats out of a total of 69. With regards to local government, legislation introduced in 2012 has mandated quotas of thirty percent of women among candidates of political parties. This has resulted in an increase from 5% to 25% in village councils and from 12% to 35% in municipal councils between 2005 and 2012¹⁰. However, this new legal measure has not guaranteed a full 30% quota outcome and during the latest elections in 2014, the percentage of women in village and municipal councils has decreased. Beyond legislation, the cultural barriers to political participation still have yet to be removed as in many ways are still viewed as a very male-dominated sphere.

Gender-based violence

Although violence against women has been declining slightly over recent years, gender-based violence remains a serious issue and indicator of the work left to be done in terms of achieving gender equality. Nearly 89% of the 1,626 new cases of domestic violence reported in 2015 were women. Physical assault accounted for 24% of cases of domestic violence, verbal assault constituted 12% of cases, threatening assault and harassment both represented 12% of all cases. Unfortunately, studies show that case of gender-based violence are largely unreported due to cultural factors, overarching patriarchal values and fear of stigma and reprisal.

A survey carried out by Gender Links on gender-based violence revealed that gender-based violence is 15 times higher than reported to the Family Support Bureau, rape 11 times higher and sexual violence 61 times higher than reported to the police. Violence and discrimination against LGQTI has also remained an important issue, although largely unreported due to the associated fear of stigma, family rejection and reprisals. Most cases are therefore reported to NGOs.

A number of support services and facilities exist to address this issue: the Family Support Bureau which also provides counselling; access to psychological services; assistance in application of a Protection Order for victims of domestic violence; follow-up of cases. Adult perpetrators of domestic violence are also given counselling, and assistance to victims of

⁹ Ibid.

¹⁰ Jasmina Bihel, Khatimah Fathoni, *Women in Mauritian Politics – Consequences of Women's Increased Representation*, examination paper, Bachelor of Public Administration, p.4

domestic violence is provided in the form of temporary accommodation in shelters. Referral to other institutions is provided when required. These services remain to be reinforced and cultural barriers broken down to ensure a decrease in the number of unreported cases as well as the elimination of discriminatory practices against LGBTQI.

Poverty

The incidence of poverty is higher among people living in female headed households. The incidence of poverty among women increases their exposure to gender-based violence, incest, rape, child prostitution, child trafficking, early pregnancy and they suffer from economic, psychological, emotional, physical and health issues. Female headed households represent 31% of the poor and 15% of the non-poor. Female-headed households living in poverty have increased from 13.2% in 2007 to 18.2% in 2012, while the incidence of poverty affected 8.1% of male-headed households in 2012, against 7.1% in 2007¹¹. Between 2007 and 2012, the absolute poverty level fell from 8.5% to 6.9%, however the relative poverty grew from 9.5 to 9.8% during the same time frame. According to the World Bank, the reduction of absolute poverty might have been twice as important had the growth been better shared and inequality had not worsened. Some measures are currently being put in place by the government, such as the negative tax income in favour of those earning less than MUR 10,000 per month.

IV. Legal and Institutional Frameworks

International legal frameworks: Mauritius has ratified the Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW); the 1997 SADC Declaration on Gender; the 1998 Addendum on the Prevention and Eradication of Violence against Women and Children; is signatory to the African Union Declaration on Gender Equality in 2004; the Commonwealth Plan of Action on Gender Equality 2005-2015 and to the Protocol on the Rights of Women of the African Charter on Human and People's Rights in 2005.¹²

National legal frameworks: There are a number of laws supporting the path towards gender equality in Mauritius. These legal and policy frameworks include the 2008 Equal Opportunities Act which proscribes direct or indirect discrimination in areas such as employment, recruitment, distribution of services and access to education. Both the Employment Rights Act 2008 and the Equal Opportunities act provide provisions against sexual harassment. A National Gender Policy Framework tackles discriminatory policies in a cross-sectoral approach.¹³ A Parliamentary Gender Caucus was set up in late 2016 to ensure that "gender equality issues are addressed, mainstreamed into policies, legislation and parliamentary processes"¹⁴.

Institutions: The Ministry of Gender Equality, Child Development and Family Welfare coordinates all major policies and programmes of the government relating to gender equality

¹¹ Sulla, Victor; Munoz Moreno, Rafael; Da Maia, Carlos Chadreque Penicela; Klapper, Leora; Van Oudheusden, Peter; Guven, Melis U.; Nikitin, Denis; Polodoo, Virendra; Randriankolona, Patrick Leon; Mazza, Jacopo; Heleniak, Timothy E.. 2015. *Mauritius - Inclusiveness of growth and shared prosperity*. Washington, D.C. : World Bank Group. <http://documents.worldbank.org/curated/en/331711468190164152/Mauritius-Inclusiveness-of-growth-and-shared-prosperity>

¹² Government of Mauritius, *The National Gender Policy Framework*

¹³ OECD. Social institutions and gender index. Retrieved from <http://www.genderindex.org/country/mauritius>

¹⁴ Set up of parliamentary caucus reaches final stage. Retrieved from <http://www.govmu.org/English/News/Pages/Setting-up-of-Parliamentary-Gender-Caucus-reaches-final-stages.aspx>

and gender mainstreaming. The National Women's Council plays an important role to support women's organization and facilitate communication between associations and the Ministry.

V. Youth

UNESCO defines youth as young people aged between 15 and 24. However, in Mauritius, following ratification of the African Youth Charter, the country defines youth as persons between the ages of 14 and 35 and intends to change the legislation towards this purpose. The total number of youth in this age range represent 33% of the population, with 33% female and 34% male. The Global Youth Index ranks Mauritius at 69 worldwide¹⁵. A National Youth Policy was renewed in 2016 with main policy areas being informal education, employment and employability, entrepreneurship, wellness and attitudes.

Education

There is a high literacy rate amongst youth, thanks to the free education system provided by the Government. In 2014, literacy rates among youth were as follows: 98.58% of female youth and 96.79% of males were literate¹⁶. A review of the national curriculum and introduction of the Nine Year Schooling Plan is expected to provide a more holistic approach to education and go beyond traditional subjects to ensure the personal development and growth of students. However, the National Youth Policy nonetheless highlights the need for lifelong learning opportunities and appropriate policies to cater for this heterogeneous group¹⁷.

Economic activity and opportunity for youth

Unemployment among youth is high, and a mismatch in skills, training and labour demand has been noted throughout reports and media headlines. The World Bank reports that young people between the ages of 15 and 24 experience substantially worse labour-market outcomes than the rest of the population. Furthermore, younger workers are more vulnerable to labour market fluctuations, and experience a more "volatile pattern of employment". The unemployment rate among youth aged 16-24 rose from 23.1% in 2013 to 25.3% in 2014. Young women's unemployment rate increased from 31.1% to 33.3% while unemployment among men of the same age group increased from 17.7% to 19.7%. Unemployment was reported to increasingly affect youth having completed their secondary education at a rate of 27.9%, and 27.7% for youth with tertiary education¹⁸. Several initiatives have been put in place to address youth unemployment, namely:

- A Skills Working Group, a joint public-private initiative to reduce skills mismatch to labour demand
- The Youth Employment Programme (YEP) which allows youth to be placed in private sector firms for up to one year and renewable in another company for a second year if the recipient was not able to secure a more permanent position. This is carried out with partial subsidies for the government to cover training and salary.
- The Dual Training Programme, another joint public-private initiative to provide a more direct match between labour demand and supply, combining job training and institution-based learning.

¹⁵ Commonwealth Secretariat. *Global Youth Index 2016*.

¹⁶ Commonwealth of Learning. *Mauritius Gender Profile*, 2015.

¹⁷ Ministry of Youth and Sports "National Youth Policy 2016"

¹⁸ Unemployment among youth. Retrieved from <http://leboncoin.nu/2015/03/unemployment-among-youth-pinpointed-by-statistics-mauritius/>

Vulnerable youth

Despite the important budget allocated from the Government towards education and many initiatives taken to retain children and youth in school, many youth have found themselves out of the school system after primary school, after repeated failures to pass the Certificate of Primary Education which has now been phased out. Low pass rates of the CPE have disproportionately affected vulnerable groups and youth of from disadvantaged socio-economic background. This has been an important factor in driving youth to the streets, where they become even more vulnerable to social ills, abuse and enter a cycle of extreme poverty. It is estimated that there are over 6,000 street-connected youth in Mauritius. Among these youth, a proportion of them live along the coast and resort to fishing activities for their subsistence and survival (12%)¹⁹. Street connected children and youth are more likely to be in a situation of conflict with the law. The juvenile delinquency rate in Mauritius was on the rise between 2014 and 2015, rising from 5.8 to 6.1 per 1,000 population.

VI. Vulnerable Groups, Gender, Youth and Climate Change

Climate change does not affect everyone the same way. Geographic situation and economic and social vulnerability make these populations even more vulnerable to climate change impacts. While the discrepancies in impact on women and men found in other Sub-Saharan African countries may not be applied to Mauritius, the following table developed by Gender Links provides an overview of the key areas of concern which may be considered by local authorities here.

Table 1 Gender Dimensions of Climate Change.

Area of Concern	Gender Implications
Food Security	Rising temperatures and challenges in rainfall patterns have direct effect on crop yields. Lower crop yields reduces women's potential income, and the availability of food for household consumption resulting in under-nutrition.
Water	The strengthening El Niño phenomenon is ravaging the region. Provision of water is usually the woman's job, and with less water available for domestic and farm work, it translates to more work for women who have to travel for long distances
Division of Labour	The disadvantaged position of women means greater difficulty in coping with disasters, environmental change and climate variability. Gendered divisions of labour often result in more women represented in agricultural and informal sectors, which are more vulnerable to environmental variability and climate change.
School dropout	Climate change have forced young girls to drop out of school and get involved in child labour, as they seek to make ends meet for their vulnerable families.

¹⁹ MFPWA and Safire, "Study on street children", 2012

Land	Women may suffer disproportionately as policy and programmatic responses to climate change exacerbate their tenure insecurity.
Transport	Women and men contribute differently to climate change. Men are more likely to drive cars, whereas women to a greater degree use public transport public transport.
Health	Women and men suffer different negative health consequences following extreme events like floods, drought and heatwaves. While disasters create hardships for everyone, natural disasters on average kill more women than men, or kill women at a younger age than men. These differences persist in proportion to the severity of disasters, and also depend on the relative socioeconomic status of women in the affected country. This effect is strongest, for example, in countries where women have very low social, economic and political status.
Stress	Stress levels and related diseases may increase for both women and men. Because society expects men to provide for the family, they experience and express stress in different, often more devastating ways than women.

Source: SADC Gender Protocol 2016 Barometer

VII. Coastal Communities, Gender and Climate Change

Coastal communities are even more vulnerable to the effect of climate change, and the gender differentiated impacts of climate change must be considered in this context. Coastal villages depend on the use of marine resources for their livelihoods and survival, and the coral reefs form the basis of the ecosystem services on which they rely. Tourism and associated businesses and operations as well as artisanal fishing are the key sectors deriving economic benefits from coral reefs and their associated ecosystems.

Hotels occupy 41.9 km of the 322 km coastline of Mauritius²⁰. Tourism is considered one of the pillars of the Mauritius economy, employing 45,500 persons representing 8.2% of total employment in 2016. This figure is augmented to 24.3% of total employment when considering jobs indirectly supported by the industry. The direct contribution of travel and tourism to GDP for the same year was estimated at MUR36.0bn (USD1.0bn) representing 8.4% of total GDP²¹.

Artisanal fishing has been a steadfast of coastal villages' culture and socio-economic landscape, providing income and promoting social cohesion, particularly in Rodrigues. Artisanal fishers numbering approximately 3,700 in Mauritius and Rodrigues and their families constitute among the most vulnerable groups of the Republic²². The deterioration of the lagoon resources due to land-based sources of pollution and coastal development with a heavy emphasis on tourism has rendered the communities which depend on these resources more vulnerable to the impacts of climate change.

²⁰ Ministry of Ocean Economy, Marine Resources, Fisheries and Shipping

²¹ World Travel and Tourism Council "Travel and Tourism Impact 2015 Mauritius", retrieved from <https://www.wttc.org/-/media/files/reports/economic%20impact%20research/countries%202015/mauritius2015.pdf>

²² Smartfish Programme for the Implementation of a Regional Strategy for the Eastern And Southern Africa and Indian Ocean Region "Revitalization of Fisheries Research In Mauritius", 2011.

Activity profile in coastal resource use in Mauritius

Traditionally, women and men in coastal villages have relied on fishing as an important economic activity. Coastal fisheries include lagoon and outer reef areas and are the main source of fresh fish supply. It is estimated that there are currently 3,700 fishermen registered with the Ministry of Ocean Economy, Marine Resources, Fisheries and Shipping, using around 1,500 boats and with an annual production of approximately 900 tons. The types of gears used include pole and lines, basket traps, large nets, gill nets and harpoons. The vast majority of registered fisher folks in Mauritius are men, although there are some coastal villages that include registered fisherwomen.

Although most are not at sea on fisher pirogues, women have traditionally been active users of coastal resources through gleaning, including crabs and bivalves which provides complimentary source of food for the household. This activity has been gradually decreasing as resources have been dwindling and economic and social structures as well as cultural habits have changed, but this type of activity remains alive in some areas of the country, particularly in more remote coastal communities with direct access to the sea, such as villages found in the Southeast coast of the island.

Due to environmental degradation and diminishing fish stocks, the policy of the Government of Mauritius in recent decades has been to limit the allocation of registration cards for fishermen. Structural changes in the economy has also meant that demand for lower skilled jobs including manufacturing have been diminishing. Informal and key informant interviews revealed that harpoon fishing underwater being outlawed, many of these fishers go out at night. This broad category includes individuals and groups who may be fairly well organized and influential and turn their activity into a lucrative albeit illegal business activity. On the other hand, there are many young people who fish to survive without any other alternative revenue and/or wish to carry on fishing as their livelihood. The latter are very vulnerable due to their precarious and oftentimes illegal situation, which does not allow them to receive the same kind of benefits as fishermen who are registered. At the same time, this type of activity is the one of the most likely to affect the coral reefs and their associated ecosystems on which they depend on to survive.

With regards to the tourism industry, there is limited information on the types of work performed by males and females. Concerning specifically employment in hotels and restaurants, the data reveals that 6.87% of all males were employed in large establishments in 2009 while the same jobs constituted 5.98% of total female employment the same year²³. Statistics Mauritius shows that the Accommodation and Food Service sector employed 26,300 males and 14,900 females in 2015²⁴.

In the proposed sites of intervention, namely, the Blue Bay Marine Park (BBMP) area including Mahébourg, South East Marine Protected Area and Rivière Banane Marine Reserve in Rodrigues, the activity profile varies from site to site, and there is a degree of variation from one household to the next. For the Blue Bay Marine Park area, special emphasis was laid on Cité La Chaux as the community hosts many fishers and boat operators, and the neighbourhood has been considered as one of the pockets of poverty listed by the National Empowerment Foundation. In contrast, most of the houses located directly next to Blue Bay

²³ Baboo M Nowbutsing and Vinaye Ancharaz, "Trade, Employment and Gender: Case Study of Mauritius"

²⁴ Statistics Mauritius

Marine Park and along Pointe d’Esny beach are either rental bungalows or secondary houses. An important number of skippers working in BBMP live in this neighbourhood. Based on key informant interviews and focus groups as well as a household survey conducted at Cité La Chaux by The Barachois Project - EPCO, it was revealed that women in the mainland Mauritius site are often likely to be involved in informal work to either provide for their families or complement the household income.

Women also provide care for the children and take care of household chores. The women interviewed in Mauritius revealed that most lagoon based activities are largely male dominated, although they expressed an interest in new opportunities arising from the project. In Mahébourg, more specifically Cité La Chaux, the majority of women consider themselves to be housewives or home makers. Domestic work and cleaning services constituted an important proportion of activities performed by women in the locality, and there were no professional occupations.

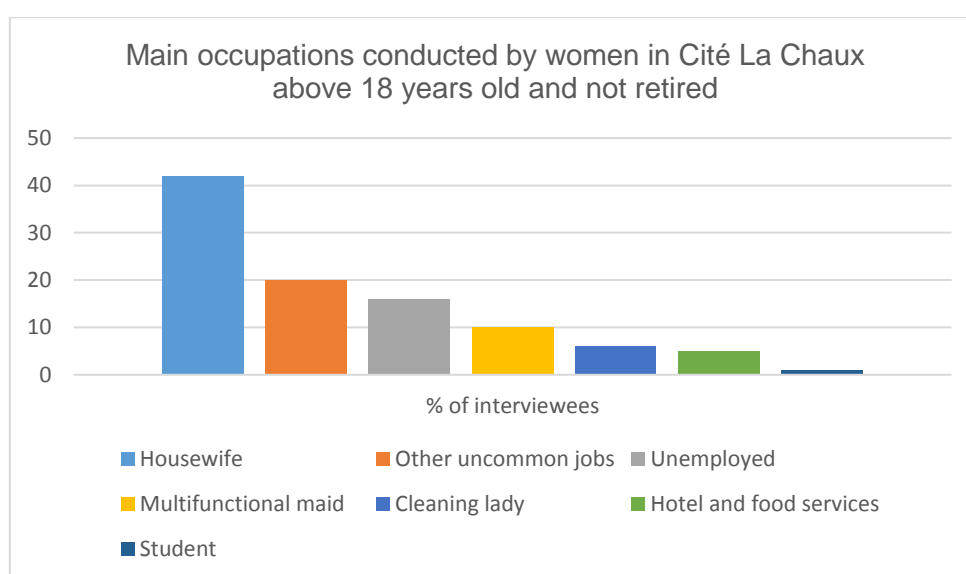


Table 2 Main occupations conducted by women in Cité La Chaux, Mahébourg (18 years+). Source: Le Barachois Project, EPCO, Household Survey, 2017

In Cité La Chaux, the economic activities of youth are also to be noted. Up to 15% of youth between the ages of 18 and 35 were unemployed. After “housewife” comprising 15% of respondents, construction (8%), fishing (7%) and hotel and food services (7%) were the most common occupations among youth.

Women in Rodrigues are heavily involved in fishing due to low depth of the lagoon. Many women in the SEMPA region are involved in octopus fishing. Following the establishment of SEMPA, an alternative livelihoods assessment was developed and several land-based activities were developed in order to diminish both their impact on the lagoon and their over reliance on fishing as a source of income. These activities are mainly agriculture related or agro-processing.

Access and control profile

Women living in socioeconomically deprived areas are more likely to be involved in the informal sector. Gender Links found that women lacked information to access finance compared to their male counterparts, and use their own source of income to raise capital for

their business. Barriers to registered formal businesses include the turnaround time to register, women's needs for social protection such as maternity benefits, childcare and prevention of abuse and non-enforcement of laws and policies regarding integration of women in the private sector²⁵.

Several focus group discussions were conducted in the villages of Cap Malheureux and Mahébourg. In Cap Malheureux, women were inclined to redirect any project discussion towards fishermen and boat operators who would in their opinion be more apt to participate in the project development. Due to the division of labour with regards to use of coastal resources, men benefit from and can also be impacted on more directly from any intervention in the lagoon and outer reef. However, women were very keen to engage in sensitization activities, and participate in any local management framework for the coral nurseries. A resilience workshop report undertaken at Cité La Chaux provides some indication of the access and control profile of this community:

“All community members, including women, have equal, fair and equitable access to opportunities and resources. Some women took the choice to be housewife and some are independent and educated as men”²⁶

To the extent that men use their income to provide for their families, both men and women from these coastal-dependent communities are likely to benefit from the positive outcomes of the project with regards to reef health, resilience and adaptation to climate change.

Decision-making

At the project level and on selected sites, decision making varies from household to household. While women participating in the focus groups were eager to be a part of project development and participate in the local-level management and follow-up of the project, key informants also revealed that for other social projects, permission from or consultation with husbands or partners were required to involve women in various activities, such as literacy courses, life skills courses and swimming lessons. In Cité La Chaux, however, women's knowledge, skills and experience were recognized and respected at all levels, and their participation in the management of their household was deemed significant²⁷.

Women and vulnerable groups in the selected sites identified a lack of support from formal institutions and a lack of funding to develop projects that improved the wellbeing of community members and helped support better environmental management practices.

Capacity needs, skills and knowledge

Any previous gender gap existing with regards to access to education has been gradually closed, such that level of education is now on a comparable level for both women and men, particularly for younger generations. Women's and men's knowledge, capacity and skills were valued very differently when it came to use of the lagoon and potential participation in the project. Women indicated that fishermen and boat operators were best placed to participate actively in the project implementation, while women were thought to be skilled as community organizers and for awareness raising within the larger community. Both men and women

²⁵ Decentralized Cooperation Programme of the European Union, “Study on Gender Analysis in Mauritius”, 2016

²⁶ Le Barachois – EPCO and GEF Satayoma Project “Indicators of Resilience in Socio-ecological Production Landscapes and Seascapes: Assessment Workshop Reporting Form” 2017.

²⁷ Ibid.

shared similar views on roles of each group and were keen to work together towards improved management of their coastal resources and gain new skills in climate change adaptation. Both groups reported beach erosion in their locality and degradation of their environment. They reported a general lack of awareness about environmental issues within their village and neighborhoods and lack of institutional support for locally-led environmental projects.

Women and men interviewed in Mahébourg had different levels of education, without clear advantage of one group over the other. They were not all fully literate, but could sign their names and use “functional” literacy skills. Of the group interviewed, there were three amateur fishermen and three women who participated in the informal economy and on a conservation project in their locality. The amateur fishermen indicated that there were a group of 50 fishers in the region that were not part of the official lists of fishermen, with groups of 7 to 10 individuals going out in boats at night to fish.

Action Plan

The following recommended actions and strategies are based on a review of documentation on women and youth in Mauritius, focus groups as well as personal knowledge of the local stakeholder groups. The action plan in table format for the gender and youth action plan has been integrated to the Community Development Plan to mainstream all gender and youth considerations in the main project proposal.

1. Establish a gender and youth sensitive monitoring and evaluation framework at the Project Management and Regional Steering Committee levels

A gender sensitive approach to climate change adaptation in ecosystem-based adaptation requires gender mainstreaming at the Steering Committee and Project Management levels in order to ensure that all aspects of the project consider the inclusion of women and youth concerns in decision making and monitoring of the project. Without adding further budgeting requirements, it is proposed that gender and youth considerations remain a recurring point in the agenda of the Regional Steering Committee, and towards this purpose a focal point within the project management team can be designated to ensure all relevant data disaggregated by sex and age is collected for monitoring, evaluation and reporting in all project components and levels. The UNDP gender mainstreaming strategy requires that all its managers cultivate an inclusive work culture, and the at least 10 per cent of the learning budgets of country offices be earmarked for gender-related learning activities. It is therefore proposed that UNDP country office allow the Project Management Unit to benefit from its gender-learning activities.

1. Identify and recruit women, men and youth in community mobilization efforts

Women consulted at the community level in the project development phase have expressed a strong interest in participating in community mobilizing efforts. In Mahébourg, the role of women in household decisions and in their neighborhood can help gather support among their peers for the project and help identify relevant community members to participate in the training for set up of nurseries, maintenance and monitoring as well as transplantation of corals on rehabilitation sites. Other key community members are village council presidents, organizers of local events such as pirogue regattas, fishermen’s associations representatives and skippers or boat operators’ representatives.

2. Engage women through women's groups, NGOs and CBOs identified in the stakeholder analysis, identify individual women and youth representatives to participate in local decision-making platforms

CBOs and other local community groups were identified in the preliminary stakeholder analysis elaborated in the Community Development Plan. These include women's groups as well as individual women who are active in their respective communities (Mahébourg and SEMP/ARivière Banane) and have an interest in taking part in the project. Engaging women in decision making processes at a local level such as designation of nursery sites and follow up of project implementation will help support gender balance and gender sensitive outcomes and ensures greater stewardship by the community as a whole – rather than only the direct stakeholders involved.

3. Identify and recruit women, men and youth for direct participation in the designation of nursery and rehabilitation sites

Fishermen, fisherwomen, youth and boat operators are daily users of the sea and know their environment well. Building on participatory approaches, fishers groups and boat operators can provide their inputs as to the best areas for the location of nursery sites. Their participation through consensus building and balancing between the scientific approaches and their local knowledge as well as their needs and economic imperatives will also help built greater cooperation between them and the government authorities and ensure that nursery sites are respected among the wider local community.

4. Identify and recruit women, men and youth for training for set up and maintenance of coral reef nurseries

Community members who are from fisher families are best placed to participate in the training sessions that will be delivered by MOI and AFRC. A strong participatory process during the activity 3 can help stakeholders elect designated community members who will receive training, and NGOs have a key role in facilitating this process and ensuring that the selected or elected community members already have strong underwater skills. Most of the community members identified for this work are young fishermen, however there is a small proportion of women who are part of the fishermen's groups who go out to fish at night. Participation of these individuals in the project will help diminish the community's over-reliance on fishing and reduce their impacts on the reef, while allowing them to gain skills that will contribute to the sustainability of their livelihoods and increase their employability.

5. Empower youth through participation in nursery site designation, maintenance and monitoring, research and awareness-raising

Undergraduate university students have already actively been engaged in the set-up, maintenance and monitoring of coral nursery and rehabilitation trial sites in Mauritius, most notably in Trou-aux-Biches (North) and Pointe-aux-Feuilles (South-East). While not diverting from the primary rehabilitation and restoration objectives of the project, the involvement of university students in research can significantly support the knowledge management aspect of the project while building capacity at a national level for coral reef rehabilitation and ecosystem service restoration. Beyond research and participation of undergraduate students, local youth groups such as scouts and sailing clubs have shown an interest to be involved in awareness raising activities and campaigns.

Project Component / Objective	Actions / Strategy	Performance / Target Indicators	Responsible entity
Overall project planning and implementation			
Engage women, youth and other vulnerable groups in project planning and implementation	<ul style="list-style-type: none"> • Ensure women and youth are included consultations prior to and during project implementation to ensure that they receive sufficient information about the project and create opportunities for them to voice their views on the project • As needed, provide training on gender equality to agencies engaged with the project to improve their understanding of gender concerns and increase their capacity to implement the Project's gender and youth action plan • Ensure appropriate social inclusion in decision-making and use an adaptive management approach to ensure proper stakeholder inclusion throughout the duration of the project • Equal work opportunities (and equal pay) will be provided to men and women under the project 	<ul style="list-style-type: none"> • At least 40% women and 20% youth represented in consultation forums • Number of women's groups, youth groups and other vulnerable groups consulted during project implementation • Number of gender-learning activities provided at the onset and during project implementation • Number of women and men disaggregated by age involved in regional, national and local decision-making and project activities • Gender & age disaggregated attendance lists for all project activities 	Project Management Unit, UNDP Country Office, Regional Steering Committee



**AFB Project Formulation Grant
Restoring marine ecosystem services by rehabilitating coral reefs
to meet a changing climate future**

(July 2017)

COMMUNITY DEVELOPMENT PLAN (SEYCHELLES)

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ANNEX 1 - Identification of stakeholder and their interest in the AFB Coral Reef Restoration Project

ANNEX 2 – List of NGOs/CSOs and other organisations registered with the Civil Engagement Platform

Annex 3 – PowerPoint Presentation – Draft Community Development Plan

1.0 INTRODUCTION

Following a call for proposals of the Adaptation Fund Board (AFB) in May 2015, the UNDP Country Office for Mauritius and Seychelles with national stakeholders have developed a concept note for a regional project which endeavours to “restore marine ecosystem services by rehabilitating coral reefs to meet a changing climate future”. This concept note was approved by the AFB in October 2016 and is now being developed into a full project proposal.

The main objective of the proposed Coral Restoration Project is to upscale and mainstream the rehabilitation of coral reefs degraded by coral bleaching in order to restore essential ecosystem services in the face of climate change threats and to generate knowledge about the most effective solutions for dissemination to SIDS and countries within the wider region. The proposed project will be implemented jointly by Seychelles and Mauritius. It will have three components (excluding project management), namely:

- Component 1)** Enhancement of food security and reduction of risks from natural disasters through the restoration of degraded reefs in Mauritius,
- Component 2)** Enhancement of food security and reduction of risks from natural disasters through the restoration of degraded reefs in Seychelles and
- Component 3)** Knowledge management and sharing, training and sensitization to build regional capacity for sustainable reef restoration Institutional Arrangement

In Seychelles, the project will be implemented by the Ministry of Environment, Energy and Climate Change (MEECC) in collaboration with the following key national implementing entities:

EXECUTING INSTITUTIONS

- Nature Seychelles (NSey)
- Seychelles National Parks Authority (SNPA)

COMMUNITY ENGAGEMENT SPECIALIST

- Marine Conservation Society Seychelles (MCSS)

Coral restoration sites have been identified at the following locations, namely the are Cousin Island Special Reserve (main site), Curieuse Island Marine National Park (pilot site) and the reef of Anse Forbans/Anse Marie Louise in the South of Mahe (pilot site). Detailed descriptions of each location are provided in the AFB proposal.

This report presents the Community Development Plan (a.k.a Stakeholder Engagement Plan) for the AFB Coral Reef Restoration Project to be implemented in Seychelles. It considers the recommendations from the Gender and Youth Assessment for Seychelles, which stipulates the inclusion of sex and age-specific indicators in the Project’s Logic Framework, the targeting of women-headed vulnerable households as beneficiaries, and the need for education and information activities, preferably with participation of NGOs and civil society groups, to ensure

that potential participants and beneficiaries become aware of the AFB Coral Reef Restoration Project.

2.0 STAKEHOLDER ANALYSIS

The stakeholder analysis is based on a literature review, feedback from workshops and one-on-one meetings as well as responses to a questionnaire that was circulated to stakeholders in May 2017. The aim is to identifying key stakeholders in the AFB Coral Reef Restoration Project and asses their interests in the project. This analysis provided the foundation for developing the Project's Community Development Plan and will facilitate in the prioritization of engagement activities with different stakeholder groups and individuals.

2.1 STAKEHOLDER IDENTIFICATION

The following organisations (and projects) were identified as key stakeholders in the AFB Coral Reef Restoration Project. Their interests in this project is elaborated in Annex 1. An additional list of NGOs, Civil Society Organisation (CSOs) and other organisations registered with the Civil Engagement Platform Seychelles is presented in Annex 2.

- Ministry of Environment, Energy and Climate Change (MEECC) & the Programme Coordination Unit?
- Nature Seychelles
- Seychelles National Parks Authority (SNPA)
- Marine Conservation Society Seychelles (MCSS)
- UNDP - Seychelles
- Department of Blue Economy
- Seychelles Fishing Authority (SFA)
- other environmental NGOs (Green Island Foundation – GIF, Seychelles Island Foundation – SIF, Island Conservation Society -ICS, Anba Lao)
- Seychelles Maritime Academy (SMA) previously Maritime Training Centre
- Wise Oceans
- Black Pearl Seychelles
- Artisanal Fishermen
- University of Seychelles (UniSey) / Blue Economy Research Institute (BERI)
- Coastal Community Group (e.g. Anse Forbans)
- Dive Centres (Mahe & Praslin)
- Tour operators and boat operators (Mahe & Praslin)
- Seychelles Climate Change Adaption Trust (SEYCCAT)
- The Nature Conservancy (TNC)
- Save our Seas Foundation (SOSF)
- Hotels/Resort near restoration area
- Global Vision International (GVI)

- Environmental Youth Groups (Blue Economy Champions, Wildlife Clubs of Seychelles, SYAH, Eco-academia, Eco-school etc.)
- Seychelles Prison (non-violent criminals)
- National Institute of Science Technology and Innovation (NISTI)
- Small Grants Programme (SGP)
- International tourist
- other marine related projects (UNEP Ecosystem-based Adaptation project, GOS-UNDP-GEF outer island project, GOS-UNDP-GEF protected areas finance project, GOS-UNDP-GEF Ecosystem-based Adaptation project etc.)
- Civil society organisations, including women's groups.

Please note that the list is in no order nor is it exhaustive. The focus has been primarily on direct beneficiaries or those involved in marine conservation and community engagement activities that could be included in the project implementation or benefit from capacity development to expand the scope of the restoration effort beyond the project area and lifespan.

2.2 STAKEHOLDER PRIORITIZATION

As can be seen from the table in annex 1, the group of stakeholders and their interests are quite diverse. It is therefore, not practical nor warranted that the same level of engagement be applied to each stakeholder group throughout the AFB Coral Reef Restoration Project. Prioritization between stakeholders, especially in such a complex project with multiple phases and impacts, is necessary. This does not mean that certain stakeholders are excluded or discriminated against, but rather their involvement (or lack thereof) is objectively based on the identified rights, interests, and influence of each stakeholder. Prioritization facilitates identifying appropriate forms of engagement for different stakeholder groups. Below is a brief explanation of the 4 prioritisation categories, with table 1 showing how each of the stakeholders identified above impact the successful implementation of the AFB Coral Reef Restoration Project.

Group 1 stakeholders are very relevant to the success of the activity but may have little influence on the process. For example, the success of an AFB Coral Reef Restoration Project will depend on how well women and minorities are able to participate in the activities, but these groups may not have much influence on the design and implementation of the project. They may require special emphasis to ensure that their interests are protected and that their voices are heard.

Group 2 stakeholders are central to the planning process as they are both relevant and influential. These should be key stakeholders for partnership building. For example, Nature Seychelles, SNPA and MCSS have been identified as the project's implementing agencies and will work in collaboration with the MEECC and UNDP - without their support the AFB Coral Reef Restoration Project will not be possible.

Group 3 stakeholders are not the central stakeholders and have little influence on its success or failure. They are unlikely to play a major role in the overall process. Other environmental

NGO's, for example, will not be directly impacted by the AFB Coral Reef Restoration Project and have little influence on its success, but could benefit from capacity development to extend the scope of restoration beyond the project area and lifespan.

Group 4 stakeholders are not very relevant to the activity, but may exercise significant influence. For example, SEYCCAT and TNC, while not a relevant stakeholder for the implementation of the AFB project, could have major influence in securing additional funds for the continuation and expansion of restoration activity beyond the project area and lifespan. Even if they are not involved in the planning process, there may need to be a strategy for communicating with these stakeholders and gaining their support.

Table 1. Stakeholder importance and influence matrix for the AFB Coral Reef Restoration Project

Relevance ↑ high ↓ low	Group 1: High Importance/Low Influence Stakeholders <ul style="list-style-type: none"> • Seychelles Maritime Academy (SMA) • Wise Oceans • Coastal community groups • Environmental Youth Groups (Wildlife Clubs of Seychelles, Seychelles Youth Aims Hub, Eco-School, Blue Economy champions etc.) • Black Pearl Farm, Praslin • Hotels & Resorts near site • Civil Society organisations, including women’s groups 	Group 2: High Importance/High Influence Stakeholders <ul style="list-style-type: none"> • Ministry of Environment, Energy and Climate Change (MEECC) (& the Programme Coordination Unit?) • Nature Seychelles • Seychelles Marine Parks Authority (SNPA) • Marine Conservation Society Seychelles (MCSS) • Department of Blue Economy • United Nations Development Programme (UNDP)
	Group 3: Low Importance/Low Influence Stakeholders <ul style="list-style-type: none"> • Global Vision International (GVI) • Seychelles Prison • other environmental NGOs (Green Island Foundation, Seychelles Island Foundation, Island Conservation Society, Save our Seas Foundation, Anba Lao etc.) • other marine related project (UNEP Ecosystem-based Adaptation project, GOS-UNDP-GEF outer island project, GOS-UNDP-GEF protected areas finance project, GOS-UNDP-GEF Ecosystem-based Adaptation project etc.) • International tourists 	Group 4: Low Importance/High Influence Stakeholders <ul style="list-style-type: none"> • Seychelles Fishing Authority (SFA) • Artisanal fishermen • Dive centres • Tour operators • Hire craft operators • Seychelles Climate Change Adaptation Trust (SEYCCAT) • The Nature Conservancy (TNC) Small Grants Programme (SGP) • University of Seychelles (UniSey) / Blue Economy Research institute (BERI) • National Institute of Science Technology and Innovation (NISTI)
Influence low —————> high		

3.0 STAKEHOLDER ENGAGEMENT PLAN

The Community Development Plan (a.k.a Stakeholder Engagement Plan) is designed to address the core problem identified in the Gender and Youth Assessment for Seychelles, while maximising the engagement of stakeholders identified and prioritised in the stakeholder assessment elaborated above to ensure the successful implementation of the AFB Coral Reef Restoration Project.

The aim of the Community Development Plan is to:

- Engage stakeholders to participate fully and effectively, where possible, in the development and implementation of the AFB Coral Reef Restoration Project
- Address gender and youth issues, where possible, considering the technical requirements of the AFB Coral Reef Restoration Project
- Ensure that capacity building forms an integral part of community engagement initiatives carried out by each of the project implementing agencies

A draft Community Development Plan (annex 3) was presented to the Project development team during the 3rd steering committee meeting held between the 20th and 21st June 2017 in Seychelles. Due to budget constraints and liability concerns, this has heavily revised, with some sections removed entirely while others are being considered under the business plan for Seychelles, at no additional cost to the AFB Coral Reef Restoration Project.

The Community Development Plan is presented in table 2. This plan was finalised by the project implementation agencies, namely the Ministry of Environment, Energy and Climate Change (MEECC) in collaboration with the following key national implementing entities: Nature Seychelles (NS), Seychelles National Parks Authority (SNPA) and the Marine Conservation Society Seychelles (MCSS).

In contrast to the development plan being proposed for Mauritius, Seychelles has certain limitations when it comes to community engagement. Three restoration sites will be targeted under the AFB Coral Reef Restoration project: Cousin Island Special Reserve (main site), Curieuse Island Marine National Park (pilot site) and the reef of Anse Forbans/Anse Marie Louise in the South of Mahe (pilot site).

Cousin Island Special Reserve is an existing marine protected area that is largely unpopulated, it was established in 1980. It is managed by Nature Seychelles, and environment NGO set up in 1998. As a land-sea no take reserve, the establishment of coral restoration sites within the reserve boundary will have limited impact on the day the day activities of residents and reserve users. The Curieuse Island Marine National Park was established in 1979 and is managed by the Seychelles National Parks Authority. It too is considered a no-take one site.

In contrast, the coral reef of Anse Forbans/Anse Marie Louise in the South of Mahe has no legal protection and was proposed for the community-based coral reef restoration efforts during the

second steering committee meeting on the 8th of May 2017. The Anse Forbans site has been “adopted” by the recently formed Anse Forbans Community Conservation Programme (AFCCP), which is working in partnership with the Marine Conservation Society Seychelles (MCSS). Together, they have identified coral restoration as their main priority areas. In fact, AFCCP recently received CSR funds from the Mauritius Commercial Bank (MCB) for SCR 2000, 000 (approx. US \$ 15,400) to set up land-based coral nursery to launch the coral restoration effort at Anse Forbans.

Like Mauritius, given the technical requirements of the restoration effort and the need for a SCUBA certified work force, there is little opportunity to engage marginalised groups on a large scale and provides limited opportunities for direct employment. However, coral reef restoration could provide incentives for properly educated coastal users to protect their resources and respect any code of conduct that is developed for each site. As such, as it has been suggested for Mauritius, it may be useful to employ a full-time community coordinator/facilitator, in addition to the overall project manager, who can support the community engagement process on behalf of the four implementation agencies.

To make the most of limited funds, the stakeholders were classified in groups with similar interests:

- ✓ Artisanal fishermen
- ✓ Non-executing Environmental NGOs
- ✓ Residents of Takamaka
- ✓ Civil Society Organisations & women’s groups
- ✓ Teachers
- ✓ Primary and Secondary school students
- ✓ Seychelles Maritime Academy (SMA)
- ✓ University of Seychelles / Blue Economy Institute
- ✓ Environmental Youth Groups
- ✓ International volunteers

Table 2. Community Development Pan for Seychelles

Target groups	Activities	Lead Agency	Timeline	Budget per activity (US\$)	Total Budget (US\$)
Artisanal Fishermen	Regular meetings with fishermen to brief them about the project	SNPA, MCSS	year 1 of project, middle of project and end of project	at no cost to AFB	\$-
	Engage fishermen as boat operators, non-scientific divers and/or manual labour in restoration activities	NSeY	throughout the project on 6-month contracts	SCR 10,000/month	\$45,800.80
non- executive environmental NGOs (Green Island Foundation – GIF, Seychelles Island Foundation – SIF, Island Conservation Society - ICS, Anba Lao etc.)	Organise training sessions in coral restoration techniques for at least 2 participants from each organisation	NSeY	Year 4 of project	US \$ 400 per day for training workshop x 10 training days x 2 workshops	\$8,000.00
	Update the Reef Rescue training manual in coral restoration techniques (hand book and instructional video)			US \$ 2,000 for printing manual.	\$2,000.00
	Facilitate staff exchange programme between implementing agencies and other environmental NGOs, so participants can benefit from hands on experience	NSeY, SNPA, MCSS	Year 4 of project	at no cost to AFB	\$-
	Provide technical assistance, as necessary, for coral restoration effort outside the AFB project areas			at no cost to AFB	\$-
Residents of near restoration sites	Presentation of AFB Coral Reef Restoration Project to the general public on Mahe and Praslin	MEECC, SNPA, MCSS	year 1 of project, middle of project and end of project	at no cost to AFB	\$-

	Publish periodic newspaper articles in local newspapers (Nation, Today etc.)	NSeY, MEECC, SNPA, MCSS,	at least 1 article every 3 months	at no cost to AFB	\$-
Civil Society Organisations (CSOS), including women's groups and other vulnerable groups	Presentation of AFB Coral Reef Restoration Project for CSOs	MEECC, SNPA, MCSS	year 1 of project, middle of project and end of project	at no cost to AFB	\$-
	Provide opportunities to involve interested individual/groups in land based restoration activities, specifically women's groups and other vulnerable groups		at least 2 activities per year	at no cost to AFB	\$-
	Outsource non-technical respective tasks (e.g. settlement plates, coral tags, nursery tags etc)	NSeY	as required	at no cost to AFB	\$-
Teachers	Develop a "marine education guide to coral reef conservation & restoration" in collaboration with the eco-school coordination unit for primary schools	SNPA, MCSS	year 3 of project	US \$ 2,000 to develop & design a manual, US \$ 1,500 to print 100 copies of marine education teacher's manual	\$3,500.00
	Develop a "marine education guide to coral reef conservation & restoration" in collaboration with the eco-school coordination unit for secondary schools		year 3 of project		\$3,500.00
	Organise theoretical and practical training session for primary and secondary school teachers on Mahe, Praslin and La Digue in marine issues, climate change adaptation and coral restoration		year 4 of project	US \$ 1000 per training workshop	\$2,000.00

Primary & Secondary school students	Organise age-appropriate hands on sessions with students from Primary school on Mahe, Praslin and La Digue	SNPA, MCSS	At least 2 activities per year	at no cost to AFB	\$-
	Organise age-appropriate hands on sessions with students from Secondary school on Mahe, Praslin and La Digue		At least 2 activities per year	at no cost to AFB	\$-
Seychelles Maritime Academy (SMA)	Train SMA instructors in coral restoration techniques and Climate Change impacts and adaptation action	NSey, SNPA, MCSS	as required	at no cost to AFB	\$-
	Incorporate coral restoration in the SMA diploma course		as required	at no cost to AFB	\$-
	Provide equal opportunities for boys and girls to benefit from 2 month-long internships with each implementing agencies		Year 2 to 5	US \$586.5 total allowance per person for 2-month period + housing	\$8,692
	Provide training in basic coral and fish identification and monitoring techniques (possibly linking up with the GVI scholarship programme) and involve successful participants in monitoring changes at restoration sites		Year 2 to 5	US\$ 1,200 per student for 4 years	\$9,600
	Identify individuals for potential full-time employment in the future		beyond AFB project	at no cost to AFB	\$-
University of Seychelles / Blue Economy Institute	Engage BSc and MSc in coral research projects	SNPA, MCSS	Year 2 to 5	This is included in the summer internships	\$-
	Provide equal opportunities for students (boys and girls) to participate in month-long PAID internships with each implementing agencies during the holidays	NSey, SNPA, MCSS	Year 2 to 5	US \$586.5 total allowance per person for 2-month period + housing	\$8,692

	Present findings at national and regional conferences (e.g. WIOMSA)	NSey, MEECC, SNPA, MCSS,	as required	at no cost to AFB	\$-
	Provide equal work opportunities (and equal pay) to University graduates (men and women) under the project		Year 2 to 5	US\$ 1,200 per student for 4 years	\$9,600
Environmental Youth Groups (Blue Economy Champions, Wildlife Clubs of Seychelles, SYAH, Eco-academia, Eco-school etc.)	Organise age-appropriate education and awareness activities	SNPA, MCSS	at least 2 activities per year	at no cost to AFB	\$-
	Provide equal opportunities for boys and girls to participate in month-long UNPAID internships with each implementing agencies during the school holidays	NSey, SNPA, MCSS	3 times a year	at no cost to AFB	\$-
International Volunteers	Provide equal opportunities for non-scientific volunteers (boys and girls) with SCUBA certification to participate in 3 month-long UNPAID Reef Rescue internships	NSey	throughout the project	at no cost to AFB	\$-
	Provide equal opportunities for scientific volunteers (boys and girls) with SCUBA certification to participate in 3 month-long PAID Reef Rescue internships			See notes	\$190,733.30
Community engagement specialist	Employ a Seychellois staff for community outreach	MCSS	throughout the project	US \$ 1,082/ month, 2 % inflation rate/year	\$67,569.00

ANNEX 1

Table 1. Identification of stakeholder and their interest in the AFB Coral Reef Restoration Project.

Stakeholders	Interest of stakeholder in relation to AFB Coral Reef Restoration project	Effect of AFB project on interest (+/-)	Importance of stakeholder for success of AFB project 1 = little/no importance, 2 = some importance, 3 = moderate importance, 4 = very important, 5 = critical player	Degree of influence of stakeholder over AFB project 1 = little/no influence, 2 = some influence, 3 = moderate influence, 4 = very influential, 5 = critical player
Ministry of Environment, Energy and Climate Change (MEECC) (& the Programme Coordination Unit ?)	<ul style="list-style-type: none"> • PCU can provide implementation support • PCU can provide reporting support • MEECC primary recipient of AFB funds • MEECC has not decided on implementation modality • exiting structure for PCU to implement projects on behalf of MEECC • MEECC GIS unit have GIS maps for marine habitats for Marine Spatial Plan • MEECC responsible for disbursing AFB funds • PCU has experience in AFB projects 	(+) (+) (+) (-) (+) (+) (+ / -) (+)	5	5
Nature Seychelles	<ul style="list-style-type: none"> • project lead • environmental NGO • project implementer • ongoing reef rescue programme • marine conservation centre on Praslin • existing structure in place for education and awareness (website, Facebook, newsletters etc.) • opportunity for land based nurseery • manages Cousin Island Special Reserve • existing coral restoration project • intention to scale up coral nursery • increase reef restoration area • have developed their own coral reef restoration protocols • 1+year experience in coral restoration • technical expertise in reef restoration 	(+ / -) (+) (+) (+) (+) (+) (+) (+) (+) (+) (+ / -) (+) (+)	5	5

	<ul style="list-style-type: none"> • partnership with Lemuria Resort • expertise to organise/facilitate training sessions 	<p>(+)</p> <p>(+)</p>		
Seychelles National Parks Authority (SNPA)	<ul style="list-style-type: none"> • project implementer • government agency • existing coral restoration project • existing structure in place for education and awareness (website, Facebook, newsletters, school talks etc.) • scale up coral nursery • increase reef restoration area in AFB project area • expand reef restoration outside AFB project area • 1+year experience in coral restoration (UNEP-EBA project) • testing 4 nursery techniques • MoU with GVI for marine monitoring support • existing research unit • have developed their own coral reef restoration protocols • Marine Spatial Mapping for Curieuse Island Marine National Park (ID donor sites and restoration areas) • increase capacity of staff • publication of research results • expertise to organise/facilitate training sessions • manages 7 marine National parks, including the Curieuse Island Marine National Park 	<p>(+ / -)</p> <p>?</p> <p>(+)</p> <p>(+)</p> <p>(+)</p> <p>(+)</p> <p>(+)</p> <p>(+)</p> <p>(+ / -)</p> <p>(+)</p> <p>(+)</p> <p>(+ / -)</p> <p>(+)</p> <p>(+)</p> <p>(+)</p> <p>(+)</p> <p>(+)</p> <p>(+)</p> <p>(+)</p> <p>(+)</p>	5	5
Marine Conservation Society Seychelles (MCSS)	<ul style="list-style-type: none"> • project implementer • existing coral restoration project • environmental NGO • existing structure in place for education and awareness (website, Facebook, newsletters etc.) • experimenting with multiple nursery design • partnership with Cerf Island Resort • partnership with SNPA (expand reef restoration within Ste. Anne MPA) • have developed their own coral reef restoration protocols • partnership with Anse Forbans community group • scale up coral nursery • scale up reef restoration in project area 	<p>(+ / -)</p> <p>(+)</p> <p>(+)</p> <p>(+)</p> <p>(+ / -)</p> <p>(+)</p> <p>(+)</p> <p>(+)</p> <p>(+ / -)</p> <p>(+)</p> <p>(+)</p> <p>(+)</p> <p>(+)</p>	5	5

	<ul style="list-style-type: none"> • own their own boat • access to larger boats if necessary • own SCUBA gear • Confirmed funding for small on-land nursery • infrastructure to support up to 6 interns at a time • partnership with Underwater Centre • 4 staff with coral restoration experience • existing plans to expand reef restoration outside project area • 1+year experience in coral restoration • experience with private partnership • experience with community outreach • expertise to organise/facilitate training sessions 	(+) (+) (+) (+) (+) (+) (+) (+) (+) (+) (+) (+)		
Seychelles Fishing Authority (SFA)	<ul style="list-style-type: none"> • food security • opportunities for clam mariculture • opportunities for coral culture? • regulate and monitor artisanal fishing • Government agency 	(+) (+) (+) (+) ?	2	3
Green Island Foundation (GIF)	<ul style="list-style-type: none"> • opportunities to participate in training activities • Conservation programme on Denis Island Private Resort • Conservation programme on North Island Private Resort • opportunities for partnerships with AFB project implementers • environmental NGO • existing partnerships with other agencies/institutions • possibility to expand reef restoration outside project area 	(+) (+) (+) (+) (+) (+) (+)	2	1
Seychelles Island Foundation (SIF)	<ul style="list-style-type: none"> • opportunities to participate in training activities • possibility to expand reef restoration outside project area • extensive experience in coral monitoring/mapping • conservation programme on Aldabra • UNESCO World Heritage Site • Government agency • networking opportunities 	(+) (+) (+) (+) (+) ? (+)	2	1

Island Conservation Society (ICS)	<ul style="list-style-type: none"> opportunities to participate in training activities possibility to expand AFB reef restoration outside project area limited man-power & equipment for marine work Conservation programme on Aride & Silhouette island Conservation programme on Outer islands Management have queries on cost/benefit of restoration effort Primary focus is terrestrial monitoring Conservation managers recently underwent coral monitoring training with GOS-UNDP-GEF outer islands project existing structure in place for education and awareness (website, Facebook, newsletters etc.) 	(+) (+) (-) (+) (+) (+ / -) (-) (+) (+)	2	1
Seychelles Maritime Academy (SMA) previously Maritime Training Centre	<ul style="list-style-type: none"> opportunities to participate in training activities integrate coral restoration in curriculum youth engagement opportunities for student internship capacity building for staff may need to provide an allowance (scr 200-400 per day) pool of non-scientific SCUBA divers 	(+) (+) (+) (+) (+) (+ / -) (+)	3	1
Wise Oceans	<ul style="list-style-type: none"> existing small-scale coral restoration project have developed their own coral reef restoration protocols experience with education outreach with local schools & youth groups partnership with Raffles Resort plans to expand marine education programme with all schools (marine holiday programme at Cap Ternay)- currently limited by lack of funds to employ additional staff provide guide snorkelling tours with tourist existing structure in place for education and awareness (website, Facebook, newsletters etc.) 	(+) (+ / -) (+) (+) (+ / -) (+) (+)	3	1
Black Pearl Seychelles	<ul style="list-style-type: none"> stopped breeding clams 5 years ago and currently have 3,000 giant clam brood stock in tanks (25-30m long - valued at about €30 to €40 per clam) aquarium trade not very profitable as expensive to export, plus high mortality during shipping 	(+ / -) (+)	3	1

	<ul style="list-style-type: none"> • planning to sell clams from brood stock to Hotels/Chinese at €15 per kg • if get publicity for Pearl Farm, willing to negotiate price for coral restoration project • might consider re-starting breeding programme but need at least 1year to 1.5 years lead time to get clams to approximate 5cm. Will need to negotiate price for new stock 	(+)		
Artisanal fishermen	<ul style="list-style-type: none"> • beneficiaries of MPA spill over (10+years) • complain about super yachts being allowed to anchor in Curieuse Island Marine National Park - need moorings at Anse Possession • recognise impact of divers/snorkelers on corals • recognise impact of sedimentation from reclamation on corals • restricted fishing areas (only Anse Forbans outside protected area network) • likely to cause anchor damage on reef • possibility for alternative livelihood (sea cucumber fishermen/octopus fishermen?) • Possible source of boat men (scr 500 per day) and additional support boats (scr 2500 per day) plus fuel • Generally, not interested in becoming PADI certified SCUBA divers • possible pool of non-scientific mostly uncertified SCUBA divers (sea cucumber fishermen/octopus fishermen?) • destructive fishing practices (e.g. traps or fishing line damage transplanted corals) • generally, support phased restoration effort (i.e. part of reef available for fishing) • require site specific education & awareness • can assist with word-of mouth to engage other fishers 	(+) (+) (-) (-) (+) (+) (+) (+/-) (-) (+) (+) (+/-) (+) (+) (+/-) (+) (+)	4	3
University of Seychelles (UniSey) / Blue Economy Research	<ul style="list-style-type: none"> • youth engagement • opportunities for student internship • incorporate coral restoration in BSc curriculum • opportunities to get involved in coral research • publication of research results • networking opportunities with project implementers 	(+) (+) (+) (+) (+) (+)	2	3

	<ul style="list-style-type: none"> • build capacity of staff • attract additional funds for coral research • Unable to provide direct financial support • UniSey starting MSc in Marine Science & Climate Change in February 2018 • 6 new researchers expected to start in September 2017 • prefer to be involved in sites near UniSey (e.g. Anse Forbans, maybe Ste Anne Marine Park) • opportunities for student internship (July/August) • opportunities for partnerships with international universities/institute • opportunities to participate in training activities 	<ul style="list-style-type: none"> (+) (+) (-) (+) (+) (+ / -) (+ / -) (+) (+) 		
Dive Centres (Mahe & Praslin)	<ul style="list-style-type: none"> • indirect beneficiaries • knowledge of potential coral donor sites outside restoration areas • Praslin Dive Centres unable to provide boat, equipment or staff (busy with tourist) • Mahe Dive Centres open to boat with skipper (scr 4,500 per day or scr 3,000 for half day) and equipment hire (scr 225 per set of diving gear per day plus Scr 75 for dive tanks and weights -not including 15% VAT) - not diving staff • restored dive sites attract fish, increase customer satisfaction • increase income over the long term • likely to cause anchor damage on reef • Praslin Dive Centres already doing some restoration (collect coral fragments and secure into holes in substrate) • restricted access to restoration site • potential to train SCUBA divers up to rescue diver • Mahe dive centres offer residential rates - OW = scr 5,000 AOW = scr 4,500 First Aid = scr 1,200 RD = scr 4,500 • Praslin dive centres do not offer residential rates - OW = € 420 AOW = € 300 First Aid = € 120 RD = € 500 	<ul style="list-style-type: none"> (+) (+) (+) (+) (+) (+) (-) (+ / -) (-) (+) (+) (-) 	2	3

Coastal Community Group (e.g. Anse Forbans)	<ul style="list-style-type: none"> • opportunities to participate in training activities • assist with populating coral nursery • assist with maintenance of coral nursery • youth engagement • involve the elderly • community engagement • involve men and women • AFCCP awarded CSR grant of scr 200,000 for on-land coral nursery • AFCCP applied for land from Government for conservation centre • AFCCP identified coral restoration as top priority but lack funds to implement • activity coordination by group members • available on weekends/public holidays • possibility for alternative livelihood for community • increased coastline protection • increased food security for community • access to boats owned by group members • existing partnership with private sector • community education & awareness • Population of Takamaka district according to the 2010 national census - 2,825 residents • Population of Baie Ste Anne Praslin district according to the 2010 national census - 4,876 residents 	<p>(+)</p> <p>(+)</p> <p>(+)</p> <p>(+)</p> <p>(+)</p> <p>(+)</p> <p>(+)</p> <p>(+)</p> <p>(+)</p> <p>(+ / -)</p> <p>(+ / -)</p> <p>(+)</p> <p>(+)</p> <p>(+)</p> <p>(+ / -)</p> <p>(+)</p> <p>(+)</p> <p>(+)</p> <p>(+)</p> <p>(+)</p> <p>(+)</p>	4	2
Tour operators and boat operators (Mahe & Praslin)	<ul style="list-style-type: none"> • indirect beneficiaries • restored dive sites attract fish, increase customer satisfaction • increased income over the long term • likely to cause anchor damage on reef • unable to provide boat, equipment or staff (busy with tourist) • restricted access to restoration site • not likely to volunteer for activities • Charge €70 + scr 500 tax per person for trip to Cousin (also have 3 island tour packages for €130 including tax) 	<p>(+)</p> <p>(+)</p> <p>(+)</p> <p>(-)</p> <p>(+)</p> <p>(-)</p> <p>(-)</p> <p>(+)</p>	2	3

	<ul style="list-style-type: none"> charge €15 - €20 + 200 tax per person for snorkelling trip to St. Pierre (usually combine with trip to Curieuse Island at €65 + scr200 tax) aware that there is a need for mooring buoys to protect reefs complain about divers damaging reef with fins potential for education & awareness for tourists (through posters and brochures produced under AFB project) require training in basic tour guiding & marine sciences 	(+)		
Anba Lao	<ul style="list-style-type: none"> 1+year experience in coral restoration trailing macro-algal control measures opportunities to participate in training activities existing partnership with SNPA expertise to organise/facilitate training sessions 	(+)	2	2
Seychelles Climate Change Adaptation Trust (SEYCCAT)	<ul style="list-style-type: none"> potential grants for other restoration projects will issue annual competitive calls for proposals supporting expansion of protected areas network to 30% of EEZ focus on ecosystem (Inc. coral) restoration funds are available to individuals, business, NGOs and government depts. potential grants to provide additional support to AFB project 	(+)	2	3
The Nature Conservancy (TNC)	<ul style="list-style-type: none"> developing the Marine Spatial Mapping for Seychelles (30% marine protected areas) assist with site selections beyond project lifespan (existing GIS maps for marine habitats/features) capacity building for staff networking opportunities with international agencies/institutions can provide with overview / global context with other TNC projects/initiatives 	(+)	2	3
Save our Seas Foundation (SOSF)	<ul style="list-style-type: none"> Conservation programme on D'Arros Atoll 1+year experience in coral restoration existing coral restoration project links with international marine expertise opportunities to participate in training activities potential grants for other restoration projects 	(+)	1	1

UNDP – Seychelles	<ul style="list-style-type: none"> • helping to realize directly the objectives of SDG 14 • UNDP’s resources/oversight and management during project implementation • assisted with development of AFB concept note • assisting with development of AFB project proposal • facilitate networking with various technical experts • encouraging south-south cooperation with other islands in the Indian Ocean. 	(+) (+) (+) (+) (+)	4	4
Seychelles Prison (non-violent criminals)	<ul style="list-style-type: none"> • pool of non-diving volunteers on day release • opportunity for alternative livelihood • assist with populating coral nursery • existing partnership with Nature Seychelles • Existing partnership with AFCCP • assist with maintenance of coral nursery • risk of inmates escaping (low) • project can target vulnerable individuals 	(+ / -) (+) (+) (+) (+) (+) (-)	1	1
National Institute of Science Technology and Innovation (NISTI)	<ul style="list-style-type: none"> • potential for networking • potential for research collaboration 	(+) (+)	1	3
Small grants programme (SGP)	<ul style="list-style-type: none"> • leverage funding for SGP project • knowledge exchange with project partners & government agencies • co-financing for AFB project esp. at Anse Forbans • good links with community groups 	(+) (+) (+) (+)	2	3
Civil Society organisations, including Gender and Vulnerable groups	<ul style="list-style-type: none"> • Most NGOs, CSOs etc. registered with the Civil Engagement Platform Seychelles (CEPS) • 7 thematic CEPS commissions - Education, Social & Health Commission, Professional Commission, Faith-based Commission, Environment & Natural Resource Commission, Gender, Rights & Governance Commission, Youth, Culture & Sports Commission and Socio-economic Commission • Strong links to community • Strong links to vulnerable groups • Opportunities for education and awareness • Opportunity to engage women and youth 	(+) (+) (+) (+) (+) (+)	5	2

	<ul style="list-style-type: none"> • Opportunity to engage individuals with physical and mental disabilities 	(+)		
International tourist	<ul style="list-style-type: none"> • most have limited knowledge on what a healthy reef should look like • happy to see fish, turtles and sharks • would buy coral friendly sun tan lotion if available locally • generally, not aware of El Nino or coral bleaching • willing to pay for guided tours (land and marine) • complain about service delivery • Might consider donating to community activities 	(+ / -) (+ / -) (+) (-) (+) (-) (+)	1	1
Department of Blue Economy	<ul style="list-style-type: none"> • opportunities for networking and building partnerships • strategic policy guidance • national collaboration (can be part of the steering committee) • possible local in country logistics support • set up blue economy champions initiative with SYAH, so mechanism in place to attract, monitor and expand internship programme 	(+) (+) (+) (+) (+)	4	4
other marine related project (UNEP Ecosystem-based Adaptation project, GOS-UNDP-GEF outer island project, GOS-UNDP-GEF protected areas finance project, GOS-UNDP-GEF Ecosystem-based Adaptation project etc.)	<ul style="list-style-type: none"> • additional financial support for AFB project activities e.g. capacity building, education & awareness • networking opportunities with project partners • extension of project activities of the existing project 	(+) (+) (+)	1	1

ANNEX 2

Table 2. List of NGOs/CSOs and other organisations registered with the Civil Engagement Platform Seychelles.

CEPS commission	Name of Organisation	Email Contact
Environment & Natural Resources Commission	Sustainability for Seychelles (S4S)	purvismt@hotmail.com
	Moyenne Island (Foundation) Society (MIFS)	spatel@pnp.sc
	Plant Conservation Action Group (PCA)	pca.seychelles@gmail.com
	Terrestrial Restoration Action Society of Seychelles (TRASS)	trass.seychelles@gmail.com
	Life and Water Seychelles (LAWS)	westwaysupplies@outlook.com
	Nature Seychelles (NS)	projects@natureseychelles.org
	Island Conservation Society (ICS)	askerret@homail.com
	Green Islands Foundation (GIF)	gm@gif.sc
Sea Turtle Festival Seychelles (STFS)	seychelles@gviworld.com	
Faith-based organisations	Seychelles Bible Society	biblesoc@seychelles.net
	Everlasting Love Ministry (ELM)	Judefred@yahoo.com
	Grace Family Network (GFN)	gracefamilynetwork@gmail.com
	Seychelles Bible Society	biblesoc@seychelles.net
	The Church of Pentecost(COP)	fiankolarbi@gmail.com
	National Spiritual Assembly of the Bahais of Seychelles	bahaiexternalaffairs@seychelles.net
Youth for Christ International Seychelles	mervinpool@gmail.com	
Gender, Rights & Governance Commission	Seychelles Association of Women Professionals (SAWOP)	servina9mr@yahoo.com
	Association of Fathers Promoting Responsibility Parenthood	mervinfanny@gmail.com
	International Friendship League (IFL)	nellcons@seychelles.net
	Lasosyasyon Pour Promouvwar Latrankilite ek Respe (LPLR)	lindy_ernesta@live.com
	National Consumers Forum (NATCOF)	natcof@seychelles.net
	Citizens Democracy Watch (Seychelles)	citizenswatchseychelles@gmail.com
	Cooperative Des Artisans	mariettemck@hotmail.com
	Women In Partnership Against poverty	ernestaursanne@gmail.com
	Association for Rights, Information & Democracy (ARID)	luci_anne@live.com
The Voice Association	thevoicesey@gmail.com	
Professional Commission	Nurses Association of Seychelles (NARS)	rosie.bistoquet@health.gov.sc
	Association of Media Practitioners Seychelles (AMPS)	barbara.coopoosamy@sbc.sc
	Seychelles Headteachers Association (SHA)	manciennesonia@yahoo.com
	Seychelles Occupational Therapy Association (SEYOTA)	jjcup@hotmail.co.uk
	Seychelles Physiotherapy Association (SPA)	seyphysiotherapy@outlook.com
	Seychelles Empowerment-Based Social Workers Association	georges.nicette@unisey.ac.sc

	Social Workers Association of the Republic of Seychelles	blaboudallon@gov.sc
Social, Education & Health Commission	H.I.V. and AIDS Support Organisations (HASO) Alliance of Solidarity for the Family(ASFF) Association With People with Hearing Impairment (APHI) Campaign for Awareness, Resilience and Education (CARE) Cancer Concern CARITAS Seychelles C'entre D'Acceuil de la Rosiere Seychelles Children Foundation Friends of Prison Association Of Seychelles H.I.V. and AIDS Support Organisations (HASO) Les Li viv Light Amidst My Path (LAMP) Love and Care Association Nou La Pour Ou Association for the Promotion of Solid Human Families (APSHF) NOAH'S CENTRE Seychelles Empowerment-based Social Workers' Association Social Workers Association of the Republic of Seychelles Brother Dudes Sovereign Supporters Family Action Team of Mont Buxton Survival Ark Foundation National Council for the Disabled	rarnephy@gmail.com asff@seychelles.net Lizyepoutande@yahoo.com.au care@seychelles.net jmpayet@airseychelles.com caritasey@intlevision.net centrelarosiere@yahoo.com j.hoareau@scf.gov.sc friendsofprisons@gmail.com hasoseychelles@yahoo.com lesliviv.prolife@gmail.com lightpath26@yahoo.com mmjacq@yahoo.com noulapourou@seychelles.net apshf@seychelles.net nicollesperance4@yahoo.com georges.nicette@unisey.ac.sc blaboudallon@gov.sc deanpadayachi@yahoo.com lindaphiloe7@gmail.com Julievivianne72@gmail.com ncfed@seychelles.net
Socio-economic commission	Lasosyasyon Peser Praslin L'entreprendre Au Feminin Ocean Indien Seychelles Women Action In of Solidarity (WASO) Cooperative Des Artisans Val d'Endorre Farmers Association (VDFA) Seychelles Association of Omnibus Association Seychelles Farmers Association	pfa@seychelles.net calbertsez@seychelles.net seyrosie@gmail.com mariettemck@hotmail.com vjroses@hotmail.com classivetranserv@seychelles.net seychellesfarmers@gmail.com
Youth, Culture & sports Commission	Compassion Foundation PRO-ART Seychelles Seychelles Mixed Martial Arts Association Seychelles Scouts Association (SSA) Seychelles Sports Fishing Club-(SSFC) Yoga Association Seychelles Youth For Christ International Seychelles (YFCIS) UNITED FOR A PURPOSE BRIGADE	joannateresapouponneau@gmail.com dodo4charles@yahoo.com adrian.nanty@gmail.com holbertjean@yahoo.com jadeocean@live.com yogaseychelles@gmail.com mervinpool@gmail.com d.bistoe@gmail.com

SIDS YOUTH AIMS HUB-SEYCHELLES (SYAH)	mfinesse.mf@gmail.com
Science et Sport	zaher@scienceetsport.com
Anse Etoile Youth Action Team (AYAT)	terrence.crea@yahoo.com
AIESec SEYCHELLES	bogar.gmilan@aiesec.net
Bling Bling Poetry	blingblingpoetry@hotmail.com
Arterial Network Seychelles	georgecaille@gmail.com
Global Shapers Community Victoria hub	ash14_88@hotmail.com
Better Life Foundation	info@plus.sc
Sports, Arts and Culture for Kids Initiative (SACKI)	chaseca.monnaie@gmail.com
African Community Association of Seychelles	acasseychelles@gmail.com
Stand up, Step up	tirellouise@gmail.com
L'Association Seychelloise Pour La Jeunesse et L'animation	annemarie_mathiot@yahoo.com

Annex 3

PowerPoint Presentation by Elke Talma
Draft Community Development Plan for Seychelles
3rd steering committee meeting, Care House, Seychelles
20th June 2017

AFB Project Formulation Grant – Restoring marine ecosystem services by rehabilitating coral reefs to meet a changing climate future


Gender & Youth Action Plan & Community development Plan for Seychelles



3rd Steering Committee meeting
Care House, Mahe, Seychelles, Seychelles
20th – 21st June 2017

AFB Project Formulation Grant – Restoring marine ecosystem services by rehabilitating coral reefs to meet a changing climate future

1. Gender & Youth Action Plan (Seychelles)




3rd Steering Committee meeting
Care House, Mahe, Seychelles, Seychelles
20th – 21st June 2017

Gender & Youth Action Plan (Seychelles)

The Gender and Youth Action Plan is based on the findings of the Gender and Youth Assessment for Seychelles, which investigates gender & youth issues in the following areas:


- Constitutional and Legal Rights
- Governance and Political Participation
- Education and Training
- Health, Violence Against Women and Bullying
- Productive Resources, Employment and Economic Empowerment
- Climate Change, Sustainable Development and Disaster Risk Management



Gender & Youth Action Plan (Seychelles)


The principal recommendations resulting from these consultations were:

- the inclusion of sex and age-specific indicators in the Project’s Logic Framework,
- the targeting of women-headed vulnerable households as beneficiaries,
- and the need for education and information activities, preferably with participation of NGOs and civil society groups.




Gender & Youth Action Plan (Seychelles)

Project Components & Objectives	Responsible Entity
COMPONENT 2 (SEYCHELLES): To improve food security and livelihoods and mitigate disaster risk through active restoration of coral reefs degraded by coral bleaching as a result of climate change in Seychelles, in order to restore their essential ecosystem services	
2.1 Development of a sustainable partnership and business approach to reef restoration	MEECC, Nature Seychelles, SNPA and MCSS
2.2 Establishment of coral farming and nursery facilities	MEECC, Nature Seychelles, SNPA and MCSS
2.3 Active restoration of degraded reefs, with maintenance and monitoring of survival and growth rates of transplanted corals	MEECC, Nature Seychelles, SNPA and MCSS



Gender & Youth Action Plan (Seychelles)

Project Components & Objectives	Responsible Entity
COMPONENT 3 (SEYCHELLES & MAURITIUS): To generate knowledge and understanding about the use of coral restoration as an adaptation measure	
3.1 Improved understanding and knowledge management of use of reef restoration as an adaptation measure	MEECC, Nature Seychelles, SNPA and MCSS
3.2 Lessons learned regionally and globally on methods and approaches to sustainable reef restoration are disseminated	MEECC, Nature Seychelles, SNPA and MCSS
3.2 Training to build capacity for sustainable coral reef restoration	Nature Seychelles leads training, SNPA & MCSS supports community based – restoration & NGO training



Gender & Youth Action Plan (Seychelles)			
Project Components/Objectives	Action / Strategy	Performance / Target indicators	Responsible Entity
Overall project planning and implementation			
Engage men, women, youth and other vulnerable groups in project planning and implementation	Using an adaptive management approach, develop a Community Development Plan	<ul style="list-style-type: none"> Community Development Plan completed at the start of the project and reviewed periodically 	Programme Coordination Unit of the Ministry of Environment, Energy and Climate Change (PCU-MEECC) + UNDP Seychelles
	Ensure men, women and youth are included consultations prior to and during project implementation to ensure that they receive sufficient information about the project and create opportunities for them to voice their views on the project	<ul style="list-style-type: none"> At least 40% women and 20% youth represented in consultation forums At least 20% women and 10% youth on the project steering committee 	
	Ensure appropriate social inclusion in decision-making	<ul style="list-style-type: none"> Number of women's groups, youth groups and other vulnerable groups consulted during project implementation 	

Gender & Youth Action Plan (Seychelles)			
Project Components/Objectives	Action / Strategy	Performance / Target indicators	Responsible Entity
Overall project planning and implementation ... continued			
Engage men, women, youth and other vulnerable groups in project planning and implementation	As needed, provide training on gender equality to agencies engaged with the project to improve their understanding of gender concerns and increase their capacity to implement the Project's gender action plan	<ul style="list-style-type: none"> Number of training sessions with organised At least 30% women and 20% youth participation in training 	Programme Coordination Unit of the Ministry of Environment, Energy and Climate Change (PCU-MEECC) + UNDP Seychelles
	Equal work opportunities (and equal pay) will be provided to men and women under the project	<ul style="list-style-type: none"> Number of men and women involved in project activities 	
	The PCU-MEECC or UNDP Seychelles will be responsible for monitoring and review of the above set targets for women and youth as per AFB reporting schedule	<ul style="list-style-type: none"> sexr & age disaggregated attendance lists for all project activities 	

AFB Project Formulation Grant – Restoring marine ecosystem services by rehabilitating coral reefs to meet a changing climate future

2. Community Development Plan (Seychelles)

3rd Steering Committee meeting
Care House, Mahe, Seychelles, Seychelles
20th – 21st June 2017

IMPLEMENTING PARTNERS CONFIRMED AT THE 2ND STEERING COMMITTEE MEETING:

1. EXECUTING INSTITUTIONS

- Ministry of Environment, Energy and Climate Change (MEECC)
- Nature Seychelles (NS)
- Seychelles National Parks Authority (SNPA)

2. COMMUNITY ENGAGEMENT SPECIALIST

- Marine Conservation Society Seychelles (MCSS)

PROJECT SITES PROPOSED AT THE 2ND STEERING COMMITTEE MEETING:

- Cousin Nature Reserve
- Curieuse & St. Pierre Marine Park
- St. Anne Marine Park
- reef off the beaches of Anse Forbans / Anse Marie-Louise

STAKEHOLDER IDENTIFICATION, ASSESSMENT AND PRIORITISATION:

Importance	Influence
High	Low
High	High
Low	Low
Low	High

- Group 1: High importance/Low influence Stakeholders**
 - Seychelles Maritime Academy (SMA)
 - Wise Oceans
 - Coastal community groups
 - Environmental Youth Groups (Waffle Clubs of Seychelles, Seychelles Youth Aims Hub, Eco-School, Blue Economy champions etc.)
 - Black Pearl Farm, Praslin
 - Hotels & Resorts near site
 - Civil society organisations, including women's groups
- Group 2: High importance/High influence Stakeholders**
 - Ministry of Environment, Energy and Climate Change (MEECC) (& the Programme Coordination Unit?)
 - Nature Seychelles
 - Seychelles Marine Parks Authority (SNPA)
 - Marine Conservation Society Seychelles (MCSS)
 - Department of Blue Economy
 - United Nations Development Programme (UNDP)
- Group 3: Low importance/Low influence Stakeholders**
 - Global Vision International (GVI)
 - Seychelles Prison
 - other environmental NGOs (Green Island Foundation, Seychelles Island Foundation, Island Conservation Society, Save our Seas Foundation, Anba Lao etc.)
 - other marine related project (UNEP Ecosystem-based Adaptation project, GOS-UNDP-GEF over island project, GOS-UNDP-GEF protected areas finance project, GOS-UNDP-GEF Ecosystem-based Adaptation project etc.)
 - International tourists
- Group 4: Low importance/High influence Stakeholders**
 - Seychelles Fishing Authority (SFA)
 - Artisanal Fisheries
 - Dive centres
 - Tour operators
 - Hire craft operators
 - Seychelles Climate Change Adaptation Trust (SEYCCAT)
 - The Nature Conservancy (TNC)
 - Small Grants Programme (SGP)
 - University of Seychelles (Unisey) / Blue Economy Research Institute (BERI)
 - National Institute of Science Technology and Innovation (NITI)

Community Development Plan (Seychelles)

STAKEHOLDER IDENTIFICATION, ASSESSMENT AND PRIORITISATION:

Group 1: High Importance / Low Influence Stakeholders

- Seychelles Maritime Academy (SMA)
- Wise Oceans
- Coastal community groups
- Environmental Youth Groups
 - Wildlife Clubs of Seychelles, Seychelles Youth Aims Hub, Eco-School, Blue Economy champions etc.
- Black Pearl Farm, Praslin
- Hotels & Resorts near site
- Civil Society organisations, including women's groups

Community Development Plan (Seychelles)

STAKEHOLDER IDENTIFICATION, ASSESSMENT AND PRIORITISATION:

Group 2: High Importance / High Influence Stakeholders

- Ministry of Environment, Energy and Climate Change (MEECC) / Programme Coordination Unit (PCU)
- Nature Seychelles
- Seychelles Marine Parks Authority (SNPA)
- Marine Conservation Society Seychelles (MCSS)
- Department of Blue Economy
- UNDP

IMPOTANT: these stakeholder needs to be included in the Project Steering Committee for Seychelles

Community Development Plan (Seychelles)

STAKEHOLDER IDENTIFICATION, ASSESSMENT AND PRIORITISATION:

Group 3: Low Importance / Low Influence Stakeholders

- Global Vision International (GVI)
- Seychelles Prison
- International tourists
- other environmental NGOs
 - Green Island Foundation, Seychelles Island Foundation, Island Conservation Society, Save our Seas Foundation, Anba Lao etc.)
- other marine related project
 - UNEP Ecosystem-based Adaptation project, GOS-UNDP-GEF outer island project, GOS-UNDP-GEF protected areas finance project, GOS-UNDP-GEF Ecosystem-based Adaptation project etc.

Community Development Plan (Seychelles)

STAKEHOLDER IDENTIFICATION, ASSESSMENT AND PRIORITISATION:

Group 4: Low Importance / High Influence Stakeholders

- Seychelles Fishing Authority (SFA)
- Artisanal fishermen
- Dive centres
- Tour operators
- Hire craft operators
- Seychelles Climate Change Adaptation Trust (SEYCCAT)
- The Nature Conservancy (TNC)
- Small Grants Programme (SGP)
- University of Seychelles (UniSey) / Blue Economy Research institute (BERI)
- National Institute of Science Technology and Innovation (NISTI)

Community Development Plan (Seychelles)

STAKEHOLDER ENGAGEMENT PLAN (... a.k.a community development plan)

The aim of the Community Development Plan is to:

- ✓ Engage stakeholders to participate fully and effectively, where possible, in the development and implementation of the AFB Coral Reef Restoration Project
- ✓ Address gender and youth issues, where possible, considering the technical requirements of the AFB Coral Reef Restoration Project
- ✓ Ensure that capacity building forms an integral part of community engagement initiatives carried out by each of the project implementing agencies

IMPORTANT: given the technical requirements of the restoration effort, there is little opportunity to engage marginalised groups on a large scale and limited opportunities for direct employment.

Community Development Plan (Seychelles)

STAKEHOLDER ENGAGEMENT PLAN (... a.k.a community development plan)

Stakeholders groups being targeted:

✓ Policy-makers / Decisions-makers	✓ Teachers
✓ Artisanal fishermen	✓ Primary and Secondary school students
✓ Tourism establishments	✓ Seychelles Maritime Academy (SMA)
✓ Tour Operators and Dive Operators	✓ University of Seychelles / Blue Economy Institute
✓ Black Pearl Farm	✓ Environmental Youth Groups
✓ Environmental NGOs	✓ Non-violent prisoners
✓ Residents near restoration sites	✓ Orphanages on Mahe
✓ Civil Society Organisations & women's groups	?? International volunteers

Community Development Plan (Seychelles)				
Target Group	Activities	Lead Agency	Timeline	Budget
Policy-makers / Decisions-makers	High level presentation of AFB Coral Reef Restoration Project for stakeholders who can assist with networking and sourcing additional financing (e.g. representatives from Blue Economy departments, Ministry of Foreign Affairs, Ministry of Fisheries, Ministry of Tourism, TNC, SEYCCAY, NISTI etc.)	MEECC, Nature Seychelles, SNPA, MCSS	year 1 of project, middle of project and end of project	US \$ 2,000 per workshop
	Presentation of AFB Coral Reef Restoration Project to stakeholders who can assist with regulations and enforcement (e.g. police, coast guard, the Judiciary and other relevant authorities)		year 1 of project, middle of project and end of project	US \$ 2,000 per workshop
	Presentation of AFB Coral Reef Restoration Project to stakeholders with political influence (e.g. district administrators, members of the National Assembly, district councils etc.)		year 1 of project, middle of project and end of project	US \$ 2,000 per workshop

Community Development Plan (Seychelles)				
Target Group	Activities	Lead Agency	Timeline	Budget
Artisanal Fishermen (e.g. Praslin fishermen's Association, Fishermen and boat owner's association etc.)	Site specific meetings with relevant fishermen's association, namely <ul style="list-style-type: none"> Cousin Nature Reserve site - Grand Anse on Praslin Curieuse Marine Park site - Baie Ste Anne on Praslin Ste Anne Marine Park - Roche Caiman, English River and Cascade on Mahe Anse Forbans reef - Takamaka on Mahe 	Nature Seychelles, SNPA, MCSS	year 1 of project, middle of project and end of project	US \$ 1,000 per workshop
	Engage fishermen as necessary/feasible in restoration activities (e.g. boat operators, manual labour)		Throughout the project	US \$ 23 - 40 per fishermen per day, US \$ 230 per boat (including fuel) per day
	Identify a "coral restoration champion" for each site to act as liaison with other fishermen		Throughout the project	Allowance?

Community Development Plan (Seychelles)				
Target Group	Activities	Lead Agency	Timeline	Budget
Tourism establishments in or near the project area	Presentation of AFB Coral Reef Restoration Project to the management and guest relations staff: <ul style="list-style-type: none"> Cousin Nature Reserve site - Lemuria Resort and other hotels/guest houses at Anse Korlan, Praslin Curieuse Marine Park site - Raffles Resort, Le Domaine La Reserve, Paradise Sun Resort and other hotels/guest houses at Cot D'Or, Praslin Ste Anne Marine Park - Ste Anne Resort, Eden Blue Hotel, Cerf island Resort and other hotels/guest houses on Cerf island Anse Forbans reef - Allamanda Resort & Spa, Chalet D'Anse Forbans, Banyan Tree Resort and other hotels/guest houses in Takamaka, Mahe 	Nature Seychelles, SNPA, MCSS	year 1 of project, middle of project and end of project	Hotels can provide venue & refreshments as in-kind contribution

Community Development Plan (Seychelles)				
Target Group	Activities	Lead Agency	Timeline	Budget
Tourism establishments in or near the project area	Sign agreements for land-based coral nurseries or to purchase coral fragments (at least 1 per implementing agency)	Nature Seychelles, SNPA, MCSS	year 1 of project	Hotels can fund land-based nursery
	Identify at least 2 staff per hotel ("coral restoration champions") to oversee/assist with nursery operations and client education & awareness		Throughout the project	Hotel can provide additional allowance for "coral restoration champion"
	Develop a training module to be included in the staff induction course (to be presented by staff of implementation agencies together with "coral restoration champions")		?	?
	Develop site specific education & awareness materials (brochures, posters, documentary) for tourists and hotel staff		?	US \$ 5,000 for education & awareness materials

Community Development Plan (Seychelles)				
Target Group	Activities	Lead Agency	Timeline	Budget
Tour Operators / Boat Operators / Dive Operators	Site specific presentation of AFB Coral Reef Restoration Project targeting relevant operators	Nature Seychelles, SNPA, MCSS	year 1 of project	US \$ 500 per workshop
	Develop informative brochures and/or posters (could link with hotel brochures)		?	US \$ 5,000 for brochures/posters
	Identify additional restoration sites that could enhance the user experience		?	?
	Encourage Centres to "Adopt" local sites and undertake restoration with guidance from implementing agencies		?	In-kind contribution
	Engage Dive Operators on Mahe and Praslin in training interns up to Rescue Diver level		?	US \$ 1,200 per person for complete PADI SCUBA training
Engage Dive Operators to provide resources / facilities to the project (e.g. boat & equipment hire at preferential rates or free once a week)	?	US \$ 350 per day for boat rental, US \$ 50 per day per equipment hire		

Community Development Plan (Seychelles)				
Target Group	Activities	Lead Agency	Timeline	Budget
Environmental NGOs (Green Island Foundation - GIF, Seychelles Island Foundation - SIF, Island Conservation Society -ICS, Anba Lao etc.)	Organise training sessions in coral restoration techniques for at least 2 participants from each organisation	Nature Seychelles	Year 3 of project	US \$ 500 per day for training workshop + US \$ XXX site visits
	Update the Reef Rescue training manual in coral restoration techniques (hand book and instructional video)		Year 4 of project	US \$ 2,000 for printing manual. US \$ 2,500 for video
	Facilitate staff exchange programme between implementing agencies and environmental NGOs so participants can benefit from hands on experience	MEECC, Nature Seychelles, SNPA, MCSS	Year 4 of project	?
Provide technical assistance, as necessary, for coral restoration effort outside the AFB project areas			?	?

Community Development Plan (Seychelles)				
Target Group	Activities	Lead Agency	Timeline	Budget
Residents near restoration sites	Site specific presentation of AFB Coral Reef Restoration Project to the general public: <ul style="list-style-type: none"> Cousin Nature Reserve site - Grand Anse on Praslin Curieuse Marine Park site - Baie Ste Anne on Praslin Ste Anne Marine Park - Roche Caiman, English River and Cascade on Mahe Anse Forbans reef - Takamaka on Mahe 	MEECC, Nature Seychelles, SNPA, MCSS	year 1 of project, middle of project and end of project	US \$ 500 per town hall meeting (or get partner hotel to host)
	Publish periodic newspaper articles in local newspapers (Nation, Today etc.)		at least 1 article every 3 months	x
	Publish bi-annual newsletters with contributions from implementing agencies		every 6 months	US \$ 2,000 per issue for design and printing

Community Development Plan (Seychelles)				
Target Group	Activities	Lead Agency	Timeline	Budget
Civil society organisations and women's groups	Presentation of AFB Coral Reef Restoration Project for community groups	MEECC, Nature Seychelles, SNPA, MCSS	year 1 of project, middle of project and end of project	US \$ 1,000 per workshop
	Provide opportunities to involve interested individual/groups in hands-on restoration activities		at least 2 activities per year	US \$ 500 per restoration activity

NOTE: In the budget, this can be combined with activities targeting residents in each project areas. Can also use partnerships with hotel for venue and refreshments.

Community Development Plan (Seychelles)				
Target Group	Activities	Lead Agency	Timeline	Budget
Teachers	Develop a marine education teacher's manual and activity book in collaboration with the eco-school coordination unit for primary schools	MEECC, Nature Seychelles, SNPA, MCSS	year 3 of project	US \$ 2,000 to develop & design a manual
	Develop a marine education teacher's manual and activity book in collaboration with the eco-school coordination unit for secondary schools		year 3 of project	US \$ 1,500 to print 100 copies of marine education teacher's manual
	Organise theoretical and practical training session for primary and secondary school teachers on Mahe, Praslin and La Digue in marine issues, climate change adaptation and coral restoration		Year 4 of project	US \$ 2,000 per training workshop

Community Development Plan (Seychelles)				
Target Group	Activities	Lead Agency	Timeline	Budget
Primary school students	Organise age-appropriate hands on sessions with students, giving priority to the following: <ul style="list-style-type: none"> Cousin Nature Reserve site - Grand Anse Primary school on Praslin Curieuse Marine Park site - Baie Ste Anne Primary school and Vijay International School on Praslin Ste Anne Marine Park - Roche Caiman Primary school, English River Primary school and Cascade Primary school on Mahe Anse Forbans reef - Takamaka Primary school on Mahe 	MEECC, Nature Seychelles, SNPA, MCSS	At least 2 activities per year at each site	US \$ 1,000 per activity
	Collaborate with Wise Oceans to realise the marine holiday programme at Cap Ternay, and if feasible, expand to Praslin			US \$ 2,000 to purchase equipment

NOTE: Activities will guide development of teacher's manual mentioned above.

Community Development Plan (Seychelles)				
Target Group	Activities	Lead Agency	Timeline	Budget
Secondary school students	Engage students during Professional Development (PD) sessions to raise awareness on Climate Change issues and adaptation measures	Nature Seychelles, SNPA, MCSS	At least 2 activities per year at each site	?
	Provide equal opportunities for boys and girls to participate in month-long internships during the school holidays		?	?
	Identify individual for 6 month internships and train up to Rescue Diver level, with the option for full time employment in the future		?	US \$ 1,200 per person for complete PADI SCUBA training
	Develop a simplified coral reef and fish monitoring protocol for snorkelers (e.g similar to reef check) and engage students in basic monitoring activities		At least 2 activities per year at each site	US \$ 1,500 to develop, design & print protocol. US \$ 1,000 per activity

NOTE: Activities will guide development of teacher's manual mentioned above.

Community Development Plan (Seychelles)				
Target Group	Activities	Lead Agency	Timeline	Budget
Seychelles Maritime Academy (SMA)	Train SMA instructors in coral restoration techniques and Climate Change impacts and adaptation action	Nature Seychelles, SNPA, MCSS	?	?
	Incorporate coral restoration in the SMA diploma course		?	?
	Provide equal opportunities for boys and girls to benefit from month-long internships with each implementing agencies		?	?
	Provide training in basic coral and fish identification and monitoring techniques (possibly linking up with the GVI scholarship programme) and involve successful participants in monitoring changes at restoration sites		?	?
	Identify individuals for potential full-time employment in the future		?	?

NOTE: Insufficient information from SMA to expand on potential collaboration but they are eager to be involved. Need additional consultation when developing ProDoc.

Community Development Plan (Seychelles)				
Target Group	Activities	Lead Agency	Timeline	Budget
University of Seychelles / Blue Economy Institute	Engage BSc and MSc in coral research projects	Nature Seychelles, SNPA, MCSS	?	?
	Present findings at national and regional conferences (e.g. WIOMSA)		?	?
	Provide equal work opportunities (and equal pay) to University graduates (men and women) under the project		?	?
<p>NOTE: Insufficient information from UniSey/Beri to expand on potential collaboration. Need additional consultation when developing ProDoc.</p>				

Community Development Plan (Seychelles)				
Target Group	Activities	Lead Agency	Timeline	Budget
Environmental Youth Groups (Blue Economy Champions, Wildlife Clubs of Seychelles, SYAH, Eco-academia, Eco-school etc.)	Organise age-appropriate education and awareness activities as well as hands on sessions with environment youth groups, engaging non-diving volunteers in restoration effort (e.g. land-based nurseries) and where possible engaging diving volunteers in restoration effort (e.g. ocean-based nurseries, coral monitoring etc.)	Nature Seychelles, SNPA, MCSS	?	US \$ 1,000 per activity
	Provide equal opportunities for boys and girls to participate in month-long internships with each implementing agencies during the school holidays		?	?
	Identify individual for 6 month internships and train up to Rescue Diver level, with the option for full time employment in the future		?	US \$ 1,200 per person for complete PADI SCUBA training

Community Development Plan (Seychelles)				
Target Group	Activities	Lead Agency	Timeline	Budget
Environmental Youth Groups (Blue Economy Champions, Wildlife Clubs of Seychelles, SYAH, Eco-academia, Eco-school etc.)	Using the simplified coral reef and fish monitoring protocol for snorkelers (mentioned above) and engage youth in basic monitoring activities	Nature Seychelles, SNPA, MCSS	At least 2 activities per year at each site	US \$ 1,000 per activity
	Provide training in basic coral and fish identification and monitoring techniques (possibly linking up with the GVI scholarship programme) and involve successful older participants (18yrs+) in monitoring changes at restoration sites.		?	US \$ 1,000 per activity
	In collaboration with WCS, publish a marine themed magazine with emphasis on coral restoration		Year 4 of project	US \$ 3,000 to develop & design WCS magazine. & US \$ 4,500 to print 500 copies

Community Development Plan (Seychelles)				
Target Group	Activities	Lead Agency	Timeline	Budget
Black Pearl Farm	Sign MoU with MEECC for Pearl farm to supply clams from brood stock to implementing partners	MEECC	Year 1 of project	US \$ 30-40 per brood stock clam (25-30cm)
	Sign MoU with MEECC for Pearl farm to re-establish breeding programme and provide regular supply of clams to implementing partners		Throughout the project period	US \$ xx re-establish clam breeding programme & US \$ xx per clam from new stock (5-10cm)
	Asses the feasibility of setting up another farm for clams on Mahe Develop translocation protocols and monitor survival rates of translocated clams at each of the restoration sites	Nature Seychelles, SNPA, MCSS	?	?
			Year 1 of project	?

Community Development Plan (Seychelles)				
Target Group	Activities	Lead Agency	Timeline	Budget
Non-violent prisoners	Organise education and awareness activities as well as hands on sessions with non-violent prisoners, engaging non-diving day release prisoners in restoration effort (e.g. land-based nurseries) and where possible engaging divers in restoration effort (e.g. ocean-based nurseries, coral monitoring etc.)	Nature Seychelles, SNPA, MCSS	?	?
	Identify individuals for potential employment upon release, and train up to Rescue Diver level		?	US \$ 1,200 per person for complete PADI SCUBA training
	Provide equal work opportunities (and equal pay) to men and women under the project		?	?
	Provide training in basic coral and fish identification and monitoring techniques (possibly linking up with the GVI scholarship programme) and involve successful participants in monitoring activities		?	?

Community Development Plan (Seychelles)				
Target Group	Activities	Lead Agency	Timeline	Budget
Orphanages on Mahe	Organise age-appropriate education and awareness activities as well as hands on sessions with environment youth groups, engaging non-diving volunteers in restoration effort (e.g. land-based nurseries)	Nature Seychelles, SNPA, MCSS	?	US \$ 1,000 per activity
	Provide equal opportunities for boys and girls to participate in month-long internships with each implementing agencies during the school holidays		?	?
	Identify older individual for 6 month internships and train up to Rescue Diver level, with the option for full time employment in the future		?	US \$ 1,200 per person for complete PADI SCUBA training
	Provide training in basic coral and fish identification and monitoring techniques (possibly linking up with the GVI scholarship programme) and involve successful participants in monitoring activities		?	?



AFB Project Formulation Grant –
Restoring marine ecosystem services by rehabilitating coral reefs
to meet a changing climate future

QUESTIONS for Seychelles?

 
ADAPTATION FUND UNDP

3rd Steering Committee meeting
Care House, Mahe, Seychelles, Seychelles
20th – 21st June 2017



**AFB Project Formulation Grant
Restoring marine ecosystem services by rehabilitating coral reefs
to meet a changing climate future**

(June 2017)

GENDER & YOUTH ASSESSMENT & ACTION PLAN (SEYCHELLES)

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ANNEX 1 - Attendance list for the 2nd Steering Committee Meeting held in Mauritius (8th May 2017)

ANNEX 2 - Attendance list for the 1st Stakeholder Workshop held in Seychelles (12th May 2017)

ANNEX 3 - Attendance list for the 3rd Steering Committee Meeting held in Seychelles (20th – 21st June 2017)

1.0 INTRODUCTION

This report analyses gender and youth issues in Seychelles, with the aim of proposing a Gender Action Plan to ensure that the Seychelles component of the Project Proposal to the Adaptation Fund Board (AFB) for *“Restoring Marine Ecosystem Services by Rehabilitating Coral Reefs to Meet a Changing Climate Future”* adequately takes into consideration said issues and, further, provides a framework to measure and track these issues throughout the life of the Project.

The report consists of six chapters, including this Introduction.

Chapter 2.0 describes the approach applied in the formulation of this report, consisting of a desk review and stakeholder consultation.

Chapter 3.0 provides an overview of Seychelles’ achievements on gender issues and the significant steps taken by the country towards ensuring gender equality.

Chapter 4.0 provides an overview of Seychelles’ achievements on youth issues and the significant steps taken by the country towards ensuring youth engagement.

Chapter 5.0 summarizes key challenges faced by the country regarding gender and youth in the following areas: i) constitutional and legal rights, ii) governance and political participation, iii) education and training, iv) health, violence against women and bullying, vi) productive resources, employment and economic empowerment and vii) climate change, sustainable development and disaster risk management.

Chapter 6.0 elaborates the gender and youth action plan for the Seychelles component of the AFB project proposal *“Restoring Marine Ecosystem Services by Rehabilitating Coral Reefs to Meet a Changing Climate Future”*

2.0 METHODOLOGY

This document was developed through a desk review of relevant literature and consultations with relevant stakeholders, either through individual exchanges or as groups in stakeholder workshops.

The documentation reviewed for the preparation of this report is listed as footnotes in Chapters 3.0, 4.0 and 5.0.

As part of the process of preparation of the AFB Project Proposal, the Community Development Specialist (Seychelles) of the Project Development Team consulted with representatives of two Non-Governmental Organisations (NGOs) focused on women’s issues (Women In Action and Solidarity Organisation – WASO and Women In Partnership Against Poverty), as well as a

representative serving on the Gender, Rights and Governance Commission of the Citizens Engagement Platform Seychelles (CEPS), “ presently the only national umbrella organisation for civil society in Seychelles.”¹

For youth issues, the specialist consulted representatives from the Seychelles National Youth Council (SNYC) and two NGOs led by youth which focus on Climate Change (SIDS Youth AIMS Hub-Seychelles) and raising awareness on the Sustainable Development Goals (Global Shapers) and the CEPS Youth Commissioner who oversees 17 registered youth groups, including the tow mentioned above.

In addition, the specialist conferred with two local consultants (Benjamin Vel and Craig Francourt) who regularly report on gender and youth issues at a National level and an international gender specialist (Jose Gabral).

The above consultations focused on gender and youth issues in Seychelles to determine ways of incorporating these issues, where relevant, into the AFB Project design. The principal recommendations resulting from these consultations were: the inclusion of sex and age-specific indicators in the Project’s Logic Framework, the targeting of women-headed vulnerable households as beneficiaries, and the need for education and information activities, preferably with participation of NGOs and civil society groups, to ensure that potential participants and beneficiaries become aware of the Project. The AFB Coral Reef Restoration Project is responsive to these recommendations, as reflected in the Gender and Youth Action Plan in chapter 6 of this report.

In addition to the above, the Project Development Team held stakeholder workshops on the following dates: 8th May 2017, 12th May 2017 and 20th to 21st June 2017. These workshops aim to report on progress made on the Project design since the concept note was approved by AFB in June 2016 and obtaining feedback and recommendations from key stakeholders to improve the Project. Stakeholders from the public, private and civil society sectors involved in marine conservation (specifically reef restoration) and climate change issues attended and participated actively in both workshops, including a significant participation of women, as well as youth.

The attendance sheets for stakeholder workshops are included as Annexes 1, 2 and 3

¹ Citizens Engagement Platform: Seychelles *submission to the United Nations Universal Periodic Review*

3.0 PROGRESS TOWARDS GENDER EQUALITY IN SEYCHELLES

The Seychelles Constitution (1993)² declares the applicability of fundamental human rights and freedoms equally to women and men in its preamble and specifically in Chapter 3, termed the *Seychellois Charter of Fundamental Human Rights and Freedoms*.^{3, 4} As per the Constitution: “Every person has a right to equal protection of the law including the enjoyment of the rights and freedoms set out in this Charter without discrimination on any ground except as is necessary in a democratic society.”⁵

Gender equality is also established by other national laws, specifically the Civil Code (1976), the Commercial Code Act (1977) and the Status of Married Woman Act (1948), which establish that “...women no matter what their civil status in terms of marriage or other legal unions may dispose of their movable and immovable assets and properties as they so choose, without intervention of trustees or needing consent of the husband.”⁶

Because of legal protections, overt institutionalised discrimination against women is not customary in the country.⁷ This lack of open discrimination of women in Seychelles is also evident in the conservation sector where there is growing involvement of women in jobs, such as park rangers and researchers, which was once solely male-dominated.⁸

To a large extent, Seychelles has achieved Millennium Development Goal (MDG) 3, which focuses on the promotion of gender equality and empowerment of women.⁹ For instance, Seychelles has made substantial progress in terms of the level of women presence in key decision-making roles in the Cabinet, National Assembly¹⁰, judiciary, police, governing boards, national committees and business, and has surpassed the MDG target of 50% female representation in senior management positions at both the national and local government levels.^{11, 12}

With regards to the Southern African Development Community (SADC) Protocol on Gender and Development, Seychelles has achieved four of the provisions of the Protocol (1. equal pay for equal work and equal remuneration for work of equal value, 2. recognition of value of agricultural

² www.greybook.seylli.org/w/se/CAP42

³ Republic of Seychelles. Ministry of Social Development and Culture (2016) *The National Gender Policy*, p. 8.

⁴ Republic of Seychelles, Ministry of Foreign Affairs and UNDP (2015) *Seychelles Millennium Development Goals Status Report 2015*, pp. 38-39.

⁵ Republic of Seychelles. Ministry of Social Development and Culture (2016) *The National Gender Policy*, p. 8.

⁶ Republic of Seychelles, Ministry of Foreign Affairs and UNDP (2015) *Seychelles Millennium Development Goals Status Report 2015*, p. 39.

⁷ Republic of Seychelles. Ministry of Social Development and Culture (2016) *The National Gender Policy*, p. 11.

⁸ This information is based on personal communication with the CEO of the Seychelles National Parks Authority (SNPA) – 3 of the 20 rangers they currently employ are women while the Research Unit is dominated by women (5 women: 1 man).

⁹ Republic of Seychelles, Ministry of Foreign Affairs and UNDP (2015) *Seychelles Millennium Development Goals Status Report 2015*, p. 9.

¹⁰ Unfortunately, since the MDG report was released, the National Assembly women representation went down from 44% to 21% during the 2016 election due to a reduction in the number of female candidates in relation to previous elections, as well as less women candidates being elected.

¹¹ Republic of Seychelles. Ministry of Social Development and Culture (2016) *The National Gender Policy*, p. 12.

¹² Executive Board of UNDP, UNPF and UNOPS (2016) *Draft Country Programme Document for Seychelles (2017-2020)*, p. 2.

and domestic work, 3. appropriate minimum remuneration for agricultural and domestic work, and 4. equal employment benefits), largely achieved a fifth provision (equal access to wage employment) and has enacted appropriate laws and regulations that ensure compliance with three other provisions (1. prohibition of occupational segregation and discrimination at work, 2. legislative measures prohibiting dismissal or denial of recruitment on basis of pregnancy or maternity leave, and 3. protection and benefits for maternity and paternity leaves).¹³

Seychelles is a signatory to eight core International Human Rights Treaties and five main Optional Protocols. The key international instruments with gender-relevant content are the following:

1. Southern African Development Community (SADC) Protocol on Gender and Development.
2. Convention on the Elimination of all Forms of Discrimination against Women.
3. Optional Protocol to the Convention on the Elimination of All Forms of Discrimination against Women.
4. Protocol to the African Charter on Human and Peoples' Rights on the Rights of Women in Africa (Maputo Protocol).
5. Common Market for Eastern and Southern Africa (COMESA) Gender Policy and the Addis Ababa Declaration on Gender.
6. Beijing Platform for Action, signed in the framework of the United Nations Fourth World Conference on Women.
7. International Covenant on Civil and Political Rights.
8. International Covenant on Economic, Social and Cultural Rights.
9. Convention on the Rights of the Child.
10. Optional Protocol to the Convention on the Rights of the Child on Sale of Children, Prostitution and Pornography.

Seychelles launched its Gender Policy on the 25th November 2016. This is in line with provisions of the SADC Protocol on Gender and Development and follows the orientations on gender mainstreaming issued by the SADC Secretariat, the Commonwealth Secretariat and the United Nations.¹⁴

4.0 PROGRESS TOWARDS YOUTH ENGAGEMENT IN SEYCHELLES

Chapter 3 of the Seychelles Constitution (1993), entitled the *Seychellois Charter of Fundamental Human Rights and Freedoms*, and in Article 30 specifically, recognises that “*The State recognises the right of children and young persons to special protection in view of their immaturity and vulnerability...*” Therefore, children and youth have some special consideration as citizens which also lends them special protection from social, economic, moral and physical exploitation. This is

¹³ Republic of Seychelles, Ministry of Foreign Affairs and UNDP (2015) *Seychelles Millennium Development Goals Status Report 2015*, pp. 36-37.

¹⁴ Republic of Seychelles. Ministry of Social Development and Culture (2016) *The National Gender Policy*, p. 8.

further reinforced by several international conventions and treaties, national legislation and policies.

The Seychelles is a signatory to the United Convention on the Rights of the Child, the International Covenant on Civil and Political Rights and the International Covenant on Economic, Social and Cultural Rights. All these conventions provide for protection and fulfilment of rights which include citizens who are children, youth and adults, as the specific case may be.

Nationally, the Children Act 1982 (consolidated with subsequent amendments to July 2016)¹⁵ makes provision to ensure that children up to the age of 17 years, the age of maturity being 18 years, are given all the protection they need in society, especially to prevent any form of abuse and exploitation. These provisions are important when there are disputes in terms of custody, maintenance, access, adoption, fostering and any other decisions that can have a major impact on the future of the child.

The Education Act 2004 (consolidated with subsequent amendments to July 2012)¹⁶ stipulates, in Part 4, Section 43, the rights and responsibilities of children and their parents. These include the right to quality education and choice in education. The Act covers all primary and secondary state and private schools and educational institutions. It also outlines the obligations and rights of teachers and educational institutions. Other laws cover tertiary education, university and non-university (professional centres).

The Seychelles National Youth Council Act (Act 15 of 1997) establishes a Seychelles National Youth Council (SNYC) whose primary roles are, amongst others, to *“assist in the formulation and revision of the national youth policies... Offer a medium of regular dialogue between the youth and Government on matters pertaining to youth.”*¹⁷ Moreover, as its vision is to: *“... empowers (sic) the youth to be responsible, self-motivated and willing to contribute to their own wellbeing and that of Seychelles,”*¹⁸ its mission is to ensure that it provides equal opportunities to all youths (defined as young persons aged from 15 to 30 years) to fully develop physically, artistically, spiritually, educationally and morally through empowerment, participation, programmes, and advocacy of youth interests at national and international level.”

The National Youth Policy 2013-2017 which came into force in September 2013 was compiled following numerous consultations over several months with government agencies, civil society organisations and youth representatives from Mahé, Praslin and La Digue. The goal of the Policy is to provide *“... an appropriate framework to enhance the aptitude of the youth, properly address their needs and offer appropriate services, opportunities and support for their holistic development.”*¹⁹

¹⁵

<http://greybook.seylli.org/w/se/CAP28#!fragment//KGhhc2g6KGNodW5rxIVhbsSHb3JUZXh0OicnKSxub3Rlc1F1ZlZlJ5xJYnLHNjcm9sbEPEiMSKOiFuxKdIYXLEh8SgxKLEpMSXxLTetsSHU8SQdELEpFJFTEVWQU5DRSx0YWI6dG9jKSk=>

¹⁶ Republic of Seychelles (2004) Education Act

¹⁷ <http://www.snyc.info/test/>

¹⁸ <http://www.nation.sc/article.html?id=251754>

¹⁹ Republic of Seychelles, Seychelles National Youth Council (2013) *Seychelles National Youth Policy* p.8

In terms of programmatic actions, there have been several initiatives to support the implementation of youth-related policy objectives. The National Youth Policy Forum is a multi-sectorial working group whose primary role is to provide advice and make recommendations to ensure the youth policy objectives in key areas are effectively fulfilled, namely in education and training, economic participation, health and well-being, social ills, promotion of youth empowerment and moral values.

Conversely, the Seychelles National Youth Assembly (SNYA)²⁰, launched in 2003, is an educational forum, which aims at providing its members with the opportunity to nurture their knowledge and learning, as well as enabling them to develop their search and speaking skills. It is meant to be a non-political forum.

A number of non-state initiatives have also been launched to engage the youth more meaningfully in programmes of national importance, especially in environment conservation and protection. A Seychelles Chapter of a regional network of young people in Small Island Development States (SIDS) in the Atlantic, Indian Ocean, Mediterranean, and South China Sea (AIMS) is a youth-led NGO promoting and advancing youth-led sustainable development projects.²¹ It has conducted several activities to encourage the involvement of young people in the Blue Economy, such as internship in the Blue Economy Department and work attachment in Mauritius.

According to the Seychelles Sustainable Development Strategy (2012-2020), Government has shown commitment to Education for Sustainability (EFS) programmes, with the most active stakeholders in the sector being the Department of Environment and the Ministry of Education. While NGOs like Nature Seychelles and Wildlife Clubs of Seychelles (WCS) have traditionally been active, over the past few years more environmental NGOs have become established and most have Environmental Education (EE) programs which they implement in coordination with other partners like schools, the media, youth networks (Care clubs, young citizens, Scouts), faith-based groups, community environment clubs, and hotels.²²

5.0 KEY CHALLENGES IN RELATION TO GENDER AND YOUTH

Despite the tremendous progress made by Seychelles in gender equality and youth engagement reported in the previous two chapters, the country faces some challenges. This chapter discusses the key challenges in the following areas: i) constitutional and legal rights, ii) governance and political participation, iii) education and training, iv) health, violence against women and bullying, vi) productive resources, employment and economic empowerment and vii) climate change, sustainable development and disaster risk management.

²⁰ <http://www.snyc.info/snya/>

²¹ <http://syah-seychelles.weebly.com/about.html>

²² Republic of Seychelles, Department of Environment (2012) *Seychelles Sustainable Development Strategy (2012-2020)*, volume 2, p. 261.

Please note that these categories listed below are not exhaustive, but represent areas where sufficient data was available to report on.

5.1 Constitutional and Legal Rights

Although open discrimination against women is not evident in Seychelles, there are inconsistencies between stipulations of international and regional instruments dealing with gender issues and national criminal law, specifically shortcomings in the fair enforcement of criminal law as is evident in some of “... *the outcomes of legal matters such as rape and domestic violence cases*”. This highlights the need for gender-sensitive training of public officials in the criminal system (judges, magistrates, tribunal members, lawyers, police officers, etc.).

There are numerous challenges for youth in terms of their access to sexual and reproductive health rights as well as discriminatory laws for employment, marriage, the age of consent for sex and gender identity and expression. With regards to sexual and reproductive health rights, the age of consent for sex is 15 years, but it is difficult to have access to contraceptives, except condoms before the age of 18 years without the consent of the parents. Usually, this situation is circumvented by medical personnel who place the best interest of the child in terms of their physical and mental wellbeing first and that allows them to take appropriate actions as necessary. However, this is also done largely on a personal basis rather than an established protocol from the Ministry of Health.

While the Constitution (Chapter 3, Article 31(a)) allows young people to work at the age of 15 years and the Employment Act of 1995²³ with amendments makes provision for minors entering binding contracts (Section 20) and for non-discriminatory behaviour (Part VI, 46A) on basis of “*age, gender, race, colour, nationality, language, religion, disability, HIV status, sexual orientation or political, trade union or other association*” there is no guarantee that the child will be treated fairly and according to the law by the employers. The child would simply leave the position and seek employment elsewhere, without necessarily reporting mistreatment to the relevant authorities.

There is still confusion about gender differences in the law regarding marriage as minors requiring the consent of parents. Both boys and girls cannot marry unless they are 18 years of age and thus at the legal age of maturity. Presently, in Seychelles, same-sex marriages are not legal. This constitutes discrimination against sexual minorities, despite the repeal of Penal Code Section 151 in 2016 which stipulated that sodomy was illegal.

²³ Republic of Seychelles (1995) *Employment Act 1995*

5.2 Governance and Political Participation

Women representation in the public decision-making arena is substantial yet the main challenge is in the private sector, where a relatively recent survey showed that there was only one female holding both the Chief Executive Officer and Director positions among the eight largest and most profitable private companies in Seychelles.²⁴

Young people are involved in governance and political participation either through their affiliation with the various parties' youth groups or the Seychelles National Youth Assembly or their actions in civil society groups which are engaged in civil and political work. For now, the participation is still partisan and there is little effort to ensure that there is a group that brings youth together nationally and without partisan political influence. More youth groups and youth-focused NGOs are involved in morality work through specific religious denomination affiliations.

5.3 Education and Training

In line with Article 33 of the Constitution of Seychelles²⁵, boys and girls have equal access to 11 years of free and compulsory schooling. The enrolment rate and primary school completion rate is nearly 100% for both sexes²⁶ yet the quality of educational outcomes continue to be an issue in Seychelles with low national examination results, with consistently low averages (<50%) in all subjects resulting in a significant number of functional illiterate school leavers.²⁷

For those who make it to tertiary education institutions, both non-university and university, enrollment data show that more males attend trades and technological institutions (carpentry, masonry, electronics) and maritime studies institutions (marine biology, seamanship, navigation), while more females are enrolled in institutions focusing on human services (health, social work, business administration and management, and tourism). While gender stereotypes still prevail in tertiary vocational and technical education, this situation is gradually changing.²⁸

5.4 Health, Violence Against Women and Bullying

The Ministry of Health has a dedicated programme of family health which encompasses the following programmes: expanded programme on immunisation, child health, school health, youth health, reproductive health, men's health, antenatal and postnatal programmes and the Early Childhood Intervention Centre.²⁹ However, there are still challenges for groups of women and girls to access services for sexual and reproductive health. Girls who are minors and sexually

²⁴ Republic of Seychelles, Ministry of Foreign Affairs and UNDP (2015) *Seychelles Millennium Development Goals Status Report 2015*, p. 40.

²⁵ <http://greybook.seylli.org/w/se/CAP42>

²⁶ Republic of Seychelles, Ministry of Social Development and Culture (2016) *The National Gender Policy*, p. 13.

²⁷ Republic of Seychelles, Ministry of Foreign Affairs and UNDP (2015) *Seychelles Millennium Development Goals Status Report 2015*, p. 31.

²⁸ Republic of Seychelles, Ministry of Education (2015) *Education Statistical Booklet 2014*.

²⁹ Republic of Seychelles, Ministry of Foreign Affairs and UNDP (2015) *Seychelles Millennium Development Goals Status Report 2015*, p. 45.

active and Female Sex Workers (FSW), while in theory should access services easily enough, experience judgemental attitudes and discriminatory behaviours from some medical and health professionals. In fact, the recent Integrated Behavioural and Biological Surveillance Survey (IBBS) on Female Sex Workers (FSW) showed that 25% of FSW who experience a symptom of a sexually transmitted disease would not seek treatment.³⁰

Both sexes experience violence. However, women and girls are disproportionately represented in all types of violence by a ratio of more than 1:12³¹, except for physical violence towards boys. In 2015, there were 91 reported cases of physical abuse of minors; 45 cases were males and 46 were females. Men may underreport situations of gender-based violence as it is still taboo to experience such in Seychellois society. Nevertheless, the situation is serious enough that the Department of Social Affairs and the Ministry of Education have collaborated with tertiary non-university institutions to develop a Gender-Based Violence Curriculum for the students as part of their prevention programmes.³²

Vulnerable women such as FSW and men such as People Who Use Drugs (PUDs) or People Who Inject Drugs (PWID) report experiencing violence. Thirty-seven percent of FSW had experienced violence in the past year, whereas 21% had been forced to have sex against their will.³³ The same report also indicated that “... *physical violence was most likely to be suffered at the hands of the steady boyfriend or the husband (20 or 34.5%), the one-time client (9 or 15.5%) and the police (8 or 13.8%). Respondents were just as likely to be assaulted by unknown persons as they were by the police.*”³⁴ As for PUD and PWID, an IBBS conducted in 2011 showed similar results with 68% reporting verbal insults and 2% reporting being hit, kicked or beaten in the past 12 months, especially when someone believed the respondents had had sex with other men.³⁵ In terms of sexual violence, 83% reported being forced to have sexual intercourse in the past 12 months.³⁶ Fifty-four percent of Men having Sex with Men (MSM) reported being arrested in the past 12 months. It is important to note that the respondents for this study were mostly young (aged from 18 to 34 years: 78%) and male (80%).

5.5 Productive Resources, Employment and Economic Empowerment

There are gender disparities in management in the private sector, with an overwhelming presence of males on boards of directors and as chairpersons of large private firms. Women operate mostly small and medium enterprises, especially cottage industries.

³⁰ Republic of Seychelles, Ministry of Health (2016) *The Integrated Behavioural and Biological Survey of Female Sex Workers* p.47.

³¹ Republic of Seychelles, Department of Social Affairs (2017) *Gender-Based Violence Curriculum: A New Approach for Post-Secondary Institutions* p. 29-30

³² Ibid.

³³ Republic of Seychelles, Ministry of Health (2016) *The Integrated Behavioural and Biological Survey of Female Sex Workers* p. 55

³⁴ Ibid; p. 55

³⁵ Republic of Seychelles, Ministry of Health (2012) *Injection Drug Use in the Seychelles, 2011: Integrated Biological and Behavioral Surveillance Survey - Round I* p.53

³⁶ Ibid., p.53

In terms of employment, the most recent survey available³⁷ shows only a 2.8% disparity in favour of the number of employed men over women. There are wage gaps between men and women, with the former earning higher salaries. In addition, there appears to be some gender stereotyping in the workplace, with more women holding jobs in the health and education sectors, as compared to the male dominated jobs, such as economic planning, banking and engineering.³⁸

With regards to youth unemployment, this is reported 2.7 times higher than the overall unemployment rate in Seychelles with the female youth rate 3.2 times higher and the male youth rate 2.2 times higher than their corresponding national rates.³⁹

However, women with children face particular difficulties when they are engaged in shift work. They worried about the welfare of their children during their absence and some even left them with other siblings as young as 14 years of age.⁴⁰ These issues need to be taken into consideration when any project or programme want to engage employed women and girls in their activities.

In 2014, the Seychelles had the unenviable distinction of having the highest incarceration rate in the world, with 799 per 100,000 population.⁴¹ This situation was a significant departure from the norm of some 100 inmates in the only prison in the country - Long Island Prison, which had a high-security wing. In 2017, there are now five main facilities: Montage Posée Prison on the island of Mahé, the facility housing drug traffickers on Marie-Louise Island, the prison on Coetivy Island for drug offenders, the holding cells for remanded prisoners awaiting trial and the wing built by the UNODC in 2012 to house the Somali pirates. *"In previous years, the female prison could stand empty for years, with no prisoner or one or two at a time. Presently, at Montage Posée Prison, there are more than 25 female inmates whose main offences are linked to drug possession and importation."*⁴² The ratio of female to male inmates varies from 1:14 to 1:25.⁴³

5.6 Climate Change, Sustainable Development and Disaster Risk Management

It has become increasingly clear that the societal roles and responsibilities of men and women have an important influence on how they experience and respond to climate change impacts. Like most African countries, Seychellois women have the largest share of responsibility for child caring, house cleaning and cooking. This means that when epidemics and natural disasters strike, women tend to bear a larger burden of the share of the adaptation to the consequences of these phenomena. As such, it is important to identify gender sensitive strategies to respond to the environmental and humanitarian crises caused by climate change. It is also important to note the

³⁷ Republic of Seychelles, National Statistics Bureau (2013) *Labour Force Survey 2011-2012*.

³⁸ Citizens Engagement Platform, Seychelles (2015) *Draft Universal Periodic Review Report*.

³⁹ Republic of Seychelles, National Statistics Bureau (2013) *Labour Force Survey 2011-2012*, p.21

⁴⁰ Vel, B. and Larue, J. (2015) *Establishing the Social, Health and Economic Effects of Shift Work on Women in Seychelles* p.38
Seychelles Women Trust Fund, Republic of Seychelles

⁴¹ https://en.wikipedia.org/wiki/List_of_countries_by_incarceration_rate#Seychelles

⁴² Republic of Seychelles, Department of Social Affairs (2016) *The social, economic and psychological causes or factors of recidivism amongst Seychellois prisoners: Final Report* p.5

⁴³ Ibid, p. 9

role that women have as agents of change and the strong body of knowledge and expertise they possess that can be used in climate change mitigation, disaster reduction and adaptation strategies.

The Seychelles' Gender Policy notes that *"The key climate change related strategies and available research data are gender blind. Gender specific impacts of climate change in energy, water, food security, and disaster management are absent or not sufficiently analysed. Sex-disaggregated data is required to guide the development of targeted responses. There is a need to identify key populations at higher risk of climate change impacts and an urgent need to analyse their vulnerabilities. The role of women as change agents needs to be recognised and targeted"*⁴⁴. The Seychelles Sustainable Development Strategy 2012-2020,⁴⁵ also calls for gender-specific research and gender mainstreaming in its *"Human and Social Development Pillar"*.

The National Youth Policy 2013-2017 presents a rudimentary information on environment noting that the youth have the right to a clean environment and ensuring that the youth contributes to it.⁴⁶ However, there are various civil society groups that are engaging young people in environment protection, conservation and education such as the Wild Life Clubs based in schools, Seychelles Youth AIMS Hub (SYAH) and Seychelles Heritage Clubs also based in schools, which combine environment and natural heritage sites protection.

The AFB Coral Reef Restoration Project will contribute to filling the noted gaps in sex-disaggregated data in line with the provisions of the Adaptation Fund gender Policy (Annex 4 to Operational Policies and Guidelines for Parties), the United Nations 2017-2020 Country Programme Document for Seychelles,⁴⁷ as well as with the advancement of Objective 3.4.5 of the Gender Policy (*"Ensure the generation of sex-disaggregated data"*) by including specific indicators for this area in the Logic Framework, and the Monitoring and Evaluation Plan for the Project. A separate report is being prepared for the Gender Action Plan and will provide details for these indicators.

The AFB Project will also help to ensure that young people are more meaningfully engaged in national development priorities that are linked to socioeconomic sustainability based on sound management of the environmental assets. It is important to have sex-disaggregated data as well as level, type and location of youth participation in various programmatic actions to assess whether they have been meaningfully involved in the Project. To this end, the links with the stipulations of the National Youth Policy 2013-2017, the work of the National Youth Assembly and various youth NGOs will be essential components of the Project.

⁴⁴ Republic of Seychelles. Ministry of Social Development and Culture (2016) *The National Gender Policy*, p. 17

⁴⁵ Republic of Seychelles. Department of Environment (2012) *Seychelles Sustainable Development Strategy 2012-2020*.

⁴⁶ Republic of Seychelles, Seychelles National Youth Council (2013) *Seychelles National Youth Policy* p.10; p.13

⁴⁷ Executive Board of UNDP, UNPF and UNOPS (2016) *Draft Country Programme Document for Seychelles (2017-2020)*.

6.0 GENDER & YOUTH ACTION PLAN

This section of the report proposes a Gender and Youth Action Plan based on the findings of the above Gender and Youth Assessment for Seychelles. The aim is to ensure that the Seychelles component of the project proposal to the Adaptation Fund Board (AFB) for “*Restoring Marine Ecosystem Services by Rehabilitating Coral Reefs to Meet a Changing Climate Future*” adequately takes into consideration gender and youth issues. It provides suggested entry points for gender- and youth-responsive actions to be taken under each of the activity areas of the Project. In addition, the Gender & Youth Action Plan includes specific indicators to measure and track progress on these actions at the activity level. The ultimate goal is to incorporate these indicators into the detailed Monitoring and Evaluation Plan that will be developed at the start of Project implementation, so as to ensure that gender and youth data are collected and measured throughout implementation.

Project Component / Objective	Actions / Strategy	Performance / Target Indicators	Responsible entity
Overall project planning and implementation			
Engage women, youth and other vulnerable groups in project planning and implementation	<ul style="list-style-type: none"> • Using an adaptive management approach, develop a Community Development Plan • Ensure women and youth are included consultations prior to and during project implementation to ensure that they receive sufficient information about the project and create opportunities for them to voice their views on the project • Ensure appropriate social inclusion in decision-making • As needed, provide training on gender equality to agencies engaged with the project to improve their understanding of gender concerns and increase their capacity to implement the Project's gender action plan • Equal work opportunities (and equal pay) will be provided to men and women under the project • The MEECC-PCU and/or UNDP Seychelles will be responsible for monitoring and review of the above set targets for women and youth as per AFB reporting schedule 	<ul style="list-style-type: none"> • Community Development Plan completed at the start of the project and reviewed periodically • At least 40% women and 20% youth represented in consultation forums • At least 20% women and 10% youth on the project steering committee • Number of women's groups, youth groups and other vulnerable groups consulted during project implementation • Number of training sessions with organised • At least 30% women and 20% youth participation in training • Number of men and women involved in project activities • Gender & age disaggregated attendance lists for all project activities 	Ministry of Environment, Energy and Climate Change - Programme Coordination Unit of the (MEECC - PCU), UNDP Seychelles

Project Component / Objective	Actions / Strategy	Performance / Target Indicators	Responsible entity
COMPONENT 2 (SEYCHELLES): To improve food security and livelihoods and mitigate disaster risk through active restoration of coral reefs degraded by coral bleaching as a result of climate change in Seychelles, in order to restore their essential ecosystem services			
2.1 Development of a sustainable partnership and business approach to reef restoration	<ul style="list-style-type: none"> Local communities and businesses entrepreneurs benefit from improved livelihoods through employment including but not limited to reef restoration, sea scaping, marketing etc. Community consultations are carried during the first 6 months of the project with special consideration given to women, youth and vulnerable groups 	<ul style="list-style-type: none"> Number of partnership agreements signed with private sector and community groups Number of men, women and youth employed Number of community consultation meetings Number of women's groups, youth groups and other vulnerable groups consulted 	Nature Seychelles (lead) & collaboration with SNPA, MCSS and MEECC
2.2 Establishment of coral farming and nursery facilities	<ul style="list-style-type: none"> Selection of nursery sites Establish legal status for nursery sites and transplantation areas outside existing protected areas 	<ul style="list-style-type: none"> Site specific stakeholder analysis completed once nursery sites and translocation sites finalised Number of men, women, youth and vulnerable groups consulted in site selection 	Nature Seychelles (lead) & collaboration with SNPA, MCSS and MEECC
2.3 Active restoration of degraded reefs, with maintenance and monitoring of survival and growth rates of transplanted corals	<ul style="list-style-type: none"> Active restoration of degraded reefs provides equal opportunities for men, women and youth 	<ul style="list-style-type: none"> Number of men, women and youth trained up to Rescue SCUBA diver level Number of men, women and youth trained in restoration techniques Number of men, women and youth actively engaged in restoration effort 	Nature Seychelles (lead) & collaboration with SNPA, MCSS and MEECC

Project Component / Objective	Actions / Strategy	Performance / Target Indicators	Responsible entity
2.3 Active restoration (cont..)	<ul style="list-style-type: none"> Monitoring of survival and bleaching of natural, donor and transplanted colonies before, during and after restoration actions Reproduction and recruitment surveys at restored reefs Publication of scientific manuscripts 	<ul style="list-style-type: none"> Number of men, women and youth trained in monitoring techniques Number of men, women and youth engaged in monitoring effort Number of men, women and youth trained in monitoring techniques Number of men, women and youth engaged in monitoring effort Number of men, women and youth co-authoring scientific manuscripts 	Nature Seychelles (lead) & collaboration with SNPA, MCSS and MEECC
COMPONENT 3 (SEYCHELLES & MAURITIUS): To generate knowledge and understanding about the use of coral restoration as an adaptation measure for dissemination to other SIDS and countries within the wider region, and to build capacity for this intervention in the Western Indian Ocean, by adopting a regional approach, it is expected that the stakeholders involved will develop technical and scientific partnerships as well as a common understanding that will enable them to promote the use of effective natural solutions in adaptation and disaster risk reduction.			
3.1 Improved understanding and knowledge management of use of reef restoration as an adaptation measure	<ul style="list-style-type: none"> Ensure that all coral reef restoration efforts are science-based 	<ul style="list-style-type: none"> Number of men, women and youth co-authoring scientific papers, reviewing and analysing coral restoration efforts in the region and globally Number of men, women and youth co-authoring scientific paper on site selection criteria developed for nursery, transplantation sites and coral propagation 	Nature Seychelles (lead) & collaboration with SNPA, MCSS and MEECC
Project Component / Objective	Actions / Strategy	Performance / Target Indicators	Responsible entity
Lessons learned regionally and globally on methods and approaches to sustainable reef restoration are disseminated	<ul style="list-style-type: none"> Improved understanding of coral reef restoration for the Western Indian Ocean region 	<ul style="list-style-type: none"> Number of men, women and youth participating in regional workshops and exchanges 	Nature Seychelles (lead) & collaboration with SNPA, MCSS and MEECC

	<ul style="list-style-type: none"> • Improved understanding of community based coral reef restoration • Streamline process of coral reef restoration procedures 	<ul style="list-style-type: none"> • Number of scientific papers, broadcast media, social media reports produced by men, women and youth • Community coral reef restoration guidelines produced in consultation with men, women and youth • Number of community workshops organised to disseminate lessons learnt • Number of men, women and youth involved in developing the Reef Restoration Toolkit and manual • Number of Reef Restoration Toolkits and manuals disseminated to men, women and youth • Number of community workshops organised to disseminate lessons learnt 	
Project Component / Objective	Actions / Strategy	Performance / Target Indicators	Responsible entity
Training to build capacity for sustainable coral reef restoration	<ul style="list-style-type: none"> • Design and implementation of 2-week training programs (Training for Trainers Program) on coral reef restoration • Design and implementation of 2-week training programs (Basic Program) in coral reef restoration • Training of key members from main regional stakeholders 	<ul style="list-style-type: none"> • Number of training programs conducted per year • Number of men, women and youth certified as Trainers in Coral Reef Restoration • Number of training programs conducted per year • Number of men, women and youth certified as Practitioners in Coral Reef Restoration • Number of local and regional stakeholder groups trained 	Nature Seychelles leads training, SNPA & MCSS supports community based – restoration & NGO training

Annex 1

Attendance list for the 2nd Steering Committee Meeting held in Mauritius (8th May 2017)

10F = 20M

Murderer - 2017

Name	Designation	Company	Email	Tel	Signature
1. Samantha Herbert	Programme Assistant	GEF SGP UNDP	SamanthaH@unp.org	213 5384	
2. Veronique Herve	D. rector	Nature Sey	nature@seychelles.net	251 8350	
3. JURE BILFoux	ASSISTANT	UNEP-BEA PRO SECT	judebijoux@gmail.com	+358271477	
4. Lyndy Postle	National Coord.	GEF SGP UNDP	lyndy.postle@unp.org	+248 524 896	
5. Athina Parasuram	Regional Tech Advisor	UNEP-GEF	athina.parasuram@unp.org	+231 6 250 3314	
6. S. Khadice	D. SO	RE of Forest	s.khadice@gmail.com	238 4100	
7. E. Talma	Consultant	UNDP	elie.talme@gmail.com	259 0772	
8. F. Lambert	CEO	SMTA Sey.	flami.jam@smta.sc	2922890	
9. A. Dias	Apprentice	Ministry of Environment (SE)	a.dias@env.gov.sc	272 7006	
10. D. Rowan	Director	PROCS	dian.rowan@procs.sc	2513571	
11. S. FALMSTON	Staff Consultant	SmithKline	Sfalms@sk.com	—	
12. R. Senechal	PROCS	M / Komas	rsenechal@gmail.com	5718 214	
13. A. KERSHIA	MAPPING EDUCATOR	USSECEANS	KASHIA@USSECEANS.COM	—	
14. P. BACHA GABA	Research Scientist	HOI	pbacha@hoi.info	206 0560	
15. F. Apparon	Analyst	MOFED	Fapparon@mo.gov.mur	2012749	
16. P. Wese		UNEP/CDS	pwese@unp.org	2517870	
17. S. Sargent		GEF SGP UNDP			
18. Samuel Attard	DC	GEF SGP UNDP			

F = female

PTO

Second Regional Steering Committee Restoring marine ecosystem services by rehabilitating coral reefs to meet a changing climate future Le Meridien Hotel, Balabava						
Name	Designation	Company	Email	Tel	Signature	
1. P. Y. Muband	ORS	MOL	gacheml@moj.go.tz gacheml@moj.go.tz	2034300		
2. B. B. Juma	AKS	"	admirer@moj.go.tz	"		
3. P. M. Mwan	RS	MOI	gmvise@moj.go.tz	"		
4. P. Ramharan	RS	MOI	vramharan@moj.go.tz	"		
5. N. P. P. P. P.	Technical Officer	MOI	nblumulo@moj.go.tz	258 4108		
6. N. P. P. P.	ENVIRONMENTAL	MENKESD	nsoyane@moj.go.tz	59189241		
7. S. P. P. P.	Technical Officer	MOI	stanzak@moj.go.tz	2384100		
8. P. P. P. P.	Scientist	MOI	umwamwam@moj.go.tz	2034300		
9. P. P. P. P.	Programme Assistant	UMDP	zabwazi.khumbani@moj.go.tz	2034301		
10. P. P. P. P.	Project Assistant	"				
11. P. P. P. P.	Manager	"				
12. P. P. P. P.	Programme Officer	"				
13.						
14.						
15.						
16.						
17.						
18.						

→
F

F = female

Annex 2

Attendance list for the 1st Stakeholder Workshop held in Seychelles (12th May 2017)

8F: 9M




 AFB PROJECT PROPOSAL GRANT: STAKEHOLDER CONSULTATION
 SFA TRAINING ROOM - 12th May 2017

	NAME	ORGANIZATION	EMAIL/PHONE	SIGNATURE
F	Chloe Poes-Schoore	Marine Conservation Society, Seychelles	chloe.poes@hutchinson-fr.com 25 00 256	
	Andrew Ginnel-John	PCU	2482965	
	David Roubt	MOSS	david@moos.com	
	Chris Meunier-Parker	QVI	seychelles@qvi.com	
F	Kerstin Heuri	Nature Se2	nature@seychelles.net K. Heuri	
	Ben Taylor	Wise Oceans	Ben@wiseoceans.com 2766 926	
F	Georgina Baresford	Wise Oceans	georgina@wiseoceans.com 2883267	
	Sude Bisoux	UNEP-EBA	judebisoux@gmail.com 2766 926	
F	Frances A Benstrong	Atuel Student, Blue Economy Champion	francesa@atuel.com	
F	Dr. Sarah Frias-Torres	SMITHSONIAN INSTITUTION	S.frias@si.edu @gnail.com	
F	Elhe Talma	CONSULTANT	elhe.talma@gmail.com	
F	Preeti Nair	INBP	preeti.nair@unep.org	
	PS Deconard	MGECC		
	Sami Leblond	Moss/CECP	2766 926	
	Kevin Maman	MGECC	kmaman@unep.org	
F	Isabelle Ravina	SNPA	iravina@unep.org	
	Flavien Tubet	SNPA	flavien.tubet@unep.org	


F = female

Annex 3

Attendance list for the 3rd Steering Committee Meeting held in Seychelles (20th -21st June 2017)





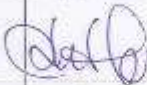
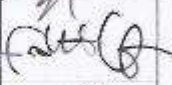



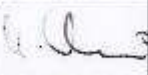








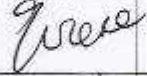
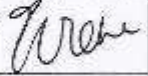

ADAPTATION FUND



UN
DP

**AFB Project Formulation Grant –
Restoring marine ecosystem services by rehabilitating coral reefs
to meet a changing climate future**

CARE HOUSE
20-21st June 2017

SNO	NAME	SIGN	
		20 June	21 June
1	Savi: 72011@gmail.com Savinien Leblond (MESS)		
F 2.	Atiko Yamamoto		
3.	WIRMAL SHAI		
F 4.	Kerstin Heleri		
5.	Fabiani Appau		
6.	BACHA GIAN SURAJ		
7.	S. Khadun		
F 8.	Ms Annouchka RAMCHARRUN		
F 9.	Emilie C. Wiehe		
F 10.	SARAH FRIAS-TORRES		



ADAPTATION FUND



AFB Project Formulation Grant –
Restoring marine ecosystem services by rehabilitating coral reefs
to meet a changing climate future

CARE HOUSE

20-21st June 2017

SNO	NAME	SIGN	
		20 June	21 June
	11 S. Ramchurn UNDP.		
F	12 Ashley Dias MEECC		
	13 ALAIN DE COMAROND ^{MEECC, Secrétaire Principale}		
	14 JUDE BISOUX ^{- Consultant, NGO ANBA LAO}		
F	15 Isabelle Ravinia (SNPA)		
	16 BEN TAYLOR ^{WISSECOGANS}		
	17 Roland Alenda. UNDP		
F	18 Elke Talma. Consultant		
F	19. Lyndy Bastienne - SGP-UNDP-Ly.		
	Ben Talma		

Terms of Reference for Project Staff /Consultants

Key Terms of Reference

Included herein:

- Regional Project Manager (RPM)
- Project Assistant (PA)
- Financial Assistant (FA)
- Chief Technical Advisor (CTA)
- Project Gender Officers
- Project Steering Committee (PSC)
- Project National Coordination Committee (PNCC)
- Regional Scientific Advisory Committee (RSAC)

1. Regional Project Manager (RPM)

Background

The Regional Project Manager (RPM) will be locally recruited based on an open competitive process. He/She will be responsible for the overall day-to-day management of the project, including the mobilization of all project inputs, supervision over project staff, consultants and sub-contractors. The RPM will report to the UNDP-CO, in close consultation with the host institution for all the project's substantive and administrative issues. From the strategic point of view of the project, the RPM will report on a periodic basis to the Project Steering Committees (PSC) at the regional level and to the Project National Coordinating Committees (PNCC) at the national level. Generally, the RPM will be responsible for meeting government obligations of the two countries under the project, under the Direct Implementing (DIM) Modality. He/She will perform a liaison role with the Government, UNDP and other UN Agencies, NGOs and project partners, and maintain close collaboration with any donor agencies providing co-financing.

Duties and Responsibilities

- Supervise and coordinate the production of project outputs, as per the project document;
- Mobilize all project inputs in accordance with UNDP procedures for nationally executed projects;
- Supervise and coordinate the work of all project staff, consultants and sub-contractors;
- Coordinate the recruitment and selection of project personnel;
- Prepare and revise project work and financial plans, as required by UNDP;
- Liaise with UNDP, relevant government agencies, and all project partners, including donor organizations and NGOs for effective coordination of all project activities; Facilitate administrative backstopping to subcontractors and training activities supported by the Project;
- Oversee and ensure timely submission of the Inception Report, Annual Progress Report (APR), Technical reports, quarterly financial reports, and other reports as may be required by UNDP, AFB and other oversight agencies;
- Disseminate project reports and respond to queries from concerned stakeholders;
- Will act as Secretariat to the PSC and PNCCs.
- Report progress of project to the PSC, and ensure the fulfilment of its directives;

- Oversee the exchange and sharing of experiences and lessons learned with relevant community based integrated conservation and development projects nationally and internationally;
- Ensures the timely and effective implementation of all components of the project;
- Carry out regular Environmental and Social Impact monitoring, as required
- Handle any grievances received and respond accordingly as per the Stakeholder Response Mechanism of UNDP.
- Assist community groups, municipalities, NGOs, staff, students and others with development of essential skills through training workshops and on the job training thereby upgrading their institutional capabilities;
- Coordinate and assists scientific institutions with the initiation and implementation of all field studies and monitoring components of the project; and
- Perform any other duty relevant to the assignment.

Competencies

Corporate Competencies:

- Demonstrates integrity by modelling the UN's values and ethical standards;
- Promotes the vision, mission, and strategic goals of UNDP;
- Displays cultural, gender, religion, race, nationality and age sensitivity and adaptability; and
- Treats all people fairly without favouritism.

Functional Competencies:

Knowledge Management and Learning:

- Promotes a knowledge sharing and learning culture in the office;
- In-depth knowledge on sustainable development issues and the mainstreaming of biodiversity conservation;
- Ability to advocate and provide policy advice; and
- Actively works towards continuing personal learning and development in one or more Practice Areas, acts on learning plan and applies newly acquired skills.

Development and Operational Effectiveness:

- Ability to lead strategic planning, results-based management and reporting;
- Ability to lead formulation, implementation, monitoring and evaluation of sustainable development programmes and projects, and mobilize resources;
- Good knowledge of the Results Management Guide and Toolkit;
- Strong IT skills; and
- Ability to lead implementation of new systems and processes, and affect staff behavioural/ attitudinal change.

Management and Leadership:

- Focuses on impact and results for the client and responds positively to feedback;
- Leads teams proactively and effectively and shows conflict resolution skills;
- Consistently approaches work with energy and a positive, constructive attitude;
- Demonstrates strong oral and written communication skills;
- Builds strong relationships with clients and external actors;
- Remains calm, in control and good humoured even under pressure; and

- Demonstrates openness to change and ability to manage complex situations.

Required Skills and Experience

Education:

- A Master degree in Environmental, Natural Sciences or Natural Resources Management;
- Master degree in management/project management is also highly desirable and can be accepted in place of a degree in Environment if completed by adequate experience.

Experience:

- At least 5 years of experience in natural resource planning and management;
- At least 5 years of project/programme management experience and at least 3 years of experience in international/regional project management
- Working experience with the project national stakeholder institutions and agencies is desired;
- Ability to effectively coordinate a large, multi-stakeholder project;
- Ability to administer budgets and prepare work plans;
- Ability to mobilize, train and work effectively with counterpart staff at all levels and with all groups involved in the project;
- Working experience with donor funded projects (UNDP, UNDEP, GEF, AFB, EU, WHO, FAO, etc) will be an advantage.
- Strong drafting, presentation and reporting skills;
- Good IT skills (word processing, presentation, spread sheets, internet, email); and
- Excellent oral and written communication skills.

Language:

- Fluency in English and French (written & spoken).

Nationality:

- international.

2. Project/Finance Assistant

Background

The Project/Finance Assistant will be locally recruited based on an open competitive process. He/She will be responsible for the overall administration of the project. The Project/Finance Assistant will report to Regional Project Manager. He/She will be based in Mauritius. Generally, the Project/Finance Assistant will be responsible for supporting the Regional Project Manager in meeting the two governments obligations under the project, under the Direct Implementation (DIM) Modality.

Duties and Responsibilities

- Collect, register and maintain all information on project activities;
- Contribute to the preparation and implementation of progress reports;
- Monitor project activities, budgets and financial expenditures;
- Advise all project counterparts on applicable administrative procedures and ensures their proper implementation;

- Maintain project correspondence and communication;
- Support the preparations of project work-plans and operational and financial planning processes;
- Assist in procurement and recruitment processes;
- Assist in the preparation of payments requests for operational expenses, salaries, insurance, etc. against project budgets and work plans;
- Follow-up on timely disbursements by UNDP CO;
- Receive, screen and distribute correspondence and attach necessary background information;
- Prepare routine correspondence and memoranda for Project Manager's signature;
- Assist in the Environmental and Social Impact monitoring, to be carried out on regular basis.
- Assist in logistical organization of meetings, training and workshops;
- Assist in the handling of any grievances received and respond accordingly as per the Stakeholder Response Mechanism of UNDP.
- Prepare agendas and arrange field visits, appointments and meetings both internal and external related to the project activities and write minutes from the meetings;
- Maintain project filing system;
- Maintain records over project equipment inventory; and
- Perform any other duty relevant to the assignment.

Competencies

Corporate Competencies:

- Demonstrates commitment to UNDP's mission, vision and values;
- Displays cultural, gender, religion, race, nationality and age sensitivity and adaptability;
- Highest standards of integrity, discretion and loyalty.

Functional Competencies:

Knowledge Management and Learning:

- Shares knowledge and experience;
- Actively works towards continuing personal learning, acts on learning plan and applies newly acquired skills;
- Excellent written and oral communication skills.

Development and Operational Effectiveness:

- Ability to perform a variety of standard tasks related to Results Management, including screening and collecting of projects documentation, projects data entering, preparation of revisions, filing, provision of information;
- Ability to provide input to business processes re-engineering, implementation of new system, including new IT based systems.

Leadership and Self-Management:

- Focuses on result for the client and responds positively to feedback;
- Consistently approaches work with energy and a positive, constructive attitude;
- Remains calm, in control and good humoured even under pressure.

Required Skills and Experience

Education:

- Minimum Bachelor Degree in; Management, Engineering, Economics, Finance, Biology and or Environmental Sciences, Public Administration.

Experience:

- At least 3 years in project management, administrative and/or financial management, environmental management experience;
- Demonstrable ability to administer project budgets, and track financial expenditure;
- Demonstrable ability to maintain effective communications with different stakeholders, and arrange stakeholder meetings and/or workshops;
- Excellent computer skills, in particular mastery of all applications of the MS Office package.
- Experience in ATLAS or other enterprise software will be an advantage.

Language:

- Fluency in English and French (written & spoken).

Nationality:

- Mauritian only

3. Chief Technical Advisor

Background

The Chief Technical Advisor (CTA) will be responsible for providing overall technical backstopping to the Project. He/She will render technical support to Project Management Team (PMT) and other government counterparts. The CTA will support the provision of the required technical inputs, reviewing and preparing Terms of References and reviewing the outputs of consultants and other sub-contractors. The CTA will also provide the principal technical input on Coral Reef Restoration. He/She will report directly to the National Project Directors of each Country and the UNDP.

Duties and Responsibilities

- Provide technical support to the PMT and other government counterparts in the areas of project management and planning, management of site activities, monitoring, and impact assessment;
- Provide the necessary technical input on Coral Reef Restoration;
- Support the PMT in preparing Terms of Reference for consultants and sub-contractors, and assist in the selection and recruitment process;
- Support the PMT in coordinating the work of all consultants and sub-contractors, ensuring the timely delivery of expected outputs, and ensuring an effective synergy among the various sub-contracted activities;
- Support the PMT in the preparation of the Annual Progress Report (APR), inception report, technical reports, quarterly financial reports for submission to UNDP, the AFB, other donors and Government Departments, as required;
- Support PMT in mobilizing staff and consultants in the conduct of a mid-term project evaluation, and in undertaking revisions in the implementation program and strategy based on evaluation results;
- Assist the PMT in liaison work with project partners, donor organizations, NGOs and other groups to ensure effective coordination of project activities;
- Oversee the handling of any complaints received.

- Oversee the Environmental and Social Impact monitoring.
- Support the PMT in documenting lessons from project implementation and make recommendations to the Project Steering Committee for more effective implementation and coordination of project activities; and
- Perform other tasks as may be requested by the PMT and UNDP.

Qualifications

- University education (MS or PhD), with specific expertise in the area of Coral Reef Restoration, with a good understanding of conservation, sustainable use and management of marine and coastal biodiversity;
- At least 15 years of professional experience in conservation, sustainable use and management of marine and coastal biodiversity;
- Demonstrable experience in implementing equivalent AFB or other multilateral donor-funded projects;
- Be an effective negotiator with excellent oral and presentation skills;
- A good working knowledge of international best practice in conservation, sustainable use and management of biodiversity is desirable;
- Excellent writing skills; and
- Fluency in English is required. A working knowledge of French is desirable.

4. Project Gender Officers

Under the overall supervision and guidance of the Regional Project Manager, the Gender Officers will have the responsibility for the implementation of the Gender Action Plan. The Gender Officers will work closely with the Responsible Parties and Project Management Team on related aspects of project implementation, reporting, monitoring, evaluation and communication. Specific responsibilities will include:

Duties and Responsibilities

- Monitor progress in implementation of the project Gender Action Plan ensuring that targets are fully met and the reporting requirements are fulfilled;
- Oversee/develop/coordinate implementation of all gender-related work;
- Review the Gender Action Plan annually, and update and revise corresponding management plans as necessary;
- Assist the PMT in the monitoring of Environmental and Social Risk and reporting.
- Work with the M&E Consultants to ensure reporting, monitoring and valuation fully address the gender issues of the project;

Qualifications

- Master's degree in gender studies, gender and development, environment, sustainable development or closely related area.
- Demonstrated understanding of issues related to gender and sustainable development; at least 5 years of practical working experience in gender mainstreaming, women's empowerment and sustainable development in relevant Country/Region/Area of Work;
- Proven experience in gender issues in Country/Region/Area of Work
- Previous experience with UN projects will be a definite asset;
- Demonstrated understanding of the links between sustainable development, social and gender issues;
- Experience in gender responsive capacity building;
- Experience with project development and results-based management methodologies is highly desired/required;

- Excellent analytical, writing, advocacy, presentation, and communications skills.
- Excellent language skills in English (writing, speaking and reading) and in local languages.

5. Project Steering Committee (PSC)

The PSC will serve to guide the overall implementation of the project. The PSC will serve as the primary decision making body to which the PMT and the Project National Coordinating Committee (PNCC) will report.

Specifically, the PSC will ensure that project goals and appropriate AF procedures for reporting are met. It will ensure complementarities across the two project countries, ensure knowledge sharing and avoid duplication of efforts that could lead to wasteful expenditures.

Membership of the Project Steering Committee:

- The members of the PSC will be composed of representatives of the Project National Coordinating Committees (at least 6 from each country including the Executing Partners and Responsible Parties), UNDP, and the PMT
- The Chair and Co-Chair of the PSC will be elected at each Committees among the senior officials of the project Countries. They should be a representative of each country.
- Representatives of the Regional Scientific Advisory Committee may be invited as observers/advisors, as necessary to any meeting of the Committee.

Secretariat

The PMT will act as Secretariat for the PSC.

Meetings of the Committee:

The PSC will physically meet at least once a year, alternating the venue between the two countries. The PSC can be called, as needs arise, using modern telecommunication means.

Role and function:

- a) Oversee and provide overall direction to the project and to give guidance to the Project Management Team and National Teams.
- b) Review, discuss and approve the annual work plan, procurement plans and budget for the project;
- c) Develop and approve terms of reference for the Project National Coordinating Committees and oversee their functioning to ensure inter-ministry involvement and the active involvement of all stakeholders;
- d) Review periodic monitoring and evaluation reports and advise the PMTs accordingly.
- e) Review Annual Progress Report.
- f) Monitor the implementation of the project, ensuring that any strategic changes are undertaken in a timely manner so that the project achieves its goals.
- g) Take note of any grievances received and provide advice on remedial actions and lessons learned.
- h) Co-ordinate with the Project Management Team to ensure the project stays on schedule and that project outputs are being completed on time and within budget;

- i) Co-ordinate the work of Regional Scientific Advisory Committee that may be established;
- j) Agree to these terms of reference in their first meeting and make any amendments as necessary.

Conduct of Committee Business

- The Project Steering Committee will aim to achieve consensus on decisions made. In the event this proves impossible, decisions may be made by simple majority vote amongst participating members. In the event of a tie, the Chairperson will have an additional casting vote.
- The PSC may from time to time review these terms of reference and its membership and make necessary adjustments and amendments

6. Project National Coordinating Committee (PNCC)

The Project National Coordinating Committee (PNCC) will be established in each country to guide the implementation of the project at National Level. The PNCC will provide recommendations and information to the PSC. Specifically the PNCC will monitor project implementation at the national level, will act as immediate grievance resolution mechanism and serve as the forum for national stakeholder participation.

Members of the Project National Coordinating Committee:

- The members of the PNCC will be the national stakeholders, including, but not limited to: Executing partner, relevant government ministries, Responsible Party the National Team, members of the Regional Scientific Advisory Committee, NGOs, Private sector, Civil Societies, academia, and other relevant stakeholders.
- The highest official of the Enforcing Entity of each country will chair the PNCC.
- The PNCC may opt to invite additional experts (observers/advisors) as necessary to any meeting of the Committee.

Secretariat:

- The Project Management Team will act as Secretariat for the PNCC

Meetings of the Committee:

- The PNCC will meet according to necessity, but not less than once in 4 months. The PNCC will otherwise maintain regular communication by e-mail and teleconference as appropriate and necessary.
- The PNCC may convene *Ad hoc* committees to advise the PNCC on specific matters.

Role and function:

The PNCC will operate by consensus to:

- a. Provide direction to the project and to give guidance to the PMT and National Team at National Level;
- b. Develop, review and approve work plans at National level for submission to the PSC;
- c. Monitor project execution at National level;
- d. Co-ordinate with the PMT to ensure the project stays on schedule and that project outputs are being completed on time and within budget;

- e. Review and approve the Environmental and Social Impact Assessment monitoring at national level.
- f. Act as immediate grievance resolution mechanism and respond accordingly.
- g. Agree to these terms of reference in their first meeting with any amendments as necessary.

Conduct of Committee Business

- The Project National Coordinating Committee will aim to achieve consensus on decisions made. In the event this proves impossible, decisions may be made by simple majority vote amongst participating members. In the event of a tie, the Chairperson will have an additional casting vote.
- The PNCC may from time to time review these terms of reference and its membership and make necessary adjustments and amendments

7. Regional Scientific Advisory Committee (RSAC)

The RSAC will be established to advise the Project Steering Committee and to ensure that the activities undertaken through the project are appropriately coordinated and communicated at the regional level. The RSAC will be a virtual committee. However, the members will meet at least twice during the course of the project, as back to back meeting to PSC meeting.

Duties

- Provide technical advice to the PMT, National team, PNCC and PSC
- Review the documents/reports, especially regarding outputs of component 3.
- Validate the process and results of the research activities
- Ensure that the best scientific knowledge and best technical standards are respected.
- Assist in identification of keynote/plenary speakers and scientists for contributions to the conference.
- Assist in establishment of review and selection process of abstracts for oral, poster presentations or workshops for the conference.
- Assist in review of documents produced for the conferences, eg. background documents, white papers programmes etc.
- Validate the quality of the reports prepared.
- Review toolkit to be produced at the end of the project.

Composition

The RSAC will be composed of:

- Relevant Scientifics from each country, including recognized international and regional coral reef restoration experts namely from, Australia, Madagascar, Maldives, South Africa, Sri Lanka and Thailand.
- CTA
- Accademia from each country
- The members of the RSAC will be approved by the PSC.

Reporting of the Adaptation Fund Core Impact Indicators

Table 1 Reporting of Number of Beneficiaries for Mauritius

Adaptation Fund Core Impact Indicator “Number of Beneficiaries”				
Date of Report	3 September 2017			
Project Title	Restoring marine ecosystem services by rehabilitating coral reefs to meet a changing climate future			
Country	Mauritius			
Implementing Agency	UNDP			
Project Duration	6 Years			
	Baseline (<i>absolute number</i>)	Target at project approval (<i>absolute number</i>)	Adjusted target first year of implementation (<i>absolute number</i>)	Actual at completion ¹ (<i>absolute number</i>)
Direct beneficiaries supported by the project	0	660 <u>Mauritius/Rodrigues:</u> <ul style="list-style-type: none"> • 20 Vulnerable groups (taking part in training and restoration work) • 40 NGO workers, researchers and conservationists • 500 Fishers • 100 Boat operators 		
<i>Female direct beneficiaries</i>	0	300		
<i>Youth direct beneficiaries</i>	0	150		
Indirect beneficiaries supported by the project	0	29,500 Mauritius: 22,491 ² Rodrigues: 7,102 ³		
<i>Female indirect beneficiaries</i>	0	14,900 Mauritius: 11,394 Rodrigues: 3,603		
<i>Youth indirect beneficiaries</i>	0	Mauritius: 3,486 Rodrigues: 1,100 ⁴		

¹ At project completion, the proponent could report on % targeted population reached or successfully supported (the absolute numbers could then be deduced from that figure)

² Populations of Mahébourg and Beau Vallon

³ Inferred from 2,029 households in SEMPA region x 3.5 average household size for Mauritius

⁴ Inferred from national percentage of youth 15-25 years old =15.5% in population census 2011

Table 2 Reporting for Number of Beneficiaries for Seychelles

Adaptation Fund Core Impact Indicator “Number of Beneficiaries”				
Date of Report	3 September 2017			
Project Title	Restoring marine ecosystem services by rehabilitating coral reefs to meet a changing climate future			
Country	Seychelles			
Implementing Agency	UNDP			
Project Duration	6 Years			
	Baseline (absolute number)	Target at project approval (absolute number)	Adjusted target first year of implementation (absolute number)	Actual at completion ⁵ (absolute number)
Direct beneficiaries supported by the project	0	223: <ul style="list-style-type: none"> • 53 vulnerable group • 45 boat operators • 85 taking part in training and restoration works • 40 NGO workers, University Students, Researchers and conservationist 		
Female direct beneficiaries	0	100		
Youth direct beneficiaries	0	70		
Indirect beneficiaries supported by the project	0	59,725 <ul style="list-style-type: none"> • 48,000 (tourists) • 2825 (population of Takamaka)⁶ • 8900 (population of Praslin) 		
Female indirect beneficiaries	0	25,000		
Youth indirect beneficiaries	0	9820 <ul style="list-style-type: none"> • 7400 tourists • 400 from Takamaka • 2020 from Praslin 		

⁵ At project completion, the proponent could report on % targeted population reached or successfully supported (the absolute numbers could then be deduced from that figure)

⁶ (2010) National Statistics Bureau, Seychelles

Table 3 Reporting of Natural Assets Protected or Rehabilitated for Mauritius

Adaptation Fund Core Impact Indicator “Natural Assets Protected or Rehabilitated”				
Date of Report	04 September 2017			
Project Title	Restoring marine ecosystem services by rehabilitating coral reefs to meet a changing climate future			
Country	Mauritius			
Implementing Agency	UNDP			
Project Duration	5 Years			
	Baseline	Target at project approval	Adjusted target first year of implementation	Actual at completion ⁷
Natural Asset or Ecosystem (type)	Restoration of coral reefs			
Change in state <i>Ha or km Protected/rehabilitated, or Effectiveness of protection/rehabilitation - Scale (1-5)</i>	0 Ha	3.2 Ha		
Total number of natural assets or ecosystems protected/rehabilitated	0	2		

Table 4 Reporting of Natural Assets Protected or Rehabilitated for Seychelles

Adaptation Fund Core Impact Indicator “Natural Assets Protected or Rehabilitated”				
Date of Report	04 September 2017			
Project Title	Restoring marine ecosystem services by rehabilitating coral reefs to meet a changing climate future			
Country	Seychelles			
Implementing Agency	UNDP			
Project Duration	5 Years			
	Baseline	Target at project approval	Adjusted target first year of implementation	Actual at completion ⁸
Natural Asset or Ecosystem (type)	Restoration of coral reefs	Restoration of coral reefs		
Change in state <i>Ha or km Protected/rehabilitated, or Effectiveness of protection/ rehabilitation - Scale (1-5)</i>	0.5 Ha	2.5 Ha		
Total number of natural assets or ecosystems protected/rehabilitated	3	4		

⁷ At project completion, the proponent could report on % targeted population reached or successfully supported (the absolute numbers could then be deduced from that figure)

⁸ At project completion, the proponent could report on % targeted population reached or successfully supported (the absolute numbers could then be deduced from that figure)

MINISTRY OF ENVIRONMENT, ENERGY & CLIMATE CHANGE



Office of the Minister

2nd Floor, Le Chantier Mall, P. O. Box 445, Victoria, Mahe, Republic of Seychelles
Tel: 4610740 Fax: 4610558 Email: s.renaud@env.gov.sc

Please address all correspondence to the Minister

9th January 2018

The Adaptation Fund Board
c/o Adaptation Fund Board Secretariat
Email: Secretariat@Adaptation-Fund.org
Fax: 202 522 3240/5

Dear Sir/Madam

**Subject: Endorsement for “Restoring marine ecosystem services by
rehabilitating coral reefs to meet a changing climate future”**

In my capacity as the designated government authority for the Adaptation Fund in Republic of Seychelles, this Ministry confirms that the above regional project proposal is in accordance with the government’s national priorities in implementing adaptation activities to reduce adverse impacts of, and risks, posed by climate change in the Republic of Seychelles.

Accordingly, we are pleased to endorse the above project proposal with full support from the Adaptation Fund. If approved, the project will be implemented by the United Nations Development Programme (UNDP) and executed in Seychelles by the Ministry of Environment, Energy and Climate Change in collaboration with the Seychelles National Parks Authority, Nature Seychelles and Marine Conservation Society Seychelles.

Yours faithfully

A handwritten signature in blue ink, appearing to be 'Didier Dogley', written over a faint blue grid.

Didier Dogley
Minister



Ministry of Finance & Economic Development
 Government Centre, Port Louis, Republic of Mauritius

In your reply, please quote:

CF/50/100/40/38

12 January 2018

Endorsement Letter

The Manager
Adaptation Fund Board
 c/o Adaptation Fund Board Secretariat
 Email: afbsec@adaptation-fund.org

Dear Madam,

**Restoring Marine Ecosystem Services by Rehabilitating Coral Reefs
 To Meet a Changing Climate Future**

As designated Government authority for endorsing projects under the Adaptation Fund in the Republic of Mauritius, this Ministry confirms that the regional project proposal for the above mentioned project is in accordance with the priorities of Government in implementing climate adaptation activities. This project will help to reduce the adverse impacts of, and the risks posed by climate change. It will also enhance collaboration and synergies not only between Mauritius and Seychelles but in the region as a whole.

2. Accordingly, we are pleased to endorse the above project proposal with full support from the Adaptation Fund. If approved, the project will be implemented by the United Nations Development Programme (UNDP) and the lead executing entity in Mauritius will be the Ministry of Ocean Economy, Marine Resources, Fisheries, Shipping and Outer Islands.



Yours Sincerely,

R. Chellapermal
 Deputy Financial Secretary
 for Designated Authority



REPUBLIC OF MAURITIUS

**MINISTRY OF OCEAN ECONOMY, MARINE RESOURCES, FISHERIES &
SHIPPING**

Albion Fisheries Research Centre, Albion, Petite Rivière

CONDITIONS FOR CORAL FARMING PROJECT

(A) Collection of Coral fragments:

The collection of a total of **X (depending on the request an area of demand)** coral fragments (only) from the selection of species: (**Targeted species to be provided by promoter/institution**) within the **X region (depending on area requested)** may be considered subject to the following conditions:

- (i) The selected mother colony for fragmentation should be of at least a diameter of 60 cm and the number of fragments collected from each mother colonies shall not exceed 10% of the total number of colonies per species.
- (ii) Live corals fragments shall be collected from colonies without adversely affecting the mother colony.
- (iii) An officer from the Albion Fisheries Research Centre shall be present on the days of the collection exercise.
- (iv) The promoter/Institution shall inform the Fisheries Protection Officers of the region before each collection coral fragments activities.
- (v) A detailed schedule of activities shall be communicated to this Ministry at least two days prior to the collection exercise.
- (vi) The collection exercise shall be carried out in such a way that no 'collateral' damage is caused to the marine environment.
- (vii) The coral fragments collected shall be used for setting up of nurseries only.
- (viii) The collection permit shall be applicable for this project only.

(B) Setting up of coral nurseries:

The setting up of coral nurseries of **(size depending on nursery required and site area)** using the rope technique may be established at GPS coordinates: **(to be determine after ecological survey carried out)** subject to:

- (i) If the coral nurseries is to be set up within a Fishing Reserves or marine park, the promoter/Institution shall apply for and pay a fee of Rs. 75 000 for an Interference Permit to this Ministry as per the Fisheries and Marine Resources (Marine Protected Areas) Regulations 2001 and amended Regulations 2007. The Interference Permit shall be renewed on yearly basis by paying a fee of Rs. 7 000.
- (ii) No dredging of the sea bed shall be carried out.
- (iii) The fishermen community of the region shall be informed of the project in view of resolving any possible conflict.
- (iv) No wastes or fall-outs shall be allowed to have access into the sea during the implementation of the nurseries.
- (v) No marine organisms shall be removed or displaced.
- (vi) All necessary precautions shall be taken to avoid any negative impact to the marine ecosystem at the sites.
- (vii) In the event that any harm has been caused to the marine environment at the site, the promoter/institution shall take all necessary steps to redress the situation at its own costs.
- (viii) This Ministry shall not be held responsible for any accidents that may occur during the process of the project.

(C) Transplantation of nurseries-reared corals:

The transplantation of the nursery-reared corals may be carried out at the GPS coordinates **(to be determine before the project is undertaken)** subject to:

- (i) A detailed schedule of activities for the transplantation shall be communicated to this Ministry at least one week prior to the transplantation exercise.

- (ii) An officer from the Albion Fisheries Research Centre shall be present during the transplantation exercises.
- (iii) The transplantation method and technique used shall not have any negative impact on the marine environment.
- (iv) A six-monthly report on the project's findings shall be submitted to this Ministry for monitoring purposes.
- (v) The Ministry of Ocean Economy, Marine Resources, Fisheries and Shipping shall be acknowledged in all publications related with this study.
- (vi) There shall be no cost involvement from this Ministry for the project.
- (vii) This Ministry reserves the right to revoke the permits, should any of the above conditions be breached.
- (viii) The promoter/Institution shall adhere strictly to the GPS locations priory approved.



REPUBLIC OF MAURITIUS

**MINISTRY OF OCEAN ECONOMY, MARINE RESOURCES, FISHERIES &
SHIPPING**

Albion Fisheries Research Centre, Albion, Petite Rivière

CONDITIONS FOR CORAL FARMING PROJECT

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- (ii) No dredging of the sea bed shall be carried out.
- (iii) The fishermen community of the region shall be informed of the project in view of resolving any possible conflict.
- (iv) No wastes or fall-outs shall be allowed to have access into the sea during the implementation of the nurseries.
- (v) No marine organisms shall be removed or displaced.
- (vi) All necessary precautions shall be taken to avoid any negative impact to the marine ecosystem at the sites.
- (vii) In the event that any harm has been caused to the marine environment at the site, the promoter/institution shall take all necessary steps to redress the situation at its own costs.
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- (iv) A six-monthly report on the project's findings shall be submitted to this Ministry for monitoring purposes.
- (v) The Ministry of Ocean Economy, Marine Resources, Fisheries and Shipping shall be acknowledged in all publications related with this study.
- (vi) There shall be no cost involvement from this Ministry for the project.
- (vii) This Ministry reserves the right to revoke the permits, should any of the above conditions be breached.
- (viii) The promoter/Institution shall adhere strictly to the GPS locations priory approved.

1. Environment and Social Risk Management Plan

A comprehensive Environmental and Social Risk Management Plan (ESMP) has been developed that includes specific measures to prevent and mitigate adverse environmental and social risks and impacts identified from all project activities.

Table 1 Detailed ESMP

Principles	Project Activities	Identified Risks	Potential E&S Impacts if risks materialize	Mitigating measures	Indicator	Responsible for Monitoring
<i>Compliance with the Law</i>	1.1.2.1 1.1.2.2 1.1.2.3 2.1.2.1	If monitoring and control not maintained, there is risk that the restoration activities using coral nurseries, might result in an illegal or uncontrolled traffic of corals	There may be cases of poaching of corals or illegal trade, leading to further degradation of corals.	<ul style="list-style-type: none"> – The relevant authorities would implement enhanced enforcement measures so as to ensure that private sector involvement in coral reef restoration follows the required standards and chain of custody for corals grown in nurseries. – Regular and enhanced monitoring at nursery grounds and restoration sites – Enhanced monitoring in ports/airport areas for illegal transport of corals 	<ul style="list-style-type: none"> – Number of monitoring patrols to enforce existing National Laws. – Number of interventions – Number of intervention of unauthorised transport/trafficking of corals at ports and airports 	National Project Team (NPT) With assistance from: <ul style="list-style-type: none"> – MOEMRFS – MEECC – SFA¹ – NCG² – Customs
<i>Access and Equity</i>	1.1.1.2 1.1.1.3 1.1.1.4 1.2.3.2 1.2.3.3 1.3.1.1 2.1.1.1	Due to the specialized nature of the skills needed, the project will not involve a large number of local community participants in on-site	Complaints may be received that some communities do not benefit from	<ul style="list-style-type: none"> – Clear and transparent criteria for eligibility of the project beneficiaries will be applied, including the selection of participants in the training sessions to be organised. 	<ul style="list-style-type: none"> – Number of complaints received – Level of application of clear and transparent criteria for eligibility of the projects beneficiaries. 	National Project Team (NPT) UNDP

¹ Seychelles Fisheries Authority

² National Coast Guard (in Mauritius and Seychelles)

Principles	Project Activities	Identified Risks	Potential E&S Impacts if risks materialize	Mitigating measures	Indicator	Responsible for Monitoring
	2.1.1.2 2.2.3.2 2.3.1.1 Component 3	restoration activities (i.e. activities requiring SCUBA diving certificates). As such, there is a risk that this limits direct participation to a larger number of community members. Fishers at Anse Forbans may temporarily have limited boat access in this pilot site. There is a slight risk that not all the communities will be aware of the works carried out and results of studies Limited access to published papers and data may impact on the regional studies	specialised training. Complaints may be received for temporary limited access to fishing ground at Anse Forbans Limited data access will hinder the work at the regional level, leading to only a limited number of people will benefit from the project work.	<ul style="list-style-type: none"> - Creation of other, not so specialised jobs associated with coral nursing and restoration efforts. - Communication on grievance mechanism. - Public communication and sensitization campaign will be developed to (i) raise public awareness and engagement; (ii) facilitate communication and collaboration among stakeholders and project partners; and (iii) enable dissemination of information and lessons through tailor-made communication products, such as: <ul style="list-style-type: none"> o Creation and maintenance of project website o Use of social media o Short clips and documentary films - Ensure access to publish papers to all project team and have agreement with Accademia to have access to published data generated with support of the project fund. 	<ul style="list-style-type: none"> - Level of application of the fair criteria for selection of participants in the training sessions organised. - Number and quality s of the project communication system. - Project website updated regularly - Communication plan approved by PSC 	MOI MOEMRFS PMT
<i>Marginalized and</i>	1.1.2.3 2.1.2.1	At some community-based coral nurseries, some of the marginalized and		Ensure the participation of women and other marginalised and vulnerable groups participate in the	<ul style="list-style-type: none"> - At least 30% of young people and women will be direct 	NPT Project Gender Officers

Principles	Project Activities	Identified Risks	Potential E&S Impacts if risks materialize	Mitigating measures	Indicator	Responsible for Monitoring
<i>Vulnerable Groups</i>		<p>vulnerable group (including fishers and women) might:</p> <p>i) Not be able to participate in the project implementation directly due to specialised nature of the skills required or not well represented in the business plan</p> <p>ii) Temporarily be unable to carry out their normal economic activities due to the coral reef restoration activities (Anse Forbans).</p>	<p>The marginalized and vulnerable may become more vulnerable, economically or otherwise, by not being able to benefit from project interventions.</p>	<p>implementation of the project and in sensitization campaign (Some indicators in the Project Results Framework are made sensitive to the marginalized and the vulnerable.)</p> <p>The project includes activities to promote alternative livelihoods to provide for alternate source of income</p> <p>Selection of the restoration sites and nurseries will occur through a participatory process where fishers can provide input on their fishing areas so that these can be avoided if possible.</p> <p>During the period that the fishing activities are curtailed, fishers will be encouraged and provided with authorization to fish in different areas.</p> <p>The project includes activities to promote alternative livelihoods to provide for alternate source of income.</p>	<p>beneficiaries of the project</p> <ul style="list-style-type: none"> – Number of alternate livelihoods (instead of fishing) undertaken by the local community (disaggregated data) – at least 30% of all trainings/workshops and learning events will be female – at least 35% of representatives in higher level authorities participating in the project will be female. – Number of marginalised/vulnerable groups benefiting from the project 	<p>With assistance from:</p> <p>MOEMRFS MEECC and Economic Development Division of UNDP</p>
<i>Core Labour Rights</i>	<p>1.2.3.1 1.2.3.2 1.2.3.3 1.3.1.1. 2.1.1.3 2.2.3.1 2.2.3.2 2.3.1.1</p>	<p>There is a risk of accidents due to mishandling of equipment or material.</p> <ul style="list-style-type: none"> – Trained SCUBA Divers may be exposed to the risk of accidents while planting corals 	<p>Occupational hazards realized to concerned workers and/or scuba divers</p>	<p>During implementation, the PMT and National Project Teams will ensure compliance with national and international labour laws and occupational and health safety laws.</p> <p>Adequate protection equipment for workers, training (advanced training</p>	<ul style="list-style-type: none"> – Proportion of workers who wear protective equipment – Level of compliance of the project with the labour laws in each country. – Number of incidence caused due to 	<p>Responsible parties.</p> <p>With the assistance from:</p> <ul style="list-style-type: none"> – MOEMRFS – MEECC

Principles	Project Activities	Identified Risks	Potential E&S Impacts if risks materialize	Mitigating measures	Indicator	Responsible for Monitoring
		<ul style="list-style-type: none"> Other risks to workers, associated with mishandling of equipment at coral nurseries or at coral restoration sites. 		for diving activities), insurance and access to medical decompression chamber will be provided.	mishandling of equipment	<ul style="list-style-type: none"> MLIRET³ MEIC⁴
<i>Involuntary Resettlement</i>	2.2.3.2 2.2.3.2 2.3.1.1	Some fishers actively fishing in Anse Forbans may feel the voluntary measures set by the Anse Forbans community to restrict fishing activities at their coral restoration site is set unfairly or set without their full consent.	This may lead to involuntary economic resettlement of unconsented fishers.	<p>There will be full community engagement in the restoration activities, with a strong sustained communication effort throughout the project implementation to ensure the buy-ins and cooperation of the fishers. Fishers will also be encouraged to use the neighbouring fishing area during the project implementation.</p> <p>In case the project activity at Anse Forbans cause an economic issue to the local community, another restoration site (with legal protection) will be sought, since Anse Forbans is a pilot restoration site outside MPA or Reserve</p>	<ul style="list-style-type: none"> Level of satisfaction of the community with the coral restoration works No of persons redirected to neighbouring fishing ground No. of complaints received for restriction of boat access. 	Responsible Parties
<i>Protection of Natural Habitats</i>	1.2.1.2 1.2.1.3 1.2.3.2 1.2.3.3 2.2.1.2 2.2.1.3 2.2.3.2	There is a low risk that some small areas of natural habitat in the project sites may be disturbed in the collection of the donor corals and	<p>Donor colony may be affected due mishandling during collection</p> <p>There is a low risk that some small</p>	Since the restoration works will be carried in MPAs and Fishing Reserves, all access and activities are regulated and controlled. In the long term, the project activity will restore the Natural Habitats.	<ul style="list-style-type: none"> Area of coral reef restored increased Report on condition of the coral reef ecosystem 	NPT MOEMRFS (AFRC and MOI) MEECC With the assistance of SFA

³ Ministry of Labour, Industrial Relations, Employment and Training

⁴ Ministry of Employment, Immigration and Civil Status

Principles	Project Activities	Identified Risks	Potential E&S Impacts if risks materialize	Mitigating measures	Indicator	Responsible for Monitoring
		construction of ocean-based nursery sites.	areas of natural habitat may be disturbed in the construction of nursery sites.	<p>Science-based coral reef restoration work, proposed by this project, will avoid the risk of impacting natural habitats when installing ocean nurseries and intervention in restoration sites as much as possible.</p> <p>All precautions will be taken to ensure that the natural habitat remains undisturbed, as far as possible. Training will be provided to Responsible parties, workers and community members that will be directly involved in the project to ensure the protection of natural habitat. Moreover, in the event that there is need to displace some living species, same will be done in the presence of the authority (e.g. Fisheries officers of the MOEMRFS in Mauritius)</p> <p>Continuous monitoring of the water quality, biodiversity and other key environmental parameters of the donor and nursery sites.</p>	<ul style="list-style-type: none"> – Coastal seawater quality, meeting the standards – Improved level of biodiversity of the restored coral reef compared to natural sites – Number of community members trained in handling living organisms – Number of translocated living organism 	
<i>Conservation of Biological Diversity</i>	1.3.1.1 2.3.1.1	Coral reef restoration work will be carried out mainly with identified climate resilient species. It is possible that the focus on climate-resilient species will lead to a reduction of genetic diversity in the restored sites	In the short term there will be a decrease in genetic diversity at the restored sites	In the short term, asexual reproduction (fragmenting) of climate resilient species will be implemented to stabilize and stop the degradation of the restoration sites. Thereafter, the genetic diversity would be increased through sexual reproduction of the transplanted corals.	<ul style="list-style-type: none"> – Number of asexually farmed corals successfully transplanted. – Number of sexually farmed corals successfully transplanted 	MOEMRFS MEECC NPT

Principles	Project Activities	Identified Risks	Potential E&S Impacts if risks materialize	Mitigating measures	Indicator	Responsible for Monitoring
					– Fish diversity (abundance and number of species)	

1.1 Institutional arrangements

Project Management Team (PMT)

PMT will have oversight/final compliance responsibility of the ESMP. The PMT will monitor the reports from the National Project Teams. They will rely on a bottom up feedback system; from the ground by going through the monitoring reports and making regular site visits to inspect and verify for themselves the nature and extent of the impacts and the success or lack thereof, of the mitigation measures.

The PMT will prepare brief consolidated periodic monitoring reports for submission to the Project Steering Committee, the UNDP and the Fund on an annual basis, at mid-term and termination of the project. The Regional Project Manager will be responsible for reporting the Project Steering Committee every year, the progress made on implementing these measures.

National Project Team (NPT)

The National Project Team consist of the Responsible Parties and will be headed by the Project Site Coordinators (2 in Mauritius and 3 in Seychelles). Direct monitoring responsibilities will be under the Project Site Coordinators.

The NPT will collect and analyse of monitoring data and also be responsible for the maintenance of management information systems and all baseline data. Monitoring will be done to ensure that actions are taken in a timely manner and to determine if actions are appropriately mitigating the risk/impact or if they need to be modified in order to achieve the intended outcome. Annual reporting will include information about the status of implementation of this ESMP, including those measures required to avoid, minimize or mitigate environmental and social risks. The reports shall also include, if necessary, a description of any corrective actions that are deemed necessary.

At inception phase of the project, an agreement will be secured with the responsible governmental institutions to provide relevant information, as per ESMP

1.2 Frequency of ESMP reporting

At the beginning of the project, stakeholders will be informed about the risks and impacts incurred and defined mitigating measures. They will review and verify the risks and the corresponding mitigation measures identified in the ESMP, and update the ESMP, as necessary, before all the stakeholders identified with some monitoring responsibilities sign an ESMP implementation agreement with UNDP. This process should be concluded during the project inception period.

The NPT under the supervision of the PMT will carry out regular monitoring of the risks identified in the ESPM in all project sites. The monitoring of the ESMP implementation will be carried out by the NPT with support from PMT, and reported to PSC, with any necessary updates on emerging risks and mitigation measures, as necessary. The monitoring of the ESMP implementation will be a standing agenda item for the National Project Coordination Committee meeting and for the Regional PSC meeting so that these steering bodies will monitor the status of ESMP implementation closely, ensure that any necessary actions are taken in a timely manner, update risks and appropriate mitigating measures as necessary, and ensure all relevant national policies and standards are applied and triggered in managing environmental and social risks caused by the project interventions.

The ESMP implementation status will be reported to the Adaptation Fund on an annual basis through the annual Project Progress Reports.

1.3 Role of Stakeholders in the implementation of the ESMP⁵

Stakeholders	Role in Project Implementation	Function
Ministry of Ocean Economy, Marine Resources, Fisheries and Shipping (MOEMRFS)	Project Execution Agency in Mauritius. Co-chair of Project Steering Committee (PSC) Chair of Project Coordination Committee (PCC) in Mauritius	<ul style="list-style-type: none"> Will lead project activities in relation to the formulation of norms and strategies, the clarification of institutional roles for Marine Parks management and conservations. Local Staff of the Ministry are responsible for planning, management, vigilance and control within the MPAs and Reserves, and also the quality of coastal water quality. Provision of training, technical assistance and control compliance with coastal water quality and monitoring of marine biodiversity. Ensure that there is no import/export of corals and other controlled marine organism
Ministry of Environment, Energy and Climate Change (MEECC)	Project Execution Agency in Seychelles. Co-chair of PSC Chair of PCC in Seychelles	<ul style="list-style-type: none"> Will lead project activities in relation to the formulation of norms and strategies, the clarification of institutional roles for Marine Parks management and conservations. Local Staff of the Ministry are responsible for planning, management, vigilance and control within the MPAs and Reserves.
Mauritius Oceanography Institute (MOI)	Institution under the MOEMRFS. Member of the PSC and PCC (Mauritius)	<ul style="list-style-type: none"> Provision of training and technical assistance Responsible for the implementation of the genetic study
Rodrigues Regional Assembly (Commission for Environment, Forestry, Tourism, Marine parks and Fisheries)	Institution responsible for Marine Parks and fisheries Member of the PCC (Mauritius)	<ul style="list-style-type: none"> Local Staff of the Ministry are responsible for planning, management, vigilance and control within the MPAs and Reserves in Rodrigues

⁵ To be verified with the stakeholders during the inception phase, before they sign an ESMP Implementation Agreement with UNDP.

Stakeholders	Role in Project Implementation	Function
Seychelles Fisheries Authority (SFA)	Member of the PCC (Seychelles)	<ul style="list-style-type: none"> Ensure compliance to Fisheries Act
National Coast Guard Mauritius	Member of the PCC (Mauritius)	<ul style="list-style-type: none"> Patrol at the sea to ensure compliance to Laws of the sea
National Coast Guard Seychelles	Member of the PCC (Seychelles)	<ul style="list-style-type: none"> Patrol at the sea to ensure compliance to Laws of the sea
Customs Mauritius	Member of the PCC (Mauritius)	<ul style="list-style-type: none"> Ensure that there is no import/export of corals and other controlled marine organism
Customs Seychelles	Member of the PCC (Seychelles)	<ul style="list-style-type: none"> Ensure that there is no import/export of corals and other controlled marine organism
Ministry of Labour, Industrial Relations, Employment and Training (MLIRET)	Ministry Responsible for Labour issues Member of the PCC (Mauritius)	<ul style="list-style-type: none"> Ensure compliance to Labour Act
Ministry of Employment, Immigration and Civil Status (MEIC)	Ministry Responsible for Labour issues Member of the PCC (Seychelles)	<ul style="list-style-type: none"> Ensure compliance to Labour Act
NGOs	Responsible Party, forming part of the National Team (Mauritius)	<ul style="list-style-type: none"> Responsible for the implementation of the project in Mauritius and Rodrigues and its monitoring and management
Seychelles National Parks Authority (SNPA)	Responsible Party (forming part of the National Team (Seychelles) and member of the PSC, and PCC (Seychelles)	<ul style="list-style-type: none"> Responsible for the implementation of the project in Cousin Island, Seychelles and its monitoring and management
Marine Conservation Society Seychelles (MCSS)	Responsible Party (forming part of the National Team (Seychelles) and member of the PSC, and PCC (Seychelles)	<ul style="list-style-type: none"> Responsible for the implementation of the project in Ste Anne Island and Anse Forbans, Seychelles and its monitoring and management
Nature Seychelles (NSey)	Responsible Party (forming part of the National Team (Seychelles) and member of the PSC, and PCC (Seychelles)	<ul style="list-style-type: none"> Responsible for the implementation of the project in Curieuse Island and Ste Anne Island, Seychelles and its monitoring and management